

FINDING OF NO SIGNICANT IMPACT

CORNERSTONE INDUSTRIAL MINERALS, INC. TUCKER HILL QUARRY PLAN AMENDMENT DOI-BLM-OR-L050-2012-0009-EA

Background

The Bureau of Land Management, Lakeview Resource Area, has analyzed a proposal and one alternative to authorize the expansion of the existing perlite quarry at Tucker Hill. The BLM initially approved a mining Plan of Operations (PoO) for the quarry, based upon an analysis of about 23 acres of surface disturbance described within an Environmental Impact Statement (EIS) that was completed in April of 1996.

The attached EA contains an analysis the effects of approving an amendment to the PoO which would authorize expanding the existing perlite quarry to include an additional estimated 47 acres of surface disturbance over a 15-year period of time. The quarry is located approximately 39 miles northwest of Lakeview in central Lake County, Oregon (Figure 1.1.1 of the attached EA).

Cornerstone Industrial Minerals, Inc. currently operates the perlite quarry. The current operation consists of mining perlite from the quarry, crushing the ore on-site, and then transporting the ore to a plant in Lakeview for further processing and shipping. Over the years of operation, waste rock has been placed in three separate disposal sites including: an old county gravel pit at the base of Tucker Hill, a second abandoned borrow pit located in Sections 23-26, 34, and 35 of Township 34 South, Range 19 East, and a third borrow site located on private land at Fisk Hill.

Context and Intensity of Impacts

The Council on Environmental Quality (CEQ) regulations state that the significance of impacts must be determined in terms of both context and intensity (40 CFR 1508.27). The proposed project is located within the Chewacan Basin. For this reason, the analysis of most impacts in the attached Environmental Assessment (EA) is described within the context of the Project area and the surrounding Chewacan Basin. However, the cumulative effects analysis also considers the impacts of the minerals program at the resource area scale.

The CEQ regulations also include the following ten considerations for evaluating the intensity of impacts:

- 1) Would any of the alternatives have significant beneficial or adverse impacts (40 CFR 1508.27(b)(1)? Yes No

Rationale: Based on the analysis contained in the attached EA, none of the alternatives would have either significant beneficial or adverse impacts on the human environment. There are no areas of critical environmental concern, research natural areas, wilderness study areas, designated wilderness areas, areas with wilderness characteristics, wild and scenic rivers, prime and unique farmlands, floodplains, special status plants, forest or woodlands, wetlands or riparian areas, fisheries or aquatic habitats, wild horses, or paleontological resources, or livestock grazing use in the project area (Tables 3.1-1 and 3.1-2 in the attached EA).

Impacts to other resource values or issues, including air quality, climate, soils, water quality, vegetation, noxious weeds, wildlife (including migratory birds and special status species), cultural resources and native American traditional values, geology and minerals, socio-economic conditions, recreation, and visual quality, anticipated by the alternatives have been analyzed within the attached EA, have been found not to be significant, and have been mitigated to extent practical (Tables 3.1-1 and 3.1-2 and pages 4-1 to 4-32 of the attached EA).

- 2) Would any of the alternatives have significant adverse impacts on public health and safety (40 CFR 1508.27(b)(2)? Yes No
-

Rationale: None of the alternatives analyzed in detail would have significant impacts on public health or safety. The proposed mine expansion area is not located near any populated urban area. Further, there are no known hazardous waste sites in the Project area. Wastes would be managed through the development and implementation of the Spill Contingency Plan located in the Plan of Operations (Appendix C). Air quality impacts would be minimal (pages 4-1 to 4-3 of the attached EA). There are no perennial streams or surface drinking water sources located in the immediate Project area (Table 3.1-1, and pages 3-12 of attached EA) and little or no impacts expected to water resources (pages 4-9 to 4-10 of the attached EA). Further, none of the alternatives would have disproportionate impacts to low income or minority populations (Table 3.1-1 of the attached EA).

- 3) Would any of the alternatives have significant adverse impacts on unique geographic characteristics (cultural or historic resources, park lands, prime and unique farmlands, wetlands, wild and scenic rivers, designated wilderness or wilderness study areas, or ecologically critical areas (*ACECs, RNAs, significant caves*)) (40 CFR 1508.27(b)(3)? Yes No

Rationale: There are no park lands, prime or unique farmlands, wetlands or riparian areas, wild and scenic rivers, significant caves, designated wilderness areas, WSAs, or ACEC/RNAs located in the project area (area (Tables 3.1-1 and 3.1-2 in the attached EA). Impacts on cultural resources have been analyzed, mitigated to the extent practical, and were not found to be significant (pages 2-2 to 2-3, 2-19 to 2-20, 3-3 to 3-6, 4-3 to 4-4, and 4-31).

- 4) Would any of the alternatives have highly controversial effects (40 CFR 1508.27(b)(4)? Yes No

Rationale: The BLM has extensive expertise reviewing and analyzing impacts of proposed mineral development actions such as those proposed by the alternatives addressed in the attached EA. The potential impacts of these actions on air quality, climate, soils, water quality, vegetation, noxious weeds, wildlife (including migratory birds and special status species), cultural resources and native American traditional values, geology and minerals, socio-economic conditions, recreation, and visual quality can be reasonably predicted based on existing science and professional expertise. Further, the attached EA analyzed these impacts (pages 4-1 to 4-32 of the attached EA).

While BLM acknowledges there is controversy related to the nature of the cultural and native American traditional value impacts from the perspective of some native American interests, they do not rise to the level of being “highly controversial”, as there is no substantial dispute within the scientific community regarding the nature of these effects (pages 3-3 to 3-6, 4-3 to 4-4, and 4-31 of attached EA).

The public and interested tribes have been given an opportunity to review and comment on the analysis of effects contained in the attached EA. The BLM is not currently aware of any other potential highly controversial effects, as defined under 40 CFR 1508.27(b)(4), but will review any comments received and address any substantive comments prior to signing this FONSI.

- 5) Would any of the alternatives have highly uncertain effects or involve unique or unknown risks (40 CFR 1508.27(b)(5)? Yes No

Rationale: The BLM has extensive expertise reviewing and analyzing impacts of proposed mineral development actions such as those proposed by the alternatives addressed in the attached EA. The potential impacts of these actions on air quality, climate, soils, water quality, vegetation, noxious weeds, wildlife (including migratory birds and special status species), cultural resources and native American traditional values, geology and minerals, socio-economic conditions, recreation, and visual quality can be reasonably predicted based on existing science and professional expertise. Further, the attached EA analyzed these impacts (pages 4-1 to 4-32 of the attached EA). The nature of these impacts is not highly uncertain, nor does it involve unique or unknown risks.

- 6) Would any of the alternatives establish a precedent for future actions with significant impacts (40

CFR 1508.27(b)(6)? Yes No

Rationale: The BLM has extensive expertise reviewing and analyzing impacts of proposed mineral development actions such as those proposed by the alternatives addressed in the attached EA. None of the alternative actions represents a new, precedent-setting mineral development technique or would establish a precedent for future similar actions with potentially significant effects.

- 7) Are any of the alternatives related to other actions with potentially significant cumulative impacts (40 CFR 1508.27(b)(7)? Yes No

Rationale: Based on the analysis contained within the Cumulative Effects section of the attached EA, none of the alternatives would have significant cumulative effects within the project area, even when added to the effects of other past, present, and reasonably foreseeable future actions (pages 4-28 to 4-31).

- 8) Would any of the alternatives have significant adverse impacts on scientific, cultural, or historic resources, including those listed or eligible for listing on the National Register of Historic Places (40 CFR 1508.27(b)(8)? Yes No

Rationale: Potential impacts to cultural resources and native American traditional values have been analyzed in the attached EA and found not to be significant. The three sites in the area would be either avoided or mitigated in accordance with an approved Historic Properties Treatment Plan (pages 2-2, 2-19 to 2-20, 3-4 to 3-6, 4-3 to 4-4, and Appendix B). Only one site would be directly impacted and it is not eligible for listing on the NRHP (pages 3-3 to 3-6, 4-3 to 4-4, and 4-31 of attached EA). The Oregon SHPO has been consulted and concurs with this finding (page 3-4). No other resources of scientific interest exist in the Project area.

- 9) Would any of the alternatives have significant adverse impacts on threatened or endangered species or their critical habitat (40 CFR 1508.27(b)(9)? Yes No

Rationale: There are no threatened or endangered plant or animal species or designated critical habitat within the project area (Table 3.1-1, and page 3-7 of the attached EA).

- 10) Would any of the alternatives have effects that threaten to violate Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)? Yes No

Rationale: The alternatives analyzed in the attached EA comply with all Federal, State, and local environmental laws or other environmental requirements, including the requirements of the National Environmental Policy Act. Compliance with cultural resource protection laws is addressed under item number 8 above.

The Federal Land Policy and Management Act requires that any action that BLM approves must conform with the current land use plan and other applicable plans and policies. Conformance with Existing Plans The proposed project is consistent with the mineral and other resource management goals in the BLM's Lakeview Resource Management Plan and Record of Decision (RMP/ROD; BLM 2003a). Conformance with this plan is detailed further in Section 1.3 of the attached EA.

The proposed project is not consistent with the approved PoO (as currently amended) for the Tucker Hill Quarry. Approval of the proposed expansion would amend the PoO to allow the mining of additional perlite material.

Finding

On the basis of the analysis contained in the attached EA, the consideration of intensity factors described above, and all other available information, my determination is that none of the alternatives analyzed would constitute a major federal action which would have significant adverse or beneficial impacts on the

quality of the human environment. Therefore, an Environmental Impact Statement (EIS) is unnecessary and will not be prepared.

Thomas E. Rasmussen, Field Manager
Lakeview Resource Area

Date

**CORNERSTONE INDUSTRIAL MINERALS, INC.
TUCKER HILL QUARRY PLAN AMENDMENT**

**Environmental Assessment
DOI-BLM-OR-LO50-2012-0009-EA**

December 2012

**U.S. Department of the Interior
Bureau of Land Management
Lakeview District Office**

**CORNERSTONE INDUSTRIAL MINERALS, INC.
TUCKER HILL QUARRY PLAN AMENDMENT
ENVIRONMENTAL ASSESSMENT**

TABLE OF CONTENTS

	Page
ACRONYMS.....	iii
1 INTRODUCTION / PURPOSE OF AND NEED FOR ACTION.....	1-1
1.1 Introduction	1-1
1.2 Purpose and Need for Action	1-1
1.3 Conformance with Existing Laws, Land Use Plans, and Policy	1-2
2 ALTERNATIVES INCLUDING THE PROPOSED ACTION	2-1
2.1 Introduction	2-1
2.2 No Action Alternative	2-1
2.3 Proposed Action.....	2-3
2.3.1 Quarry Development	2-4
2.3.2 Waste Rock Disposal.....	2-4
2.3.3 Mining Scenario and Cross Sections	2-5
2.3.4 Equipment	2-5
2.3.5 Work Force.....	2-12
2.3.6 Growth Media Management	2-12
2.3.7 Haul Road Access.....	2-12
2.3.8 Access Control.....	2-12
2.3.9 General Schedule of Operations	2-13
2.3.10 Surface Occupancy	2-13
2.3.11 Water Management Plan	2-13
2.3.12 Rock Characterization and Handling Plan	2-13
2.3.13 Quality Assurance Plan	2-13
2.3.14 Spill Contingency Plan	2-14
2.4 Reclamation Plan.....	2-14
2.4.1 Prevention of Unnecessary or Undue Degradation.....	2-14
2.4.2 Project Schedule.....	2-14
2.4.3 Post Operational Land Uses.....	2-15
Reclamation of Waste Rock Site (County Gravel Pit).....	2-15
2.4.4 2-15	
2.4.5 Haul Road Reclamation	2-15
2.4.6 Two-track Material Storage Access Road Reclamation.....	2-15
2.4.7 Drainage and Sediment Control Plan	2-16
2.4.8 Revegetation	2-16
2.4.9 Reclamation of Quarry	2-17
2.4.10 Monitoring and Maintenance of Reclaimed Areas	2-17
2.4.11 Isolation, Removal, and/or Control of Acid-Forming, Toxic or Deleterious Materials	2-18
2.4.12 Removal or Stabilization of Building, Structures, and Support Facilities	2-18
2.4.13 Drill Hole Plugging	2-18
2.4.14 Processing Site.....	2-18
2.5 Environmental Protection Measures based on 43 CFR 3809 Regulations and Mitigation Measures Established in the 1996 EIS	2-19
2.6 Alternatives Considered but Eliminated from Detailed Study	2-20

2.6.1	Larger Quarry Expansion.....	2-20
2.6.2	Second Pit Area	2-20
3	AFFECTED ENVIRONMENT	3-1
3.1	Introduction	3-1
3.2	Critical Elements of the Human Environment.....	3-1
3.3	Air Quality	3-3
3.4	Cultural Resources.....	3-4
3.5	Native American Traditional Values.....	3-5
3.6	Recreation	3-7
3.7	Wildlife	3-7
3.8	Special Status Wildlife Species.....	3-7
3.9	Vegetation	3-9
3.10	Noxious Weeds, Invasive and Nonnative Species	3-11
3.11	Water Quality – Surface and Ground.....	3-12
3.12	Geology and Minerals	3-12
3.13	Land Use/Access	3-12
3.14	Socioeconomics	3-12
3.15	Soils.....	3-13
3.16	Visual Resources.....	3-15
4	ENVIRONMENTAL CONSEQUENCES.....	4-1
4.1	Introduction	4-1
4.2	Air Quality	4-1
4.2.1	No Action Alternative	4-1
4.2.2	Proposed Action	4-1
4.3	Cultural Resources.....	4-3
4.3.1	No Action Alternative	4-3
4.3.2	Proposed Action	4-3
4.4	Native American Traditional Values.....	4-4
4.4.1	No Action Alternative	4-4
4.4.2	Proposed Action	4-4
4.5	Recreation	4-4
4.5.1	No Action Alternative	4-4
4.5.2	Proposed Action	4-4
4.6	Wildlife.....	4-5
4.6.1	No Action Alternative	4-5
4.6.2	Proposed Action	4-5
4.7	Special Status Wildlife Species.....	4-5
4.7.1	No Action Alternative	4-5
4.7.2	Proposed Action	4-6
4.8	Vegetation	4-7
4.8.1	No Action Alternative	4-7
4.8.2	Proposed Action	4-7
4.9	Noxious Weeds, Invasive Nonnative Species.....	4-9
4.9.1	No Action Alternative	4-9
4.9.2	Proposed Action	4-9
4.10	Water Quality – Surface and Ground.....	4-9
4.10.1	No Action Alternative	4-9
4.10.2	Proposed Action	4-10

4.11	Geology and Mineral Resources	4-10
4.11.1	No Action Alternative	4-10
4.11.2	Proposed Action	4-10
4.12	Land Use/Access	4-10
4.12.1	No Action Alternative	4-10
4.12.2	Proposed Action	4-10
4.13	Socioeconomics	4-11
4.13.1	No Action Alternative	4-11
4.13.2	Proposed Action	4-11
4.14	Soils.....	4-11
4.14.1	No Action Alternative	4-11
4.14.2	Proposed Action	4-11
4.15	Visual Resources.....	4-12
4.15.1	No Action Alternative	4-12
4.15.2	Proposed Action	4-12
4.16	Cumulative Impacts	4-28
4.17	Irreversible/Irretrievable Impacts.....	4-31
5	CONSULTATION AND PUBLIC INPUT	5-1
5.1	List of Preparers.....	5-1
5.2	Persons, Groups and Agencies Contacted.....	5-1
6	LITERATURE CITED	6-1

LIST OF FIGURES

Figure 1.1.1:	Project Area, Access, and Location	1-3
Figure 1.1.2:	Existing and Proposed Mine Activities.....	1-4
Figure 1.1.3:	Subsurface Ownership within the Project Area.....	1-5
Figure 2.1.1:	Fisk Hill Disposal Site	2-6
Figure 2.1.2:	Quarry Expansion Cross Section Locations.....	2-7
Figure 2.1.3:	Quarry Expansion Cross Section A-A'	2-8
Figure 2.1.4:	Quarry Expansion Cross Section B-B'	2-9
Figure 2.1.5:	Estimated Limits Subsurface Potential Thickness of Commercial Grade Perlite Ores	2-10
Figure 2.1.6:	Mining Phases.....	2-11
Figure 3.9.1:	Fire Disturbed Vegetation within the Project Area.....	3-10
Figure 3.15.1:	Soil Associations within Project Area	3-14
Figure 3.16.1:	Visual Resource Management Classes and Oregon Outback National Scenic Byway, Highway 31	3-16
Figure 3.16.2:	Visual Resources Key Observation Points	3-17
Figure 4.7.1:	Proposed Greater Sage-grouse Mitigation Area	4-8
Figure 4.15.2a:	KOP # 2 Existing Condition Northwest of Project Area	4-15
Figure 4.15.2b:	KOP # 2 No Action Alternative at Full Build Out	4-16
Figure 4.15.2c:	KOP # 2 No Action Alternative at Full Reclamation	4-17
Figure 4.15.3a:	KOP # 3 Existing Condition West of Project Area.....	4-19
Figure 4.15.3b:	KOP # 3 No Action Alternative at Full Reclamation	4-20
Figure 4.15.3c:	KOP # 3 No Action Alternative at Full Reclamation	4-21
Figure 4.15.4a:	KOP # 4 Existing Condition Northwest of Project Area	4-22
Figure 4.15.4b:	KOP # 4 No Action Alternative at Full Built Out	4-23

Figure 4.15.4c: KOP # 4 No Action Alternative at Full Reclamation 4-24
Figure 4.15.5a: KOP # 5 Existing Condition East of Project Area..... 4-25
Figure 4.15.5b: KOP # 5 No Action Alternative at Full Build Out 4-26
Figure 4.15.5c: KOP # 5 No Action Alternative at Full Reclamation 4-27

LIST OF TABLES

Table 2.1-1: Existing and Proposed Disturbance..... 2-1
Table 2.2-1: Plan Amendment History for the Tucker Hill Project 2-1
Table 2.3-1: Estimate of Net Recoverable Commercial Grade Perlite 2-5
Table 2.4-1: Monitoring Program and Schedule 2-18
Table 3.1-1: Critical Elements of the Human Environment..... 3-2
Table 3.1-2: Other Resource Values or Uses..... 3-3
Table 3.4-1: Cultural Sites within or near the Expansion Area 3-5
Table 3.9-1: Plant Species in Project Area 3-11
Table 3.15-1: Soil Series in Project Area 3-13
Table 4.2-1: Project Carbon Dioxide Emissions and the U.S. 4-2
Table 4.2-2: Carbon Dioxide Emissions from Proposed Mining Equipments 4-2
Table 4.2-3: Carbon Dioxide Emissions from On-Site Vehicles..... 4-3
**Table 4.16-1: Total Acres of Mining Related Disturbance in the Lakeview Resource Area.
..... 4-30**

APPENDIX

Appendix A: Visual Resources Contrast Rating Sheets

Appendix B: Memorandum of Agreement among Advisory Council on Historical Preservation and USDI, Bureau of Land Management, Lakeview District and Oregon State Historic Preservation Office regarding Tucker Hill Mining Project

ACRONYMS

ACEC	area of critical environmental concern
ANFO	ammonium nitrate and fuel oil
BLM	Bureau of Land Management
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOGAMI	Oregon Department of Geology and Mineral Industries
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FEIS	Final Environmental Impact Statement
GHG	greenhouse gases
HPTP	Historic Properties Treatment Plan
IM	Instruction Memorandum
KOP	Key Observation Point
MOA	Memorandum of Agreement
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NRCS	Natural Resources Conservation Service
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OWRD	Oregon Water Resources Department
PGH	Preliminary General Habitat
PPH	Preliminary Priority Habitat
RMP	Resource Management Plan
ROD	Record of Decision
SHPO	State Historic Preservation Office
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
VRM	Visual Resource Management
WB&M	Willamette Baseline and Meridian

**CORNERSTONE INDUSTRIAL MINERALS, INC.
TUCKER HILL QUARRY PLAN AMENDMENT
ENVIRONMENTAL ASSESSMENT**

1 INTRODUCTION / PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

Cornerstone Industrial Minerals, Inc. (Cornerstone) currently operates a perlite quarry on top of Tucker Hill. The BLM originally approved a mining Plan of Operations (Plan) for the quarry in April of 1996 (BLM 1996a), based upon analysis contained in an Environmental Impact Statement (EIS) (BLM 1995; 1996b). Since that time, the Plan has been amended four times. Previous amendments dealt with the use of a portable, on-site crusher in 1999, minor changes to pit development design, including a blasting schedule revision in 2001, haul road maintenance and modification in 2005, and the use of a new waste rock disposal site in 2008 located approximately 39 miles northwest of Lakeview. At this time, Cornerstone has proposed an amendment to the Plan to expand the existing quarry. Cornerstone's proposed disturbance would increase from approximately 23 acres to 70 acres over an approximately 15-year period (Project). This Environmental Assessment (EA) will incorporate information and analysis contained in the Draft Environmental Impact Statement (DEIS) (BLM 1995) and the Final Environmental Impact Statement (FEIS) approved for Atlas Perlite, Inc.'s Tucker Hill Quarry (BLM 1996b), where appropriate. Atlas Perlite, Inc. was the former operator of the Tucker Hill Quarry and Cornerstone is the current operator.

The proposed quarry expansion is located in Lake County, Oregon, approximately 35 miles northwest of Lakeview, Oregon (Figure 1.1.1). Project-related activities would consist of quarry expansion; drilling and bulk sampling (including drill roads and pad); and removal and stockpiling of growth media (Proposed Action) (Figure 1.1.2) The Project is located entirely on public land administered by the Bureau of Land Management Lakeview District Office (BLM) in Sections 26 and 35 Township 34 South, Range 19 East (T34S, R19E), Willamette Baseline and Meridian (WB&M), in Lake County, Oregon (Project Area). Subsurface ownership within the Project Area is shown on Figure 1.3.1

1.2 Purpose and Need for Action

Existing operations at Tucker Hill are being conducted under a Plan finalized in June 1996 and approved on November 1, 1996. A Plan amendment was submitted to the BLM by Cornerstone on January 31, 2012, which proposed an expansion of the existing mining operation. The existing operation consists of mining perlite from a 30-acre quarry and transporting the material to a plant in Lakeview for processing and shipping. Waste rock has been deposited at the base of Tucker Hill in an old gravel pit site near State Highway 31 and formerly operated by Lake County (see Figure 1.1.1; BLM 1996b), as part of the current reclamation plan for the gravel pit.

Perlite is utilized for the manufacture of ceiling tiles for building construction (improving insulation), as a filter aid, and for a variety of agricultural purposes, including potting soil. The existing Tucker Hill Quarry provides a close and relatively inexpensive source of perlite for west coast markets, but is nearing the end of its productive life. Cornerstone has submitted the Plan amendment to expand the existing quarry to meet on-going and future demand for products made from perlite in the western United States and Canada.

The requirements of 43 Code of Federal Regulations (C.F.R.) 3809, Surface Management Regulations, the Mining Law of 1872 (30 United States Code (U.S.C.) § 22-24, 26-28, 29-30, 33-35, 37, 39-42 and 47, May 10, 1872, as amended 1875, 1880, 1921, 1925, 1958, 1960, and 1993.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Mining and Minerals Policy Act of 1970 mandate that BLM review and respond to a Plan or Plan amendment within 30 days of receipt (43 CFR 3809.411). As per §3809.411, BLM must review the Plan amendment, determine if it is complete, respond to the proponent, and complete the environmental review required under National Environmental Policy Act (NEPA). The Secretary of the Interior is responsible for carrying out this policy in administering programs under the Secretary's authority (30 U.S.C. § 21a). As per § 3809.1, the primary purpose of the subpart is to prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws. Anyone intending to develop mineral resources on the public lands must prevent unnecessary or undue degradation of the land and reclaim disturbed areas. This subpart establishes procedures and standards to ensure that operators and mining claimants meet this responsibility.

Following completion of BLM's review of the plan, including the analysis under the NEPA and public comment, the BLM may:

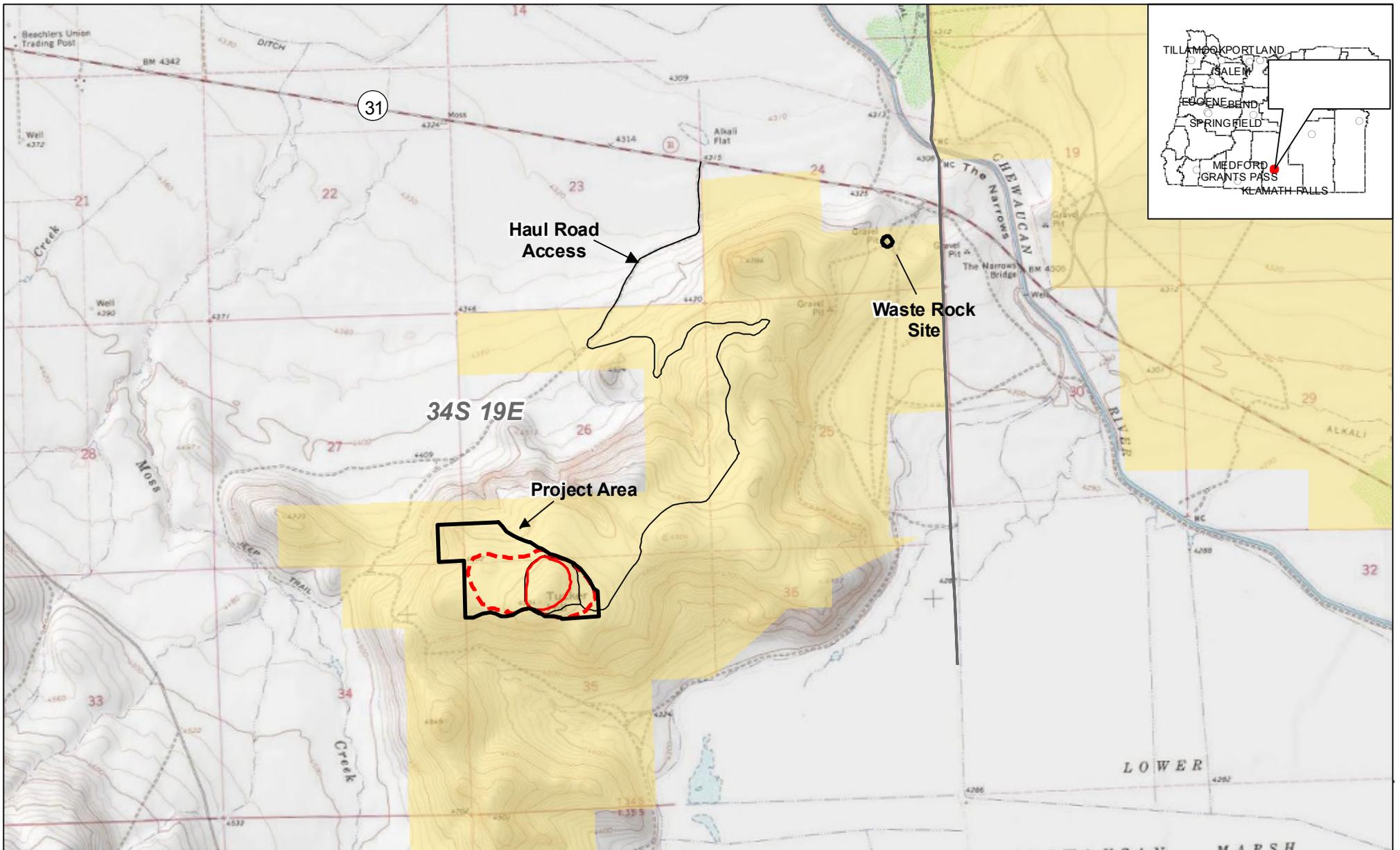
- 1) Approve the Plan as submitted (43 CFR 3809.411(d)(1));
- 2) Approve the Plan subject to changes or conditions necessary to meet the performance standards at 43 CFR 3809.420 and to prevent unnecessary or undue degradation (43 CFR 3809.411 (d)(2)); or
- 3) Disapprove or withhold approval of the Plan because the Plan:
 - (a) does not meet the applicable content requirements of 43 CFR 3809.401;
 - (b) proposes operations that are in an area segregated or withdrawn from the operation of mining laws, unless the requirements of 43 CFR 3809.1000 are met; or
 - (c) proposes operations that would result in unnecessary or undue degradation of public lands.

Approval of a mine Plan does not authorize the start of operations. The operator must also obtain all necessary state and federal permits before beginning mine plan activities. They must also obtain a reclamation bond sufficient to pay a third party contractor for reclamation of the proposed disturbances (43 CFR 3809.412).

1.3 Conformance with Existing Laws, Land Use Plans, and Policy

This EA was prepared in conformance with the policy guidance provided in the BLM NEPA Handbook (BLM Handbook H-1790-1). The BLM Handbook provides instructions for compliance with the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA and the Department of the Interior's manual on NEPA (516 DM). This EA complies with this guidance.

This EA was written in conformance with BLM regulations for surface mining on public lands under the General Mining Law of 1872, which is implemented through the Surface Management Regulations 43 CFR 3809 as mandated by the FLPMA of 1976. Reclamation of mining activities under the Plan level of activity, creating over five acres of disturbance, in the State of Oregon are regulated by the BLM and the Oregon Department of Geology and Mineral Industries (DOGAMI) as mandated by 43 CFR 3809 Regulations for the BLM.

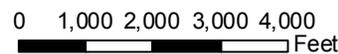


Explanation

- Project Area
- Proposed Pit Expansion
- Existing Pit
- Existing Roads
- BLM Lands

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



Projection: UTM Zone 10 North, NAD83



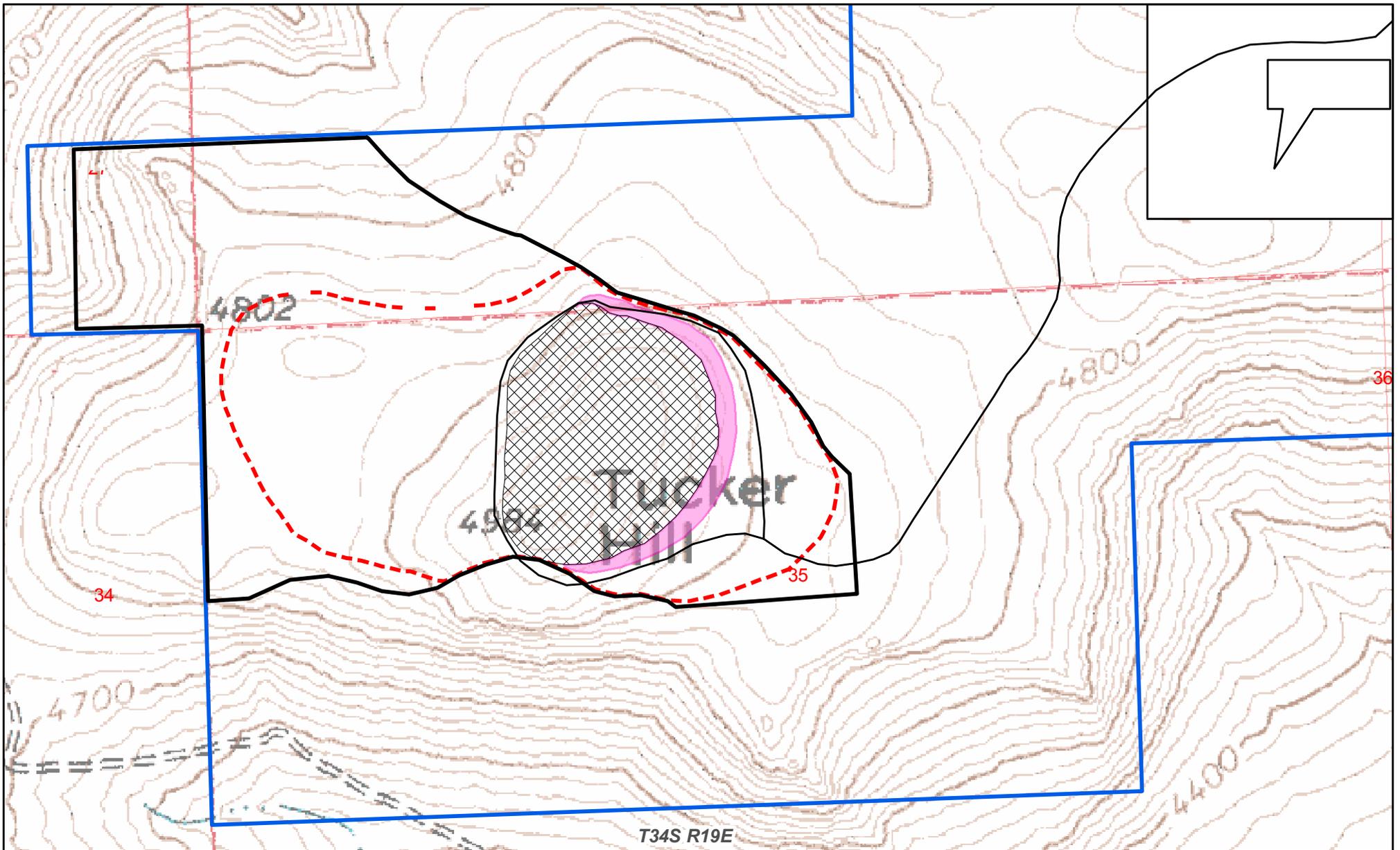
BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Project Area, Access, and Location

Figure 1.1.1

11/16/2012



Explanation

-  Project Area
-  Existing Permit Area
-  Proposed Pit Expansion
-  Growth Media Berms
-  Existing Pit
-  Existing Roads

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

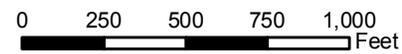
LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Existing and Proposed Mine Activities

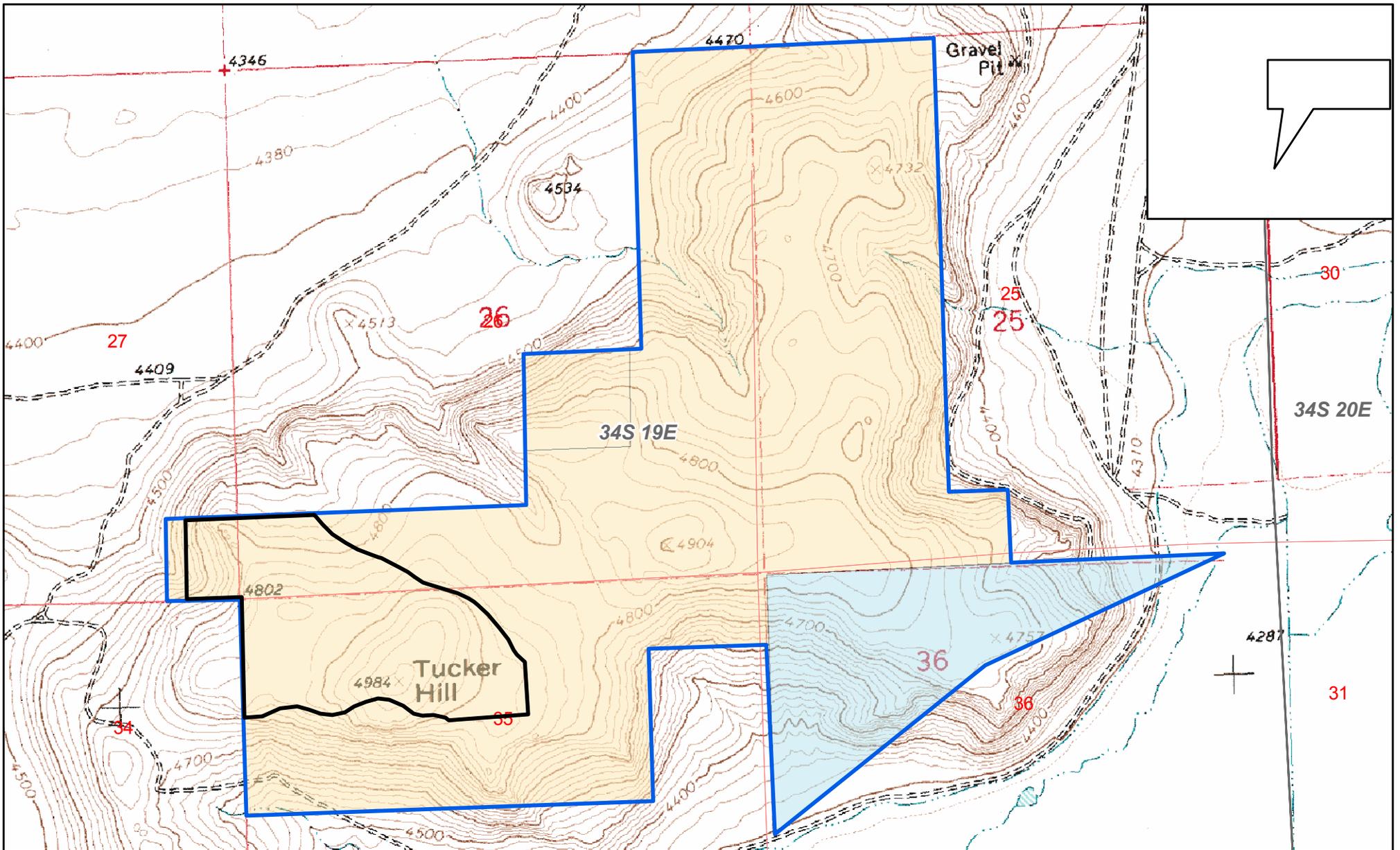


Projection: UTM Zone 10 North, NAD83



Figure 1.1.2

11/16/2012



Explanation

- Project Area
- Existing Permit Area

Land Status (Subsurface)

- BLM
- State

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
 1301 S. "G" Street
 Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Subsurface Ownership within
 the Project Area

Figure 1.1.3

11/16/2012



Projection: UTM Zone 10 North, NAD83



This Proposed Action is consistent with the mineral management goals in the BLM Lakeview Resource Management Plan and Record of Decision (RMP/ROD) (BLM 2003a). Specifically, the Energy and Mineral Resources section of the RMP/ROD states that, “within legal constraints, all federal mineral estate locatable, leasable, and salable mineral will be available for exploration, development, and production, subject to existing regulations and standard requirements and stipulations” (pages 88 to 89). Mineral management goal 1 of the RMP/ROD is to “provide opportunity for the exploration, location, development, and production of locatable minerals in an environmentally sound manner” (page 89). Map M-10 shows Tucker Hill and lands located immediately to the northeast are open to locatable mineral activity, but are subject to certain restrictions. Appendix N-3, Attachment 1, further describes the guidelines and stipulations that would be applied to locatable mineral development activities as appropriate and would be incorporated in the final decision (pages A-177 to A-179). Guidelines specifically applicable to the Tucker Hill Project include standards for topsoil salvage and storage, road construction, drill sites, dust and erosion control, safety and public exclusion, occupancy, special status species, and cultural resources. Guidelines for reclamation are also listed and include standards for concurrent reclamation, topsoil salvage and placement, earthwork, road reclamation, seedbed preparation, and revegetation.

In addition, the RMP/ROD contains management direction for other resources or management concerns that are present in the Project Area, including noxious weeds (pages 37 to 38), cultural resources (pages 74 to 79), air quality (page 80), and visual resources (page 88) management goals, and best management practices (BMPs) (Appendix D, pages A-2 to A-7) that are ~~may be~~ applicable to the proposed Project Area.

In addition, the RMP/ROD contains management goals and direction for other resources or management concerns that are present in the Project Area, including noxious weeds (pages 37 to 38), cultural resources (pages 74 to 79), air quality (page 80), and visual resources (page 88) (BLM 2003b). Best management practices (BMPs) that BLM may choose to apply to the Project in the final decision are listed in Appendix D (pages A-4 to A-7) and in Instruction Memorandum No. OR-2011-074.

The proposed operations analyzed in this EA incorporate the following Plan of Operations and amendments:

Plan of Operations and Reclamation Plan for the Tucker Hill Perlite Project (July 1996);

Tucker Hill Portable Jaw Crusher Amendment January 1998 (January 1998);

Tucker Hill Occupancy/Plan of Operations Amendment (June 2001);

Haul Road Modification to Tucker Hill Perlite Project Amendment (2006) (temporary emergency amendment); and

Cornerstone Industrial Minerals, Inc. Tucker Hills Quarry Plan of Operations Amendment Environmental Assessment (January 2008).

The 1996 *Plan of Operations and Reclamation Plan for the Tucker Hill Perlite Project* was approved for from developing a 15- to 20-acre perlite quarry and associated waste material dump and haul road over a ten-year time period. Total disturbance proposed was 37.7 acres. This Plan

of Operations was considered an amendment to the original exploration Plan of Operations that covered Tucker Hill. The 1998 amendment was approved for locating a portable jaw crusher at the mine site. The 2001 amendment was approved for the addition of two travel-trailers and modifications to blasting operations. The 2006 amendment was approved for minor modifications to the haul road. The 2008 amendment approved the development of a new waste material disposal area in an abandoned gravel pit in close proximity to the original waste material dump analyzed by the EIS.

The *Greater Sage-Grouse Conservation Assessment and Strategy* (ODFW 2005), provides one conservation guideline related to energy and mineral development which states that mineral and fossil fuel exploration and extraction sites should avoid surface occupancy within 3.2 km (two miles) of known/occupied greater sage-grouse habitat. While the BLM subsequently adopted most of the Oregon Department of Fish and Wildlife (ODFW) guidelines into the Lakeview RMP/ROD through plan maintenance in September 2009, the BLM found that this specific guideline could not be adopted without first completing a plan amendment. There is no feasible means of authorizing locatable mineral development without surface occupancy. Such a requirement would effectively close an area to locatable mineral development and that can only be accomplished through a formal withdrawal of the subsurface mineral estate from the mining laws.

In December 2011, the BLM issued interim management policies and procedures for the greater sage-grouse through Instruction Memorandum (IM)-2012-043 (BLM 2011a). This represents the current BLM management policy for greater sage-grouse habitat until such time as plan amendments can be completed throughout the range of the species that address a comprehensive conservation strategy. This policy addresses locatable minerals management for proposed authorizations/activities as follows:

“Require that new notices and plans of operation include measures to avoid or minimize adverse effects to Greater Sage-Grouse populations and its habitat. Ensure that new notices and plans of operation comply with the 43 CFR 3809 to prevent unnecessary or undue degradation. Such compliance may assist in avoiding or minimizing adverse effects to Greater Sage-Grouse populations and its habitat.”

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter provides a description of Cornerstone’s Proposed Action, which is to expand the existing Tucker Hill Perlite Quarry from 23 to 70 acres within the existing Project Area (Table 2.1-1). The BLM is also required to analyze the No Action Alternative, which describes the environmental consequences that would result if the Proposed Action is not implemented.

Table 2.1-1: Existing and Proposed Disturbance

Disturbance Component	Land Status	Existing/Authorized Acres*	Final/Proposed Acres	Total Disturbance acres
Quarry Area	Public	22.0	45.0	67.0
Growth Media Stockpile	Public	1.0	2.0	3.0
Total		23.0	47.0	70.0

*Existing surface disturbance associated with previously authorized Project-related activities also includes 7.7 acres for the main haul road, 1.7 acres for the Fisk Hill private land haul road, 6.0 acres for the waste rock dump, and 9.2 acres associated with the waste area (County Pit).

2.2 No Action Alternative

Under the No Action Alternative, the BLM would not approve the proposed Plan amendment and Tucker Hill would continue to be subject to mining activities as authorized under prior plans of operation (45.9 acres associated with all of the surface disturbance) for the Tucker Hill quarry site, as previously approved by the BLM. A summary of plan of operation amendments affecting mining activities at Tucker Hill is summarized in Table 2.2-1 below.

Table 2.2-1: Plan Amendment History for the Tucker Hill Project

Plan Amendment	Approval Date	Acreage	Areas of disturbance	Disturbance Activity
Plan of Operations (July 16, 1996)	July 16, 1996	29.3	Tucker Hill	Perlite quarry, waste rock dump, growth media stockpiles, drill access, exploration roads, and bulk sample sites.
Portable Crusher Plan Amendment	November 1997	0	Existing pit area	Set up portable crusher in existing disturbed pit.
Occupancy and Pit/Blasting Modification Plan Amendment	April 2001	0	Existing pit area	Adjust timing of blasting operations.
Haul Road Modification Plan Amendment	January 2006	0	Existing haul road	Repair and maintain existing haul road.
New Waste Material Disposal Area Amendment	January 2008	9.2	Gravel pit along Highway 31	Backfill gravel pit

Design features and requirements, and mitigation measures implemented as a result of the 1996 EIS include the following (BLM 1996b; pages 12 -13):

- 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 operations 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 DEIS 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 would be coordinated/authorized by the BLM Lakeview Resource Area biologist to protect wintering bald eagles and maintain the No Effect Determination; and
 - Blasting during the month of July 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 an 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;
- If Native American tribes or individuals express a desire for an archaeological monitor to help prevent unnecessary site disturbance, then the BLM would work with Atlas to review the need for, and possibly obtain an archaeological monitor;

- If the Native American tribes or individuals wish to use Tucker Hill for cultural activities, and if they can provide periods when they would like to use the area along with sufficient advance notice, the BLM would work with the mining company to avoid blasting on those days;
- If Native American tribes or individuals wish the BLM to pursue acquisition of legal access to the site (via an easement across private land on an existing private road), BLM would initiate an easement across private lands on an existing private road, BLM would initiate an easement acquisition, but cannot guarantee the outcome of the process;
- If visual impacts associated with the highwall of the quarry results in a sharp color contrast with the surrounding vegetation, consideration would be given to using a varnish or staining material to reduce the visual impacts;
- The seed source to be used for final reclamation would be certified weed free and approved 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.
- Fugitive dust emission at the processing plant would be controlled by water sprays, cyclones, and a baghouse.

Once all the desired ore has been removed from the site, reclamation would be completed in accordance with the existing reclamation plan (BLM 1996a; pages 6-11).

2.3 Proposed Action

The Proposed Action includes a 47-acre perlite quarry expansion and two-acre expansion to the growth media stockpile within the Project Area (Figure 1.1.2). The expansion activities would lead to a total surface disturbance of 70 acres over a 15-year period (Table 2.1-1). Mining activities, including blasting and in-pit crushing, would occur on a year-round basis. Based on available drilling information, the existing depth of the pit is approximately 100 feet from the top of Tucker Hill and approximately 80 feet from the peak. Blasting operations to expand the pit would occur three or four times a year. The quarried material would be stockpiled in place on the quarry floor for hauling. The stockpiled ore would be hauled each day by trucks from pit to processors via the existing upgraded access road to Highway 31 and then south to the town of Lakeview for processing. Hauling would occur year around. Trucks would depart from the quarry at a rate of one truck load every thirty minutes between of 5:00 a.m. to 10:00 p.m. Each haul would be approximately 32 tons at a rate of 40 loads per day. Processed perlite product would then be shipped in bulk to manufactures or end users by rail or truck, with an average of six to seven truckloads or two rail cars being shipped per day.

2.3.1 Quarry Development

The existing Tucker Hill mine would be expanded using conventional methods that consist of drilling, blasting, loading, and hauling. Drilling would be conducted with diesel-powered drills using ten- to 12-foot drill hole centers, depending on material type. The holes would be loaded with a blasting agent composed of a mixture of ammonium nitrate (fertilizer) and fuel oil (ANFO), and blasted in accordance with the regulations of the Federal Mine Safety and Health Administration (MSHA).

During blasting activity, flammable material storage and rolling equipment would be removed from the blast area, a water truck would be standing by, and the pit area would be cleared and closed by mine personnel. The ANFO would be brought on site immediately prior to the blasting periods and would be stored in sealed containers. Blasting would occur three or four times per year. Bench heights (i.e., vertical levels of the quarry) range from 20 to 25 feet high during active mining. Blasting would be designed to minimize production of flyrock, which has historically been minimal and limited to the pit area. Blasting operations would be controlled to minimize flyrock by utilizing drill cuttings known as stemming that is calculated to ensure the blast does not exceed the intended shot area.

The Lakeview Interagency Fire Center would be notified of the Tucker Hill blasting schedule a minimum of two days prior to any blasting activities. The blasted rock would be loaded with front-end loaders into haul trucks (22- to 25-ton capacity). Quarried material would be stockpiled in the pit.

Shallow development and production drilling would be completed, as needed, prior to mining in portions of the expanded pit area. Drilling would also be utilized to determine optimum mine bench designs and to better define the lower boundary of minable reserves in areas where they are currently poorly defined, for sampling in ore zones being mined, and for quality assurance/quality control sampling and testing prior to mining. Drill holes not consumed by the pit would be abandoned in accordance with Oregon Water Resources Department (OWRD) regulations and standards for well abandonment.

Mining, blasting, and in-pit crushing is conducted on a year-round basis. Broken material from the mine benches would then be transported from the active mining area, using mechanized loaders, to the portable crusher/screening plant on site, where the material is crushed and screened to a top size of 1 ½ inches. Crushed and sized ore is then stockpiled in a staging area in the mine pit per the 1998 Plan Amendment. Crushed ore would continue to be hauled approximately 43.3 miles to Cornerstone's mill in Lakeview, Oregon, via the existing access road to State Highway 31, and then south to the town of Lakeview for further processing, classification, and shipment to customers.

2.3.2 Waste Rock Disposal

Waste rock consists of perlite that does not meet specifications for market demand. Waste rock would be dumped in the northwest corner of the existing Lake County gravel pit, as approved in 2008 by the BLM. The estimated disposal life of the Lake County gravel pit (shown on Figure 1.1.1) for excavation of mineral materials is approximately 1.5 years. Additionally, Cornerstone would continue to utilize the Fisk Hill disposal site located on private land northeast

of Lakeview, Oregon (Figure 2.1.1). As the life of the mine progresses, unused post-process waste material would be transported back to the mine and used as backfill to reclaim mined out portions in the pit area. Mine waste would be mixed with finer mill tailings to add coarse size rock to finer grained material returned to the mine for use in reclamation, to meet reclamation objectives set for the 1996 EIS and approved reclamation plan (BLM 1996a). The backhauling of the waste materials from the Lakeview processing plant was approved in the 1996 Plan of Operations and the 2008 Plan amendment (BLM 1996a; BLM 2008).

2.3.3 Mining Scenario and Cross Sections

Conceptual drawings and cross sections have been prepared for the Project; however, the exact layout could change based on development drilling and avoidance of the sensitive cultural resources adjacent to the Project Area. Figures 2.1.2, 2.1.3 and 2.1.4 show cross sections of the quarry expansion. The potential thickness of the perlite is shown on Figure 2.1.5. Figure 2.1.6 depicts the four potential phases of mining. The number of years that the mine would be in operation would depend on the amount of material that is mined each year and this would be determined by market demand. Detailed mine design would be finalized following further development drilling. Table 2.3-1 shows the estimate of net recoverable commercial grade perlite based on the current understanding of the geology at the mine site, and dependent on the depth of the overburden.

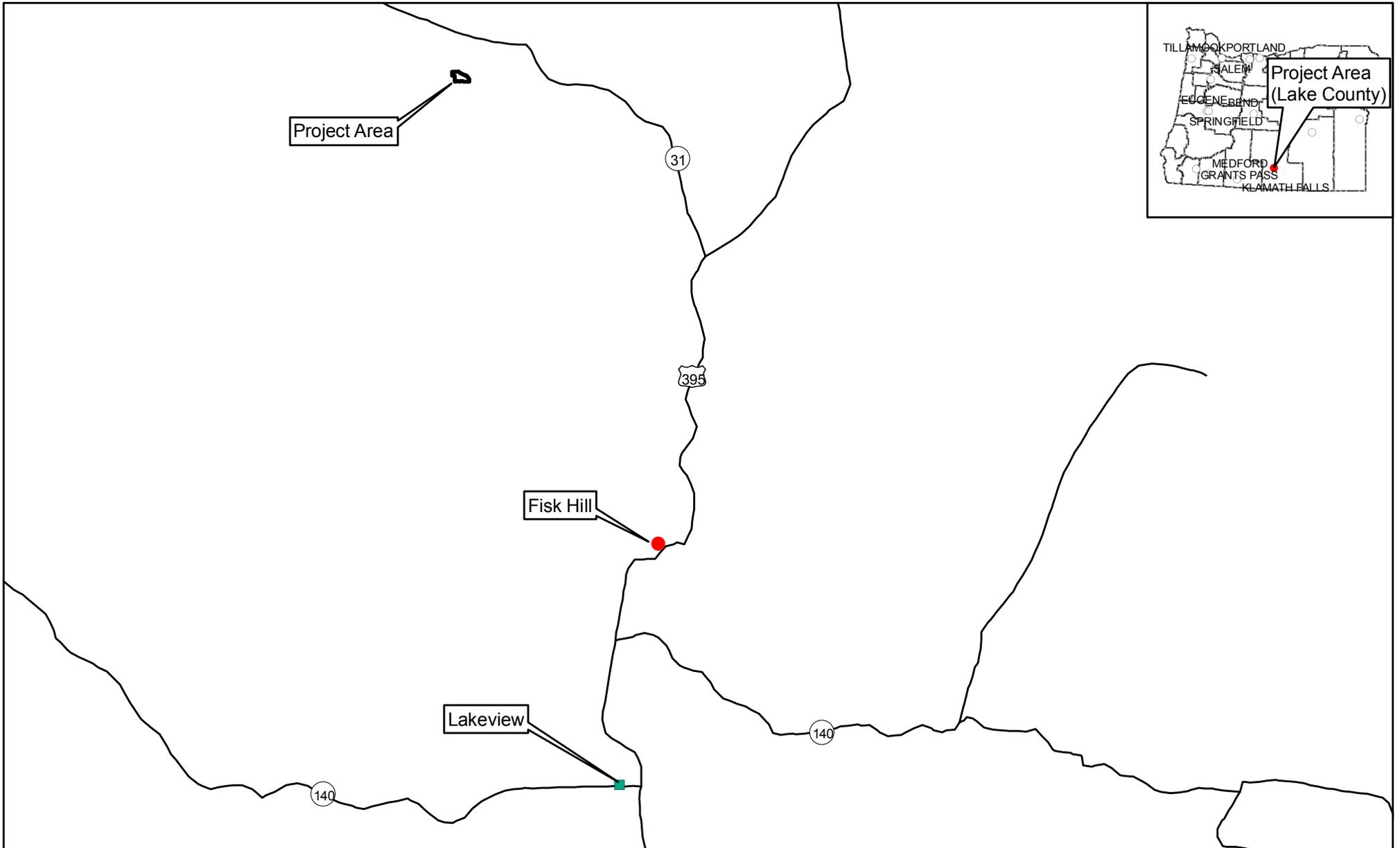
Table 2.3-1: Estimate of Net Recoverable Commercial Grade Perlite

Gross Tonnage	Soil/Growth Media (yds/tons)	Overburden (cubic yds/ton)	Internal Waste Rock (20%) (cubic yds/ton)	Estimated Net Tonnage
1,043,600	96,600/57,844	23,513/13,631 Minimum 5 feet thick	348,562/208,720	638,405 Maximum
1,043,600	96,600/57,844	463,026/277,261 Minimum 10 feet thick	348,562/208,720	499,775 Minimum

2.3.4 Equipment

The following types of equipment could be utilized for the Project:

- Four 25-ton dump trucks;
- One D9 or equivalent dozer;
- One 980 or equivalent front end loader;
- One drill rig (Cat MD5090 Hydraulic Rock Drill);
- One 3,000-gallon water truck;
- One 2,000-gallon fuel tank;
- Up to four light vehicles (pickup trucks);
- One office trailer;
- One generator (V12 Detroit);
- Four conveyors;
- One jaw crusher unit;
- One cone crusher unit; and
- Two road graders.

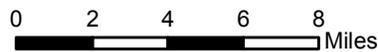


Explanation

-  Project Area
-  Fisk Hill Disposal Site
-  Cities
-  Highways

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
 1301 S. "G" Street
 Lakeview, OR 97630



Projection: UTM Zone 10 North, NAD83



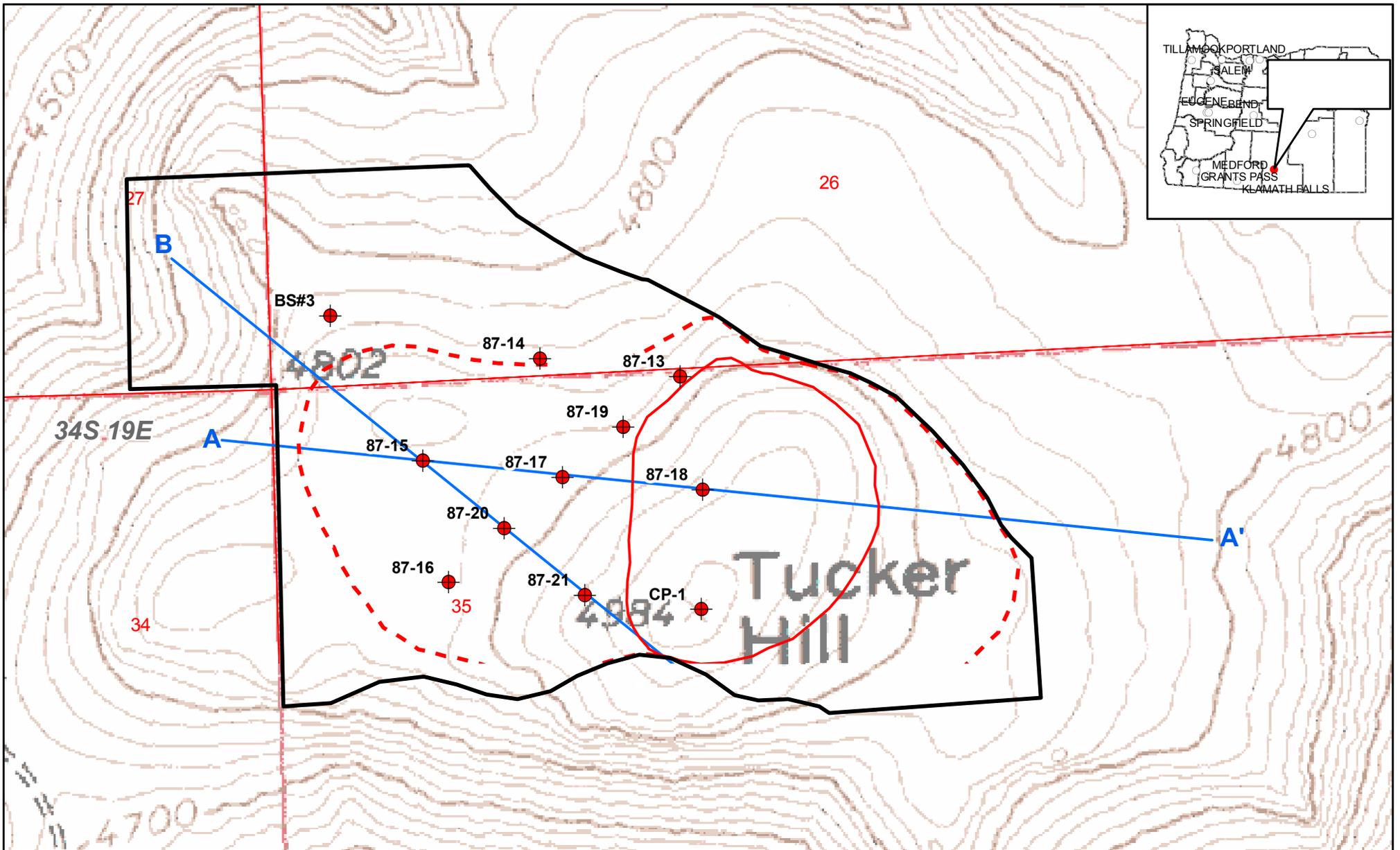
BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Fisk Hill Disposal Site

Figure 2.1.1

11/16/2012



Explanation

- Project Area
- Proposed Pit Expansion
- Existing Pit
- Cross Section Line
- Surface Sample Sites and Drill Sites

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

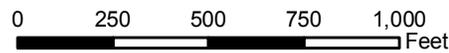
LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Quarry Expansion Cross Section Locations

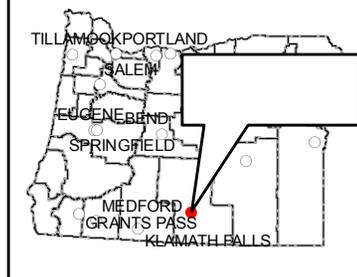


Projection: UTM Zone 10 North, NAD83

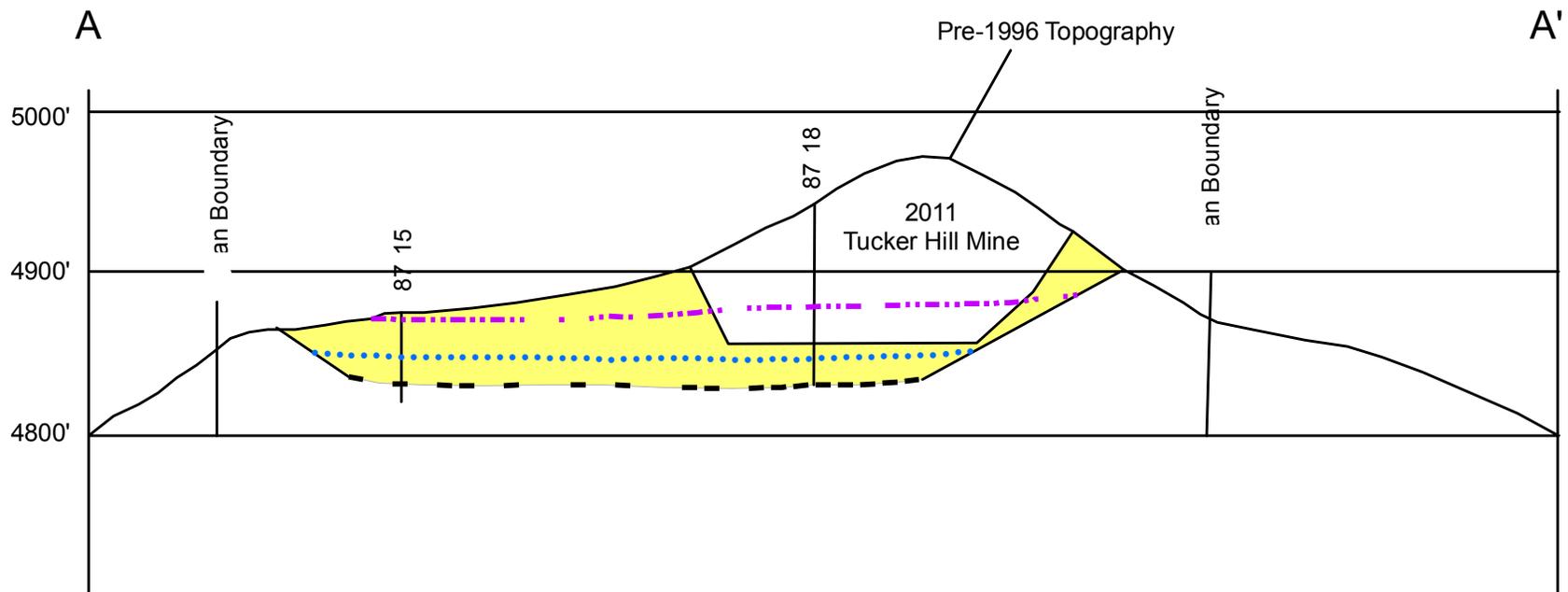


Figure 2.1.2

11/16/2012

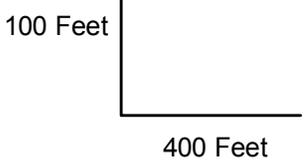


LOOKING NORTH



Explanation

- ⋯ Pit Backfill Alternative
- ⋯ Partial Backfill Alternative
- Perlite Deposit



LAKEVIEW DISTRICT OFFICE
 1301 S. "G" Street
 Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

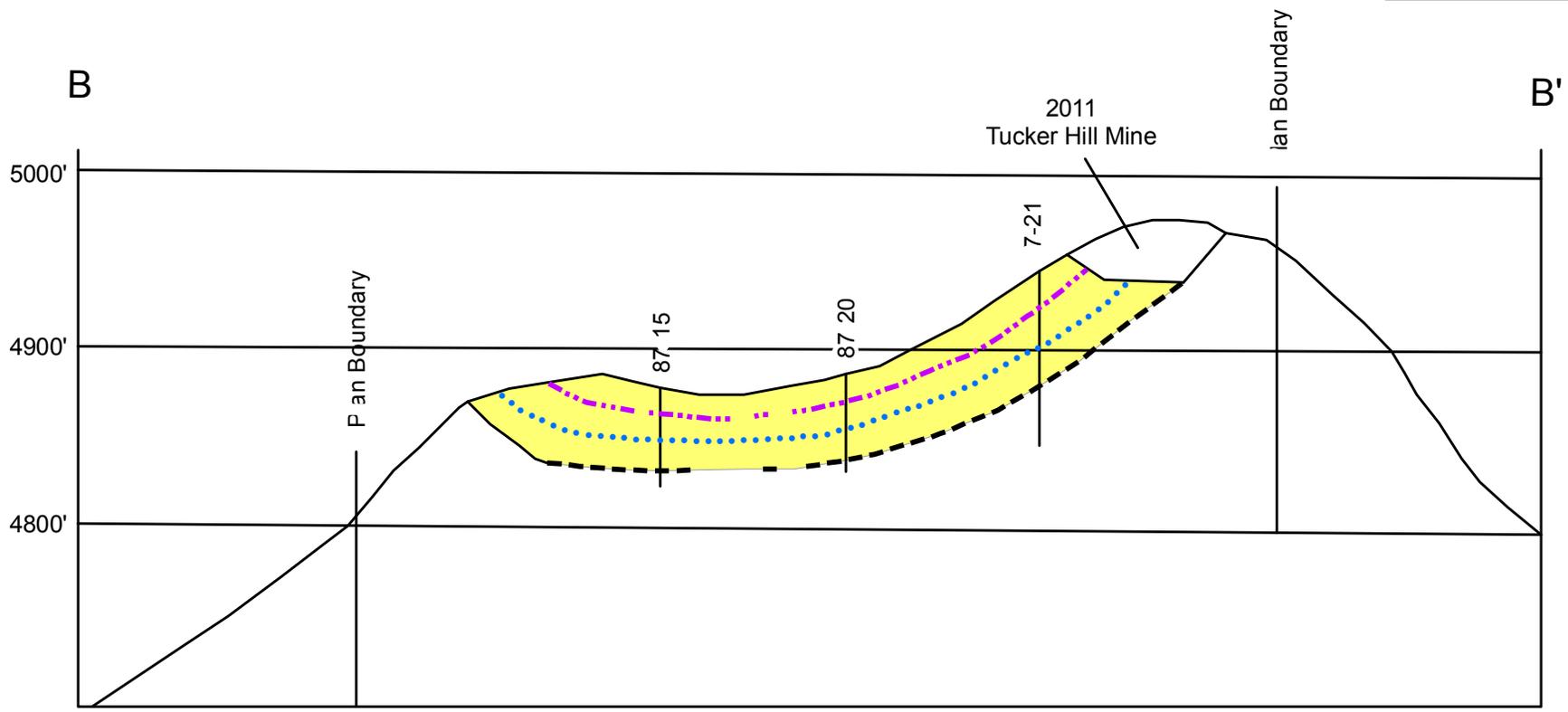
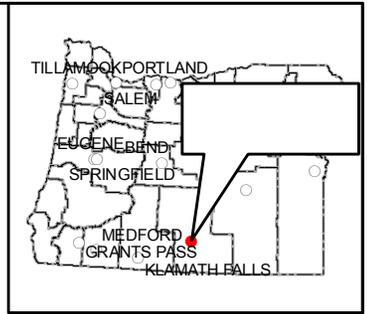
Quarry Expansion Cross Section A-A'

Figure 2.1.3

11/16/2012

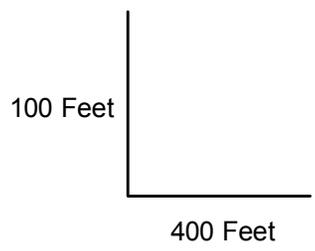
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LOOKING NORTHEAST



Explanation

- - - - Pit Backfill Alternative
- Partial Backfill Alternative
- Perlite Deposit



LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630

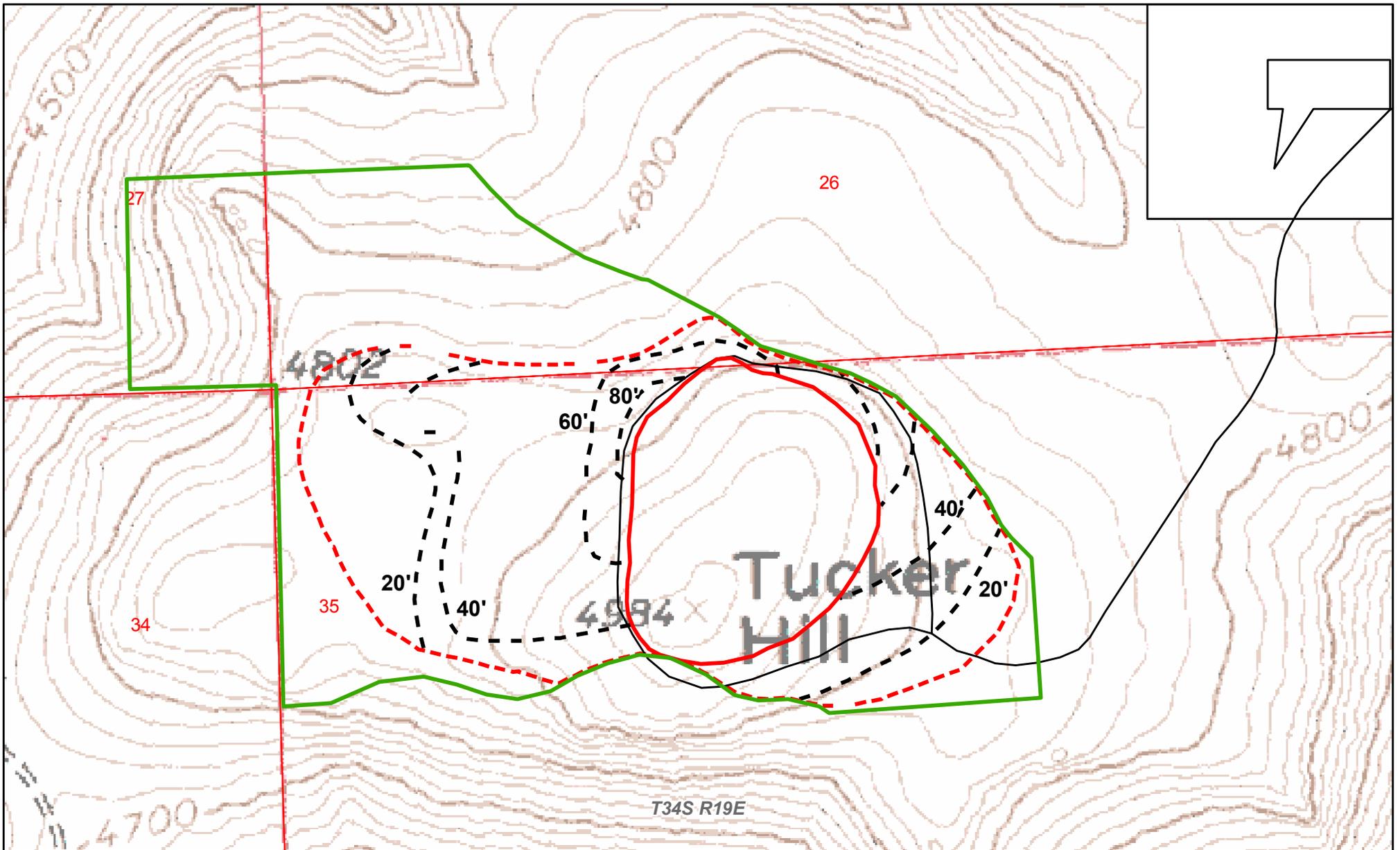


BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT
Quarry Expansion Cross Section B-B'

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Figure 2.1.4



Explanation

- Project Area
- Proposed Pit Expansion
- Existing Pit
- Thickness Contour
- Existing Roads

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



Projection: UTM Zone 10 North, NAD83



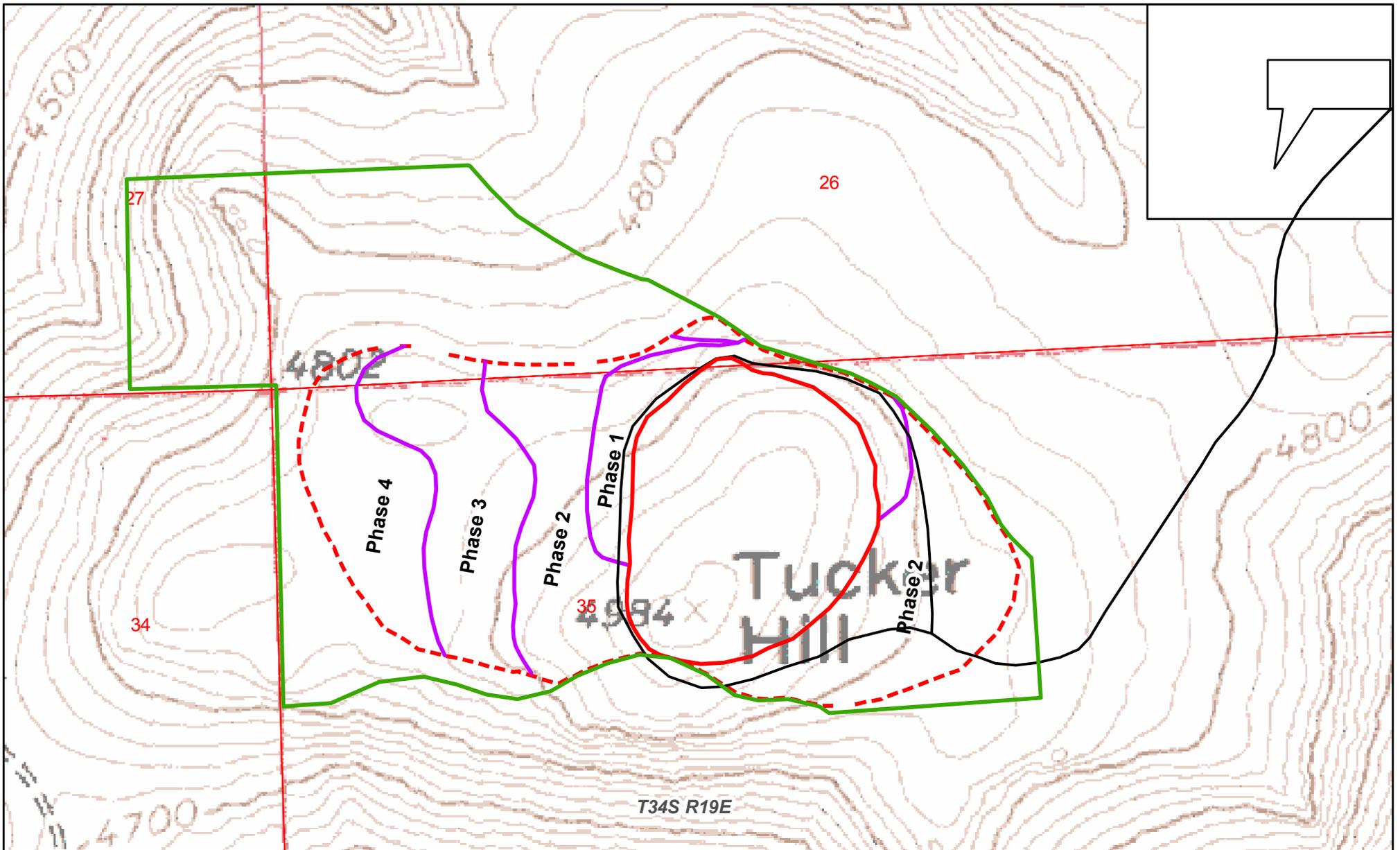
BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Estimated Limits Subsurface
Potential Thickness of
Commercial Grade Perlite Ores

Figure 2.1.5

11/16/2012



Explanation

-  Project Area
-  Proposed Pit Expansion
-  Existing Pit
-  Phases
-  Existing Haul and Access Roads

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



Projection: UTM Zone 10 North, NAD83



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Mining Phases

Figure 2.1.6

11/16/2012

2.3.5 Work Force

The proposed work force would consist of a maximum of four people in the quarry four or five days a week. There would be up to four trucks averaging ten trips per day per truck working a daily shift from approximately 5:00 a.m. to 10:00 p.m. daily. The hauling would occur year-round. Weather shutdowns are possible mostly due to precipitation events softening the road, which could deteriorate the haul road with heavy truck use. Snow removal would occur if necessary.

2.3.6 Growth Media Management

Prior to expansion of the quarry, the available growth media of limited loose soil, gravely material and overburden that can feasibly be obtained with standard equipment would be removed separately and stockpiled. Stockpiles would be placed along the pit expansion area. Stockpiles may be re-handled when necessary along the boundary of the pit expansion area. Growth media would be removed from the expansion area by a bulldozer and stockpiled as a berm around the perimeter of the open pit to provide visual screening of mining activity and to stockpile all available growth media for later use for mine reclamation. Growth media removed during the quarry expansion would be salvaged to cover the reclaimed pit areas and pit floor. Growth media would be stored on stable slopes adjacent to the pit. Because of the location of two archaeological sites on the north and south boundaries sides of the proposed project area, a buffer zone of 100 feet would be clearly delineated between the two sites and the berm of stockpiled growth materials. The sites and buffer zone would be permanently marked “avoidance area”. No vehicle traffic within this buffer zone would be allowed. The stockpiled material would be stabilized during the operational phase by seeding with the seed mix determined by the BLM. The application of seed would occur at a time conducive to seed germination. The growth media stockpile surface disturbance would increase from the existing one acre to three acres.

Monitoring of growth media stockpiles would include the detection and appropriate removal of any invasive or noxious weed species. Weed control would be determined by consultation with representatives of the Lakeview BLM.

2.3.7 Haul Road Access

The Project would continue to be accessed using the existing 3.3-mile long haul road. The road has been resurfaced with crushed stone or gravel, where necessary, to provide for an all-weather travel surface. Turn-outs have been constructed where appropriate to provide for safety. During operations, the road would be graded and watered by Cornerstone to maintain the surface and control fugitive dust. The existing road has been expanded to an approximate running width of 18 feet and total disturbance width has not exceeded 32 feet. There is a maximum cutbank height of approximately six feet. An existing two-track road has been upgraded on the private lands directly south of Highway 31.

2.3.8 Access Control

Public access to the quarry area is restricted, as the haul road entrance is located on private land that is gated. Cornerstone is provided access by a right-of-way easement lease allowing Cornerstone to cross the private ranch property and is subject to renewability on a five-year

basis. Warning signs are posted at strategic locations, advising of the danger associated with the operations. Access is provided to individuals or groups requiring access to or through the quarry for such purposes as education, research or cultural/religious practices. However, there is no legal public access on the portion of the haul road that crosses private land. The quarry may potentially be accessed by cross-country All-Terrain Vehicles or by foot. An old exploration road northwest of the Project Area may provide access on foot or by motorized vehicles to the haul road. During periods of mining, Cornerstone would control access to the mine during blasting and ensure security in the pit expansion area by utilizing gate closure. During periods of non-operation, Cornerstone would post appropriate signage.

2.3.9 General Schedule of Operations

Cornerstone would continue to conduct mining activities under the existing approved plan of operations. Following BLM approval, Cornerstone would commence work to expand the pit as outlined in the Plan amendment. The proposed mining activities under this Plan amendment would last over the life of the mine (estimated at 15 years), but would depend upon market conditions and the delineation of additional reserves.

2.3.10 Surface Occupancy

Occupancy is defined as full or part-time residence on the public lands (43 CFR 3715.0-5). Activities that involve residency include: the construction, presence, or maintenance of temporary or permanent structures that may be used for such purposes; the use of a watchman or caretaker for the purpose of monitoring activities. Residence or structures include, but are not limited to, barriers to access, fences, tents, motor homes, trailers, cabins, houses, buildings, and storage of equipment or supplies. No additional structures to the project site are proposed under the Plan amendment.

2.3.11 Water Management Plan

The Project does not require a water management plan because there are no surface water bodies located in the arid Project Area. The nearest surface water is in the Chewaucan Marsh, located approximately one mile east of the base of Tucker Hill. There are no perennial drainages or springs located on Tucker Hill, and ground water is reported in water wells at a depth greater than 300 feet below surface of the playa lake surface, approximately 600 feet below the summit of Tucker Hill. No ground water has been found in exploration drill holes, which have been drilled to a depth of 100 feet along the upper surfaces of Tucker Hill.

2.3.12 Rock Characterization and Handling Plan

No rock handling plan is required for this perlite operation based on the analysis contained in the 1996 EIS that was prepared for the mine since there are no sulfides present in the ore or waste rock to contribute to acid rock drainage in the event of standing impounded water.

2.3.13 Quality Assurance Plan

Quality assurance for reclamation would be addressed under the Reclamation Plan.

2.3.14 Spill Contingency Plan

A Spill Contingency Plan is located in the Plan amendment in Appendix C. Additionally, a plastic-lined pit is utilized for secondary containment and storage of fuel and oil.

2.4 Reclamation Plan

Reclamation would begin within the mine areas when mining is complete or the disturbance is no longer needed for mining or development activities. Reclamation would continue as approved in the 1996 Plan, and would include the following: recontouring; redistribution of stockpiled growth media; reseeding; use of drainage control ditches; installation of water bars and culverts, as necessary; and rock armor for erosion control. Reclamation would be completed for haul and access roads and would include recontouring and seeding. The pit floor would be reclaimed through growth media and then seeded. In coordination with the BLM, Cornerstone would evaluate the need to rip the pit floor where areas of compaction have occurred. Seeded areas would be monitored for stability and revegetation success, during the spring or fall, for three years or until revegetation is determined successful by the BLM and DOGAMI. Reclamation activities would be coordinated with the BLM, as necessary.

In addition, perlite mill waste from the processing plant may be backhauled to the Tucker Hill pit. Revegetation of exploration roads and pads not located within the mining component boundary would take place during the mining of the Project. The BLM and DOGAMI would consider reclamation successful when the disturbed sites are stabilized, secondary plant succession is established, and the conditions are met to realize the land use objectives. This finer material would be interbedded with the mine waste to reduce fugitive dust. Once the quarry has been filled with waste material and growth media, the surface of the reclaimed area would be regraded and seeded. The processed perlite has the same chemistry as the mined mineral, and no chemicals are added during processing, which makes it suitable for reclamation use. The proposed reclamation would be initiated as soon as practicable.

2.4.1 Prevention of Unnecessary or Undue Degradation

As detailed in the 1996 Plan of Operations, the Reclamation Plan has been developed in accordance with BLM Handbook 3042-1, "Solid Minerals Reclamation Handbook." Components of the Reclamation Plan would be monitored and administered by DOGAMI and the BLM. Design and construction of the Project facilities would incorporate performance standards per 43 CFR 3809.420 to prevent unnecessary or undue degradation of the environment.

2.4.2 Project Schedule

The Project activities would last over the life of the mine and would depend on market conditions. The schedule could be affected if conditions change. As a result of the modest size and nature of the Project, concurrent reclamation for the waste rock site and haul road is not practical. Reclamation would be performed upon termination of operations. Reclamation of existing exploration/development-related disturbances outside of the proposed quarry area would be reclaimed during the life of the Proposed Action.

Timing of revegetation activities is critically important to the overall success of the program. Seeding activities would be timed to take advantage of optimal climatic windows and would be coordinated with other reclamation activities. In general, seedbed preparation would be completed in the fall, either concurrently with or immediately prior to seeding, after regrading of disturbed areas. Seeding would be completed in late fall to take advantage of winter and spring precipitation and optimum spring germination. Early spring seeding may be utilized for areas not completed in the fall. In either case, seeding would be avoided when the ground is frozen or snow covered.

2.4.3 Post Operational Land Uses

As detailed in the Plan Amendment, the objectives of the Reclamation Plan include preventing or minimizing safety hazards, stabilizing disturbed areas, and providing for a post operational surface condition that would be consistent with the long-term multiple uses of surrounding lands managed by the BLM.

2.4.4 Reclamation of Waste Rock Site (County Gravel Pit)

The County would reclaim this gravel pit in accordance with BLM permit stipulations and DOGAMI requirements upon its closure. Cornerstone would be responsible for the reclamation of the gravel pit approved in the 2008 Tucker Hill Quarry Plan of Operations Amendment that lies adjacent to the County Gravel Pit (BLM 2008)

2.4.5 Haul Road Reclamation

Long-term management of the haul road after mining operations have ceased and reclamation has been completed at the mine would be determined by the BLM prior to the reclamation process. Possible options include the following:

- Permanently close the road, bring the road bed back to the original contour as closely as possible, and revegetate the road corridor. Fill material, enhanced with available growth media, would be pulled onto the roadbed to restore the slope to its existing contour. 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; or
- Regrade and recontour the haul road to return the road bed to approximately its preexisting configuration.

2.4.6 Two-track Material Storage Access Road Reclamation

Final reclamation would include the reclamation of the two-track material storage access road along Highway 31. The reclamation process would be similar to those options provided for the haul road in Section 2.4.5.

2.4.7 Drainage and Sediment Control Plan

The goal of the Drainage and Sediment Control Plan is to convey runoff from reclaimed areas and up-gradient undisturbed areas through the Project Area in a manner that would protect the reclaimed areas and prevent degradation of down-gradient water quality. The Drainage and Sediment Control Plan is designed to require no maintenance.

The main method of drainage and sediment control at the Project site would consist of revegetating all disturbed areas, with the exception of the quarry. Roads would be maintained by Cornerstone to prevent degradation from erosion. Drainage on roads would be by ditching, installation of waterbars and, where appropriate, culverts. If any of these activities go outside of areas of existing disturbance, an archaeological/cultural survey/evaluation would be required. Running surfaces of the road would be rocked to reduce sediment runoff. Drainage facilities would be designed to accepted road engineering standards. Reclamation would be considered acceptable if there are no rills over six inches in depth and/or width after three years.

During operation, the quarry would be a topographic depression and all precipitation falling onto the quarry surface area would be contained on-site. Construction by this method would help control potential erosion from site runoff. Since the quarry is located on the top of Tucker Hill, no watershed exists up-gradient of the quarry, and only the precipitation directly falling onto the quarry area could be impounded. However, the site is arid, annual evaporation exceeds precipitation, and the perlite is fractured allowing infiltration of the water. These factors lead to rapid infiltration or evaporation of precipitation. Consequently, it is highly unlikely that any water would be impounded. The Tucker Hill quarry lies within a 2.6- to 2.8-inch isopluvials of a 100-year 24-hour precipitation event. Impoundment under the circumstance of a 100-year event would be short term.

2.4.8 Revegetation

The revegetation methods described at this time are generally based on common industry practices. Seeds from a native seed bank, if possible, would be obtained for reclamation. The seed mix utilized from the seed bank for reclamation of this Project would be based on known soil and climatic conditions and would be selected to establish a plant community that would support post-mining land uses such as dispersed recreation and wildlife habitat as prescribed by the BLM. The seed mix would be designed to provide species that are able to become established in the environment of south central Oregon, are proven species for vegetation, and/or are native species found in the plant communities prior to disturbance. Potential seed mixes are included in Appendix L of the Lakeview RMP/ROD (BLM 2003a).

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 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 the Oregon BLM's 2010 ROD for

Vegetation Treatments Using Herbicides on BLM lands in Oregon and other more site-specific weed plan/EAs (such as BLM 2004)

Timing of revegetation activities is critically important to the overall success of the program. Seeding activities would be timed to take advantage of optimal climatic periods and would be coordinated with other reclamation activities. In general, earthwork and drainage control would be completed in the summer or early fall. Seedbed preparation would generally be completed in the fall, either concurrently with or immediately prior to seeding. Seeds would be sown in late fall to take advantage of winter and spring precipitation and optimum spring germination. Early spring seeding may be utilized for areas not seeded in the fall. In either case, seeding would be avoided when the ground is frozen or snow covered.

2.4.9 Reclamation of Quarry

The quarry walls would be left with benched slopes approximately 20 to 25 feet vertical by approximately 20 to 25 feet horizontal. This would provide a very stable final slope.

There would be no surface water 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.

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. In addition, mill tailings from the processing plant may be backhauled to the Tucker Hill pit. Mill tailings material would be interbedded with the mine waste to reduce fugitive dust. Once the quarry has been filled with mill waste material and waste (perlite material that does not meet specifications for market demand), the area would be covered with growth media and seeded.

Prior to final reclamation, public safety concerns would be evaluated with the BLM and the DOGAMI. If determined to be necessary by the agencies, Cornerstone would construct a safety berm using rock or waste material approximately five feet high with a one-foot top and 1.5 horizontal to one vertical ratio side slopes along the margin of the pit approximately 25 feet back from the highwall edge. Growth media would also be incorporated into sections of the berm in order to be utilized during reclamation of the pit areas and pit floor. The safety berm would be constructed with a dozer and a loader when highwalls are established. This berm would be posted with warning signs located in front of the berm and spaced every 200 feet. The permanent waste material berm or weather resistant metal signs would provide for public safety following mining. Safety berms would be seeded with approved seed mix to help reduce visual impacts of the quarry due to color contrasts.

2.4.10 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 operational monitoring until reclamation has been determined by the BLM and DOGAMI to be complete and permanent vegetation has been established. Once

reclamation has been determined complete, including vegetation, the Project’s reclamation bond would be released to Cornerstone. Annual reports on the progress of the reclamation would be submitted to the BLM and DOGAMI.

The BLM and DOGAMI would consider reclamation successful when the disturbed areas are stabilized, secondary plant succession is established, and the conditions are set to realize the land use objectives. The type and frequency of monitoring applicable to the Project is found in Table 2.4-1 below.

Table 2.4-1: Monitoring Program and Schedule

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

*The Project would be monitored for noxious weed invasions throughout the life of the mine operation and reclamation activities.

2.4.11 Isolation, Removal, and/or Control of Acid-Forming, Toxic or Deleterious Materials

There are no natural occurring acid-forming, toxic or deleterious materials associated with perlite. Mining operations are conducted 12 months per year; however, should there be a temporary shutdown, all fuels, lubrication oil, and waste oil tanks located within the Project Area would be emptied. All valves in the fuel and lube island containment structures would be left in the closed positions. All chemical agents, such as WD-40, or Brake Kleen would be secured inside the flammable containers cabinet located inside the trailer that remains locked when the mine area is not occupied. Grease and other lubricants would be stored either inside the locked storage container or the locked trailer. No other toxic chemicals or deleterious materials are kept on site.

2.4.12 Removal or Stabilization of Building, Structures, and Support Facilities

Several structures would be utilized during the life of the Project. All equipment and supplies would be decommissioned and removed following completion of the Project. Other materials, including scrap, trash, and unusable equipment, would be removed on a daily or weekly basis and disposed of in accordance with federal and state regulations and laws.

2.4.13 Drill Hole Plugging

Drill holes would be abandoned in accordance with established OWRD standards and regulations.

2.4.14 Processing Site

The processing site for the perlite ore is on the north end of Lakeview in an existing industrial site on private property. The processing site would continue to be used under the Proposed Action as in current operations. 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 continue to 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. Fugitive dust emission at the processing plant would be controlled by water sprays, cyclones, and a baghouse.

2.5 Environmental Protection Measures based on 43 CFR 3809 Regulations and Mitigation Measures Established in the 1996 EIS

Cornerstone commits to the following environmental protection measures to prevent unnecessary or undue degradation during construction, operation, and reclamation of the Project. The measures are derived from the general requirements established in BLM Surface Management Regulations at 43 CFR 3809, as well as other water, air quality, and environmental protection regulations.

Air Quality/Visual Resources

- 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; and
- If visual impacts associated with the highwall of the quarry results in a sharp color contrast with the surrounding vegetation, consideration would be given to using a desert varnish or staining material to reduce the visual impacts.

Cultural Resources

- 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. This plan was developed during environmental analysis of potential impact from development of the original mine at Tucker Hill; and
- If Native American Tribes or individuals express a desire for a tribal monitor to help prevent unnecessary site disturbance, then the BLM would work with Cornerstone to review the need for, and possibly obtain an archaeological monitor. BLM does not require a monitor nor does BLM pay for monitors. The obligation of the BLM is to provide an opportunity for Tribes to provide monitors if they so desire. This does not prevent Cornerstone from paying for monitors if they wish; and
- If the Native American Tribes or individuals wish to use Tucker Hill for cultural activities, and if they can provide specific periods when they would like to use the area along with sufficient advance notice, the BLM would work with the mining company to avoid blasting on those days; and
- If Native American Tribes or individuals wish the BLM to pursue acquisition of legal access to the site (via an easement across private lands on an existing private road), the BLM would initiate an easement acquisition, but cannot guarantee the outcome of that process;

- Should any additional archaeological discoveries be encountered during ground disturbing activities, all such activities would halt within a 50 meter radius of the discovery, and the BLM would be contacted to determine the nature of the find, evaluate its significance and if necessary, suggest preservation or mitigation measures; and
- Cornerstone would coordinate with the BLM to construct a permanent barrier for the 100-foot buffer. Coordination efforts would consider appropriate fence reflectors, spacing between stakes, and suitable fencing material (i.e., steel posts).

General

- Long-term management of the Tucker Hill access road would be determined as a component of the Reclamation Plan; and
- Cornerstone would follow the Spill Contingency Plan located in Appendix C of the Plan amendment.

2.6 Alternatives Considered but Eliminated from Detailed Study

2.6.1 Larger Quarry Expansion

This alternative is similar to the Proposed Action except that the quarry would be expanded to a larger size than in the Proposed Action. Under this alternative, lands to the north and south would be included in the Plan Amendment totaling approximately 72 acres. However, there are several sensitive cultural sites surrounding the current Project Area that would be negatively affected by this proposal. This alternative would create irreversible impacts to known cultural resources and may require substantial time delays and costs to fully mitigate. For these reasons, this alternative was not considered economically feasible at this time.

2.6.2 Second Pit Area

This alternative would include an additional pit expansion area located east of the existing Project Area. The additional pit area would create approximately 110 acres of new surface disturbance. This surface disturbance would include irreversible impacts to cultural resources. These impacts may require substantial time delays and costs to fully mitigate. For these reasons, this alternative was not considered economically feasible at this time.

3 AFFECTED ENVIRONMENT

3.1 Introduction

The affected environment for the proposed quarry expansion area covers Sections 26 and 35, T34S, R19E, located on public lands administered by the BLM approximately 35 miles northwest of Lakeview, Oregon (Figure 1.1.1). The Proposed Action disturbance would consist of 47 additional acres of public lands for a total of 70 acres of proposed and presently authorized disturbance within the Project Area (Table 2.1-1). This chapter will incorporate by reference and tier, in accordance with the BLM NEPA Handbook H-1790-1 (Section 5.2) to the affected environment section in Chapter 3 of the EIS for *Atlas Perlite, Inc.'s Tucker Hill Perlite Project* (BLM 1995), where applicable.

3.2 Critical Elements of the Human Environment

Critical elements represent requirements specified by statute or executive order (EO) that must be considered in all BLM decisions. These are listed in Table 3.1-1. The table lists the elements and their status as well as the rationale describing whether an element present would be affected by the Proposed Action.

In addition to the critical elements of the human environment, the BLM considers other resources and uses that occur on public lands and may result from the implementation of the Proposed Action. Other resources or uses of the human environment that have been considered for this EA are listed in Table 3.1-2 below. Resources or uses that may be affected by the Proposed Action are analyzed further in Chapter 4.

The remainder of this chapter describes current conditions of resource values or uses that are present in the Project Area

Table 3.1-1: Critical Elements of the Human Environment

Critical Element	Not Present	Present/ Not Affected	Present/ Potentially Affected	Rationale/Reference Section
Air Quality			X	See Sections 3.3 and 4.2.
Areas of Critical Environmental Concern (ACEC)	X			The Red Knoll ACEC is located to the south, but outside the Project Area. For this reason ACECs are not further addressed in this EA.
Cultural Resources			X	See Sections 3.4 and 4.3.
Environmental Justice		X		Low income and minority populations are present in Lakeview and Lake County. However, they would not be disproportionately impacted by any of the alternatives considered. Not further addressed in this EA.
Farm lands (Prime or Unique)	X			Critical Element is not present, therefore it is not further addressed in this EA.
Fish and Aquatic Habitat	X			Critical Element is not present, therefore it is not further addressed in this EA.
Floodplains	X			Critical Element is not present, therefore it is not further addressed in this EA.
Forests and Woodlands (HFRA Projects only)	X			This Project does qualify as an HFRA project. This resource is not addressed further.
Migratory Birds			X	See Sections 3.7 and 4.6.
Native American Traditional Values			X	See Sections 3.5 and 4.4.
Noxious Weeds, Invasive Non-native Species			X	See Sections 3.10 and 4.9.
Recreation		X		See Sections 3.6 and 4.5.
Special Status Plant Species	X			This critical element is not present; therefore, it is not further addressed in this EA.
Special Status Wildlife Species			X	See Sections 3.8 and 4.7.
Wastes, Hazardous or Solid			X	This is addressed through the development and implementation of the Spill Contingency Plan located in the Plan of Operations (Appendix C).
Water Quality - Surface and Ground		X		See Sections 3.11 and 4.10.
Wetlands and Riparian Zones	X			This critical element is not present; therefore, it is not further addressed in this EA.
Wild and Scenic Rivers	X			This critical element is not present; therefore, it is not further addressed in this EA.
Wilderness/WSAs	X			This critical element is not present; therefore, it is not further addressed in this EA.

Table 3.1-2: Other Resource Values or Uses

Other Resources or Uses	Present/ Not Affected	Present/ Potentially Affected	Reference Section
Geology and Mineral Resources		X	See Sections 3.12 and 4.11.
Land Use/Access		X	See Sections 3.13 and 4.12.
Livestock Grazing	X		This resource use currently does not occur in the Tucker Hill area. Therefore, none of the alternatives would have an impact to grazing use and this issue is not addressed further in this EA.
Socioeconomics		X	See Sections 3.14 and 4.13.
Soils		X	See Sections 3.15 and 4.14.
Vegetation		X	See Sections 3.9 and 4.8.
Visual Resources		X	See Sections 3.16 and 4.15.
Wildlife		X	See Sections 3.7 and 4.6.
Lands with Wilderness Characteristics	X		This resource is not present; therefore, it is not further addressed in this EA (BLM 2011c).

3.3 Air Quality

Air Quality

Ambient air quality emissions of air pollutants are regulated under both federal and state laws and regulations. The Environmental Protection Agency (EPA) has developed classifications for distinct geographic regions known as air quality management areas. Under these classifications, for each federal criteria pollutant, each air basin (or portion) of an air quality management area (or “planning area”) is classified as in “attainment” if the air quality management area has “attained” compliance with the adopted National Ambient Air Quality Standards (NAAQS) for that pollutant, or is classified as “maintenance” if the monitored pollutants have fallen from nonattainment levels to attainment levels. The Oregon Department of Environmental Quality’s (ODEQ) Air Quality Division is delegated the responsibility for implementing a state implementation plan to set emission limits and allocated pollution control responsibility to meet the NAAQS among other tasks.

The Project Area lies within an EPA NAAQS “unclassified” attainment area. The ODEQ considers the Project Area within state standards for attainment (BLM 1995; page 56).

Greenhouse Gases

Greenhouse gas (GHG) emissions from anthropogenic (human-induced) activities contribute to the phenomena of climate change. The four principle GHGs, carbon dioxide, methane, nitrous

oxide, and halocarbons affect climate by altering incoming solar radiation and outgoing infrared (thermal) radiation that are part of the Earth's energy balance (Forster *et al.* 2007).

3.4 Cultural Resources

The Project is located within the Chewaucan Basin. Evidence shows that humans have occupied this area for thousands of years. The Tucker Hill landform was an integral part of the Chewaucan Basin system of resources used by aboriginal peoples.

Tribal consultation associated with the development of the original mine established that tribal members of the Klamath Tribes, the Burns Paiute Tribe, and the Fort Bidwell Tribe used the Tucker Hill formation and surrounding land from prehistoric times until the 1950's. Consultation with the Confederated Tribes of Warm Springs indicated that individuals from that Tribe also used the area. At some time in the fifties, use tapered off and ceased due to lack of road access to the top of the Tucker Hill EA and a perception that tribal members were not allowed to cross private land.

Cultural surveys of the Tucker Hill area were completed prior to the development of the original mine and identified 35 cultural sites located at Tucker Hill or along the access road from Highway 31. The majority of these have not been formally evaluated for eligibility for listing on the National Register of Historic Places (NRHP) (BLM 1995; pages 40–42). However, sites that were impacted by the original mine development were either mitigated or avoided.

Class III archaeological surveys have been conducted in the proposed pit expansion area on two occasions. Review of the previous surveys for cultural and archaeological resources at Tucker Hill determined that three cultural sites exist within or near the Project Area (Table 3.4-1). Two large sites 35 LK 3048 and 35 LK 3056 are thought to be significant, but have not formally been evaluated for inclusion on the NRHP, and are located north and south of both the existing pit and the proposed expansion.

The Project Area was recently resurveyed by ASM Affiliates, Inc. (2011). They resurveyed the borders of sites 35 LK 3048 and 35 LK 3056 and marked them with steel posts specifically so the mine operators could tell where the sites were located. (These two sites would be avoided through creation of a 100-foot buffer zone between the sites and any surface disturbance).

A third cultural site, 35 LK 3065, a less than two-acre lithic obsidian debitage site, is located within the proposed quarry expansion area. Kautz carried out mitigation of this site, which included surface collection and subsurface testing, in 1996 (Kautz 1996). During the environmental evaluation process for the initial development of the original mine at Tucker Hill this site was evaluated for NRHP eligibility and determined to be ineligible. This determination was reviewed by the Oregon SHPO who agreed that the site is not eligible and did not warrant further testing (Oregon SHPO 1996). The SHPO reaffirmed this finding in 2011 (telephone conversation between BLM Archaeologist and Oregon SHPO dated November 12, 2011).

Table 3.4-1: Cultural Sites within or near the Expansion Area

Site number	Site Type ¹	NRHP Eligibility	Located within APE
35LK3048	Large lithic scatter	No formal evaluation for eligibility	Yes
35LK3056	Large lithic scatter	No formal evaluation for eligibility	Yes
35LK3065	Two-acre lithic obsidian debitage site	Evaluation concluded ineligible	Yes

¹Source: Kautz Environmental Consultants, Inc. 1996.

As a result of previous consultation with Native American Tribes and the Oregon SHPO, a Memorandum of Agreement (MOA) was developed and signed on December 31, 1996, covering mitigation of impacted cultural sites within the existing quarry and all operation areas of the original mine. The MOA was signed by the BLM District Manager, the Oregon Deputy SHPO, Advisory Council on Historic Preservation, The Klamath Tribes, The Burns Paiute Tribe and Atlas Corporation (Appendix B). A Historic Properties Treatment Plan (HPTP) was subsequently developed and implemented. The HPTP contains the names of those Native American Elders, Cultural Specialists and Advisors whom were consulted on the original mine project. The HPTP remains in effect.

3.5 Native American Traditional Values

The existence of archeological and religious sites at Tucker Hill, as discussed in Section 3.4, is of direct interest and concern to Native American communities, both for historic preservation purposes and of socio-cultural values. Native American concerns for these values and archaeological sites have been established through direct consultation with Tribes both for the original mine development and the proposed pit expansion. A report on the importance of the area to Native Americans entitled *Tucker Hill Quarry Project, Tribal Consultation* (1995) by Robert Winthrop, Ph.D., describes the ethnographic setting in the Chewaucan River Basin.

The proposed pit expansion Project Area is located on the geologic formation known as the Tucker Hill formation. Tucker Hill is a relatively small feature consisting of 1,300 acres. The identification of 35 archaeological sites which include obsidian quarry areas, lithic scatters, a burial site, rock art sites, caves with cached material and rock cairn sites confirms the past use of Tucker Hill by Native Americans (BLM 1995; pages 35-38).

The MOA which was signed by the parties involved in the original mine development as mentioned in Section 3.4 remains in effect. BLM consultation with the tribes has been ongoing since the Tucker Hill EIS (BLM 1995; pages 7, 8; 1996b; page S-2) was prepared for the development and operation of the original perlite mine.

During development of the EIS for the original mine, interviews were conducted with Tribal Elders and Cultural Resource Specialist from Tribes associated with the area, including the following: The Klamath Tribes; Burns Paiute Tribe; Confederated Tribes of Warm Springs; and the Fort Bidwell Tribe. Information gathered from these Tribes and related archeological records were compiled to assess Native American concerns relating to the Project. A summary of issues identified are as follows (BLM 1995; pages 38-39). These concerns and issues generally remain the same today.

- Tucker Hill lies within the Lake Abert/Chewaucan Marsh area that many Paiute groups in post-reservation period utilized for plant gathering and hunting;
- Tucker Hill was used traditionally for hunting bighorn sheep;
- Thirteen culturally important plants have been identified at Tucker Hill (Section 3.9);
- Archeological evidence suggests Tucker Hill was used for the procurement of obsidian and the manufacture of stone tools over a 10,000-year time period;
- A relatively high concentration of sites, site types, and artifacts indicates semi-sedentary occupation of the Tucker Hill formation and area;
- The Burns Paiute Tribe, Fort Bidwell Tribe, The Confederated Tribes of Warm Springs and The Klamath Tribes have recognized that Tucker Hill as a site of spiritual importance;
- Tribal consultants have recognized various rock cairns located at Tucker Hill as religious sites. Tribal consultants have recognized the importance of their long-term maintenance; and
- Tribal consultants consider the perceived lack of access as the leading reason for the lack of use of Tucker Hill by Tribal Members. During development of planning for the original mine, while Tribal Members had access to the Tucker Hill formation, new rock stacks began to appear. Archeological evidence suggests Tucker Hill was previously used for religious purposes based on the presence of pictographs/petroglyphs, stacked stone features, cache caves, burials, and the general setting of the formation.

On June 30, 2011, letters were sent from BLM District Manager, Carol Benkosky, to the Tribal Chair of the Confederated Tribes of Warm Springs, Chairman of the Klamath Tribes, Tribal Chair of the Burns Piute Tribe, and the Chairman of the Fort Bidwell Indian Community Council informing each tribe of the Proposed Action and BLM's position that no additional archeological work would be needed to process the Plan amendment. The Confederated Tribes of Warm Springs responded on July 25, 2011, expressing that they believed further review was needed with tribes and the SHPO. The BLM responded on October 14, 2011, restating that no further cultural survey work was required and that SHPO had been contacted and had agreed (specifically to the ineligibility determination of site 35LK3065). A final telephone call was made between Bill Cannon of the BLM, and the SHPO regarding concurrence with the new proposal. Tribal consultation facsimile is available at the BLM Lakeview office.

Additionally, Tribes have expressed concerns regarding whether rock cairns are located within the proposed pit expansion Project Area. No rock stacks are known to be located within the area of site 35 LK 3065 or the quarry expansion area (personal communication of Carol Benkosky, BLM, to Tribal Chair, Burns Paiute Tribe, June 30, 2011). No additional issues regarding the proposed Project expansion have been identified as a result of consultation. However, it should be recognized that the various Tribal groups who have been involved with consultation have repeatedly stated that they desire all archaeological and cultural sites and materials be preserved and protected.

3.6 Recreation

Recreation within Tucker Hill is limited based on land resources present and limited access. Activities include hunting for big game species and upland game birds. There are no developed trails or campsites on Tucker Hill. Some off highway use might occur at the base of Tucker Hill. There is potential for dispersed non-motorized activities as well (BLM 1995; page 45).

3.7 Wildlife

Habitat in the Project Area has been extensively altered as a result of wildland fire in 2002. Available wildlife habitat within the Project Area is marginalized and consists primarily of grasses and nonnative cheatgrass.

Raptor species that potentially could utilize the Project Area include American kestrels (*Falco sparverius*), red-tailed hawks (*Buteo jamaicensis*) and northern harriers (*Circus cyaneus*). Other birds that have the potential to occur in the Project Area include common ravens (*Corvus corax*), prairie falcons (*Falco mexicanus*), barn owls (*Tyto alba*), western meadowlarks (*Sturnella neglecta*), sage thrashers (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*), Brewer's sparrow (*Spizella breweri*), Mountain bluebirds (*Sialia currucoides*), Townsend's solitaires (*Myadestes townsendi*), house finch (*Carpodacus mexicanus*), and northern flickers (*Coaptus auratus*). Cliff faces near the Project Area can be occupied by Canadian geese (*Branta canadensis*), rock doves (*Columba livia*) and cliff swallows (*Hirundo pyrrhonota*) (BLM 1995; page 57; BLM 1996b).

Various small mammals, and small and medium-sized carnivores might frequent the area as well. Coyote (*Canis latrans*) and bobcat (*Felis rufus*) skeletons have been found in the vicinity of the Project Area. Weasels (*Mustela* sp.), desert woodrat (*Neotoma lepida*), kangaroo rat (*Dipodomys* sp.), Great Basin pocket mouse (*Perognathus parvus*), black-tailed jackrabbit (*Lepus californicus*), and the mountain lion (*Felis concolor*) are known to frequent the Project Area as well.

Large game species that are known to occur in the Project Area include mule deer. Pronghorn antelope and bighorn sheep (*Ovis canadensis*) are known to occasionally frequent the Project Area.

Amphibians and reptiles that may occur within the Project Area include the northern leopard frog (*Rana pipiens*), Oregon spotted frog (*Rana pretiosa*), and the western pond turtle (*Clemmys marmoratata*) (BLM 2001; page 2-39).

3.8 Special Status Wildlife Species

Threatened, Endangered and Candidate Species

No known threatened or endangered species occur in the Project Area or the immediate vicinity. One candidate species has the potential to occur within the Project Area or the vicinity: the greater sage-grouse (*Centrocercus urophasianus*).

Greater Sage-Grouse

The nearest greater sage-grouse lek is located approximately 5.5 miles to the south of the Project Area. The *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat* (ODFW 2011) represents the most current and comprehensive greater sage-grouse management guidelines for Oregon and recommends management actions at the local and project-level scales. The Project Area is located within greater sage-grouse “low density” habitat (ODFW 2011). Low density habitat is defined by sagebrush types or other habitats that support greater sage-grouse in areas where: a) low density strata overlapped with seasonal connectivity corridors; b) local corridors occurred outside of the all lek density strata; c) low lek density strata occur outside of connectivity corridors; and d) seasonal connectivity corridors occur outside of all lek density strata.

In December of 2011, the BLM issued Instruction Memorandum (IM) No. 2011-043, entitled *Greater Sage-Grouse Interim Management Policies and Procedures* (BLM 2011a). This direction addresses BLM activities within two types of sage-grouse habitats including Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH). These habitat descriptions, PPH and PGH, generally correspond to the same habitats in the Oregon Sage-Grouse Strategy as Core Habitat and Low Density Habitat respectively. Approximately 107 acres of the Project Area is located in PGH or low density habitat. Conformance with this IM is discussed in Section 1.3.

Threats within the Project Area were factored from pertinent information provided in *Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats* (Connelly and Knick 2011) and from the United States Fish and Wildlife Service (USFWS) *Endangered and Threatened Wildlife and Plants: 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered* (USFWS 2010). Habitat within the Project Area is marginalized as a result of wildland fire in 2002. Wildland fire is considered a contributing factor to the declining habitat availability of sage-grouse sagebrush habitats: “Many of the native vegetative species of the sagebrush-steppe ecosystem are killed by wildfires, and recovery requires many years...fire is one of the primary factors linked to population declines of greater sage-grouse because of long-term loss of sagebrush” (USFWS 2010).

BLM Sensitive Species

Golden and Bald Eagles

Golden (*Aquila chrysaetos*) and Bald eagles (*Haliaeetus leucocephalus*) are protected by the Migratory Bird Treaty Act of 1918 (as amended) and the Bald and Golden Eagle Protection Act of 1940 (as amended) (USFWS 1918; USFWS 1940), both of which prohibit taking of migratory birds, their parts, nests, eggs, and nestlings without a permit.

Roosting and foraging habitat for the bald eagle have been observed in the Project Area. The nearest roosting site is located several miles northwest of the Project Area on U.S. Forest Service lands. Golden eagles are known to occur in the general area of the Project. Two golden eagle nests are located approximately one mile northeast of the Project Area on Tucker Hill. Both of these nests are located outside of the line of sight of the Project and are alternate nests for one

nesting pair. Golden eagles are year-round residents in the general area of Tucker Hill (personal communication, Todd Forbes, BLM Assistant Field Manager, December 13, 2011).

Peregrine Falcon

Peregrine Falcon's (*Falco peregrinus*) are known to nest near Tucker Hill. Peregrine falcons have been hacked (raised and released to the wild) approximately 25 miles northwest of Tucker Hill and have been known to occasionally forage over the Chewaucan Marsh (BLM 1995; page 59).

Bats

The pallid bat (*Antrozous pallidus*); Townsend's big-eared bat (*Corynorhinus townsendii*); fringed myotis (*Myotis thysanodes*); and spotted bat (*Euderma maculatum*) have some suitable habitat within the Project Area (BLM 2011c).

Pygmy Rabbit

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. However, pygmy rabbits have not been recorded in the area (BLM 1995; page 59).

Burrowing Owls

The burrowing owl (*Athene cunicularia*), has marginal habitat within the Project Area and vicinity (BLM 2011c).

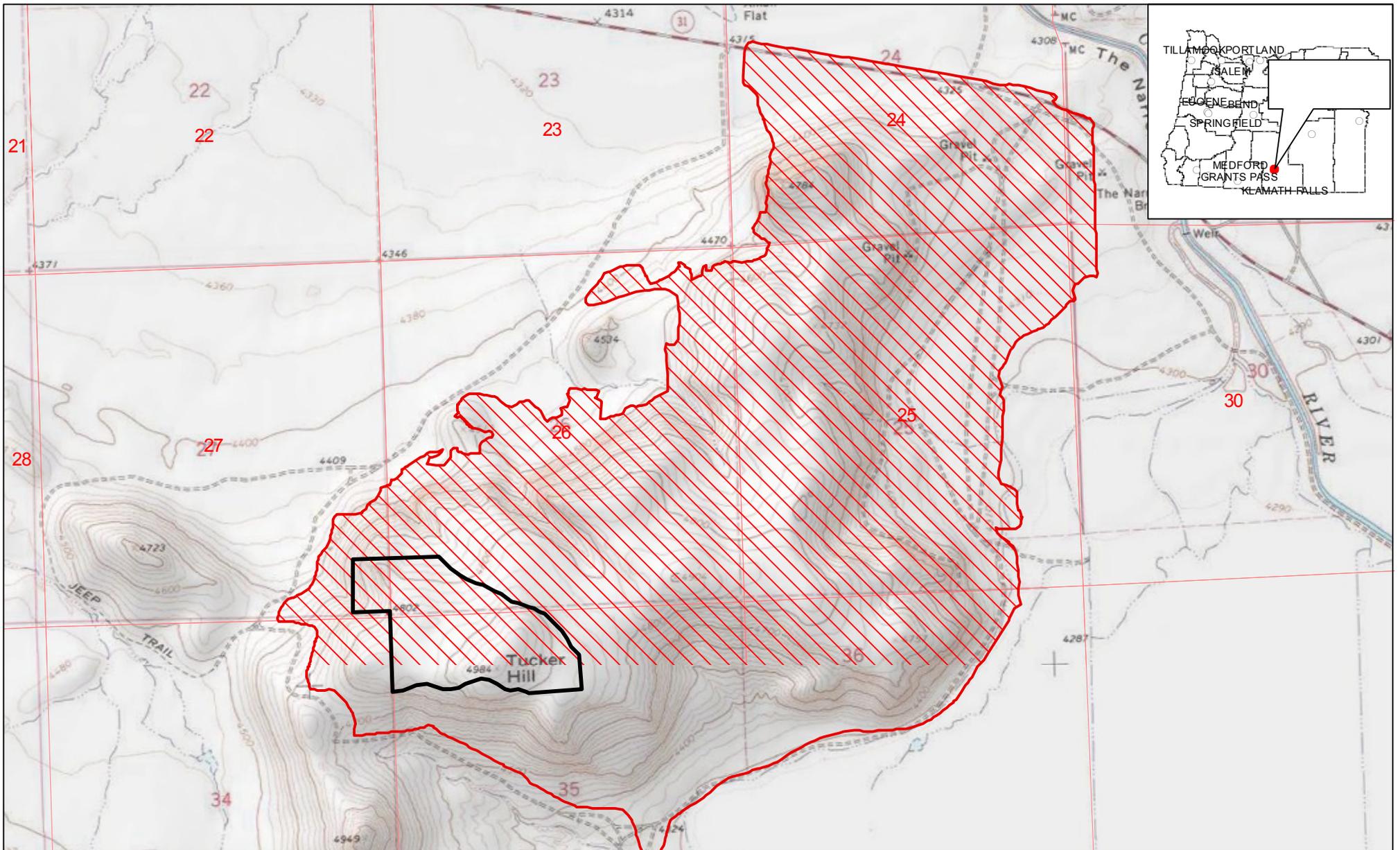
Other Special Status Species

The Chewaucan Marsh, near the Project Area, includes habitat for candidate and special status species including greater sandhill crane (*Grus canadensis*); white-faced ibis (*Plegadis chihi*); the Oregon Lake tui chub (*Gila bicolor oregonensis*); and the interior redband trout (*Oncorhynchus mykiss gibbsi*) (BLM 1995; page 60).

Other special status species that may potentially occur within the Project Area and vicinity include Preble's shrew (*Sorex preblei*), Merriam's shrew (*Sorex merriami*), northern sagebrush lizard (*Sceloporus graciosus graciosus*), the western fence lizard (*Sceloporus occidentalis*) and the kit fox (*Vulpes macrotis*) (BLM 2011c).

3.9 Vegetation

The vegetation of Tucker Hill has been extensively altered as a result of a wildland fire in 2002 (Figure 3.9.1). A complete list of plant species found on Tucker Hill during a 2011 survey, including the Project Area, is listed in Table 3.9-1 (BLM 2011d). The 2002 wildland fire resulted in the removal of most of the sagebrush vegetation that previously existed within the Project Area. The post-fire vegetation consists of native grasses as a result of reseeding and extensive amounts of cheatgrass (*Bromus tectorum*) (personal communication, Todd Forbes, Assistant Field Manager, December 1, 2011).



Explanation

-  Project Area
-  Fire Perimeters (2000-2011)

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
 1301 S. "G" Street
 Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Fire Disturbed Vegetation
 within the Project Area



Projection: UTM Zone 10 North, NAD83



Figure 3.9.1

11/16/2012

Culturally Important Plant Species

Several plant species found in the Project Area are important to Native Americans for the maintenance of their culture. Based on ethnographic documentation of the Project Area, the following species are culturally important for food and fiber and may occur within the the Project area: gray desert parsley/biscuit root (*Lomatium macrocarpum*); desert celery (*Lomatium nevadense*); Canby’s desert parsley (*Lomatium canbyi*); spiked wheat grass (*Agropyron spicatum*); Indian onion (*Allium parvum*); big sagebrush; Great Basin wildrye; juniper (*Juniperus sp.*); Indian asparagus (*Orobanche fasciculata*); squaw currant (*Ribes cereum*); white-stemmed stickleaf (*Mentzelia albicaulis*); and tumble mustard (*Sisymbrium altissimum*) (BLM 1995; page 54).

Table 3.9-1: Plant Species in Project Area

Trees and Shrubs	Forbes	Grasses/Sedges/Rushes
Wyoming big sagebrush (<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>)	Menzies’ fiddleneck (<i>Amsinckia menziesii</i>)	Cheatgrass (<i>Bromus tectorum</i>)
Rubber rabbitbrush (<i>Ericameria nauseosa</i>)	Pussytoes (<i>Antennaria</i> sp.)	Squirreltail (<i>Elymus elymoides</i>)
Antelope bitterbrush (<i>Purshia tridentata</i>)	Basalt milkvetch (<i>Astragalus filipes</i>)	Needle and thread (<i>Hesperostipa comate</i>)
	Rough eyelashweed (<i>Blepharipappus scaber</i>)	Sandberg bluegrass (<i>Poa secunda</i>)
	Desert paintbrush (<i>Castilleja chromosa</i>)	Thurber’s needlegrass (<i>Stipa thurberiana</i>)
	Desert larkspur (<i>Delphinium parishii</i>)	Intermediate wheatgrass (<i>Thinopyrum intermedium</i>)
	Sulphur-flower buckwheat (<i>Eriogonum umbellatum</i>)	
	Whitedaisy tidytips (<i>Layia glandulosa</i>)	
	Lewis flax (<i>Linum lewisii</i>)	
	Stemless dwarf lupine (<i>Lupinus caespitosus</i>)	
	Silver lupine (<i>Lupinus albifrons</i>)	
	Alpine lake false dandelion (<i>Nothocalais alpestris</i>)	
	Threadleaf linearis (<i>Phacelia linearis</i>)	
	Longleaf phlox (<i>Phlox longifolia</i>)	
	Shasta clover (<i>Trifolium productum</i>)	

3.10 Noxious Weeds, Invasive and Nonnative Species

A recent survey conducted within the Project Area identified a small infestation of one noxious weed species, nodding plumeless thistle (*Carduus nutans*) within the Project Area (BLM 2011d). The nodding plumeless thistle is classified as a “B” weed by the Oregon Department of

Agriculture. Control of “B” weeds may vary depending on site-specific and case-by-case factors. The goal of “B” weed management is control and prevention of new infestations within the State of Oregon (ODA 2011).

3.11 Water Quality – Surface and Ground

The Project Area and vicinity are relatively arid and receive approximately 10 inches of precipitation per year. The water table is relatively deep. Ground water is reported in water wells at a depth greater than 300 feet below surface of the playa lake surface, approximately 600 feet below the summit of Tucker Hill. Additionally, no surface waters, other than intermittent waters from storm events exist at the site (BLM 1995; page 68). The nearest source of surface water is the Chewaucan River located north and east of the Project Area, approximately 12,000 feet from the quarry and 1,900 feet from the waste material site.

3.12 Geology and Minerals

The geology of the Project Area consists of basalt and andesite, rhyolite core, inner glass envelope of onion-skin perlite, and outer glass envelope that is mostly of granular and vesicular perlite. The Tucker Hill rhyolite dome complex is a package of cooling units related to several rhyolitic vents that originated from a single volcanic event. The Tucker Hill complex demonstrates distinct lateral and vertical zonation. Two major cooling units are recognized, an outer chill margin and an inner rhyolitic core. Vesicle (air pocket) abundance within the rock increases outwards from the rhyolite core through the chill margin as a result of degassing and quenching of the once molten lava. The chill margin was originally obsidian that was converted to perlite as the result of secondary hydration through continued contact with meteoric waters. Obsidian that remains is found as local zones of Apache Tears. The chill margin contains various sub-units of perlite. The perlite sub-units are based on textural differences that resulted from variable degassing. Differential erosion of the Tucker Hill lava dome has removed portions of the outer glass envelope, exposing the rhyolite core (Cornerstone 2012).

3.13 Land Use/Access

Access to the Tucker Hill Quarry crosses 0.8 mile of private land owned by the Simplot Company, which operates as a cattle ranch. Cornerstone acquired permission to use and/or improve the road where it crosses private land (BLM 1995; page 60; BLM 1996b).

3.14 Socioeconomics

As of 2010, the population for the State of Oregon has grown to 3,831,074. Lake County increased by 6.4 percent from 2000 to 2010 with a population of 7,895. The population trend since 1960 in the area has been relatively stable (BLM 1995; pages 60 and 61).

In 2000, 57.3 percent of the Lakeview population 16 years and over were in the labor force compared to 63.9 percent for the country (U.S. Census Bureau 2007). Per capita income between 2005 and 2009 for Lake County was \$19,817, below the State of Oregon average of \$25,893 (U.S. Census Bureau 2010).

The median value of Lakeview homes between 2005 and 2009 was \$114,500 compared to \$244,200 for the State of Oregon. A total of 3,248 households were accounted for in the 2005-2009 survey (U.S. Census Bureau 2010).

Cornerstone is the fifth largest employer in Lake County, Oregon, and is the largest shipper on the Lake County Railroad, moving the highest volume of rail cars on the Lakeview Branch Line (greater than 60 percent) (BLM 2008; pages 3-4). At the present time, Cornerstone has 30 employees.

3.15 Soils

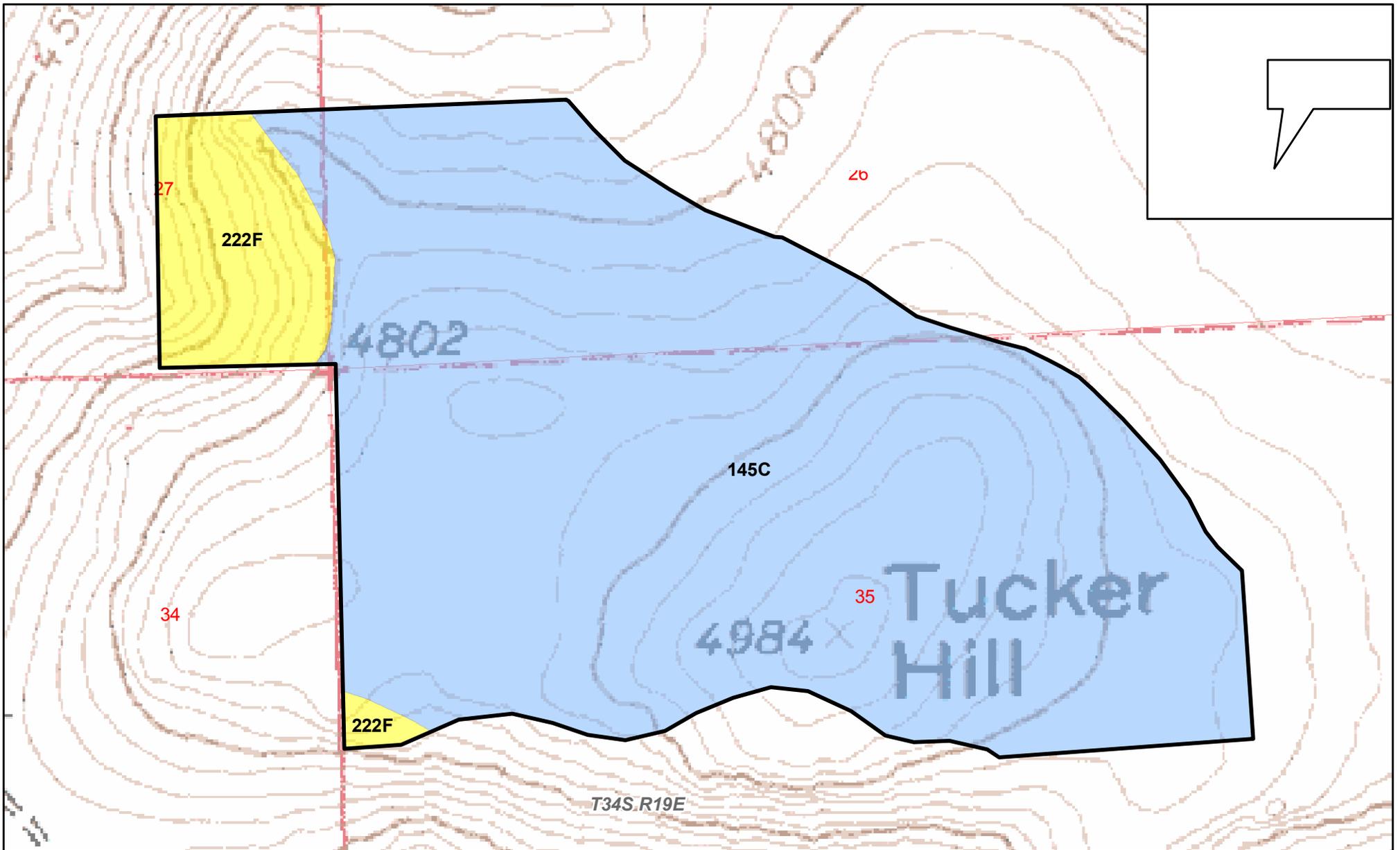
The Natural Resources Conservation Service (NRCS) has classified soils in the proposed Project Area as Lorella Gravelly Sandy Loam (soil 145C) and Redcanyon-Rock Outcrop Complex (soil 222F) (Figure 3.15.1).

The Lorella Gravelly Sandy Loam (soil 145C) occurs in areas of low precipitation on slopes of two to 15 percent (98.2 acres). The Lorella series consists of shallow, well drained soils formed in colluviums and residuum from tuff and basalt. Typically the surface is very dark brown gravelly sandy loam approximately eight inches thick. The subsoil is dark brown very cobbly clay loam approximately four inches thick over bedrock (BLM 1995; page 49).

The Redcanyon-Rock Outcrop Complex (soil 222F) is found on south slopes of 30 to 50 percent (9.6 acres). 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 a brown and dark brown extremely bouldery loam and is 18 inches thick. The upper part of the subsoil is a pale brown extremely bouldery loam that is 11 inches thick over a calcareous light yellowish brown extremely bouldery loam that is two inches thick (BLM 1995; page 49). None of these soil types are classified as prime and unique farmlands.

Table 3.15-1: Soil Series in Project Area

Soil Type	Erosion Hazard		Flooding Frequency	Permeability	Suitability as Roadfill	Suitability as Topsoil
	Water	Wind				
Lorella Gravelly Sandy Loam (145C)	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
Redcanyon-Rock Outcrop Complex (222F)	Moderate	Low	None	Slow	Poor, due to depth to rock and slope	Poor, due to small stones and slope



Explanation

Project Area

NRCS Soil Survey or636

145C, Lorella gravelly sandy loam, low precipitation, 2 to 15 percent slopes (98.2 acres)

222F, Redcanyon-Rock outcrop complex, 30 to 50 percent south slopes (9.6 acres)

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Soil Associations
within the Project Area

Figure 3.15.1

11/16/2012



Projection: UTM Zone 10 North, NAD83



3.16 Visual Resources

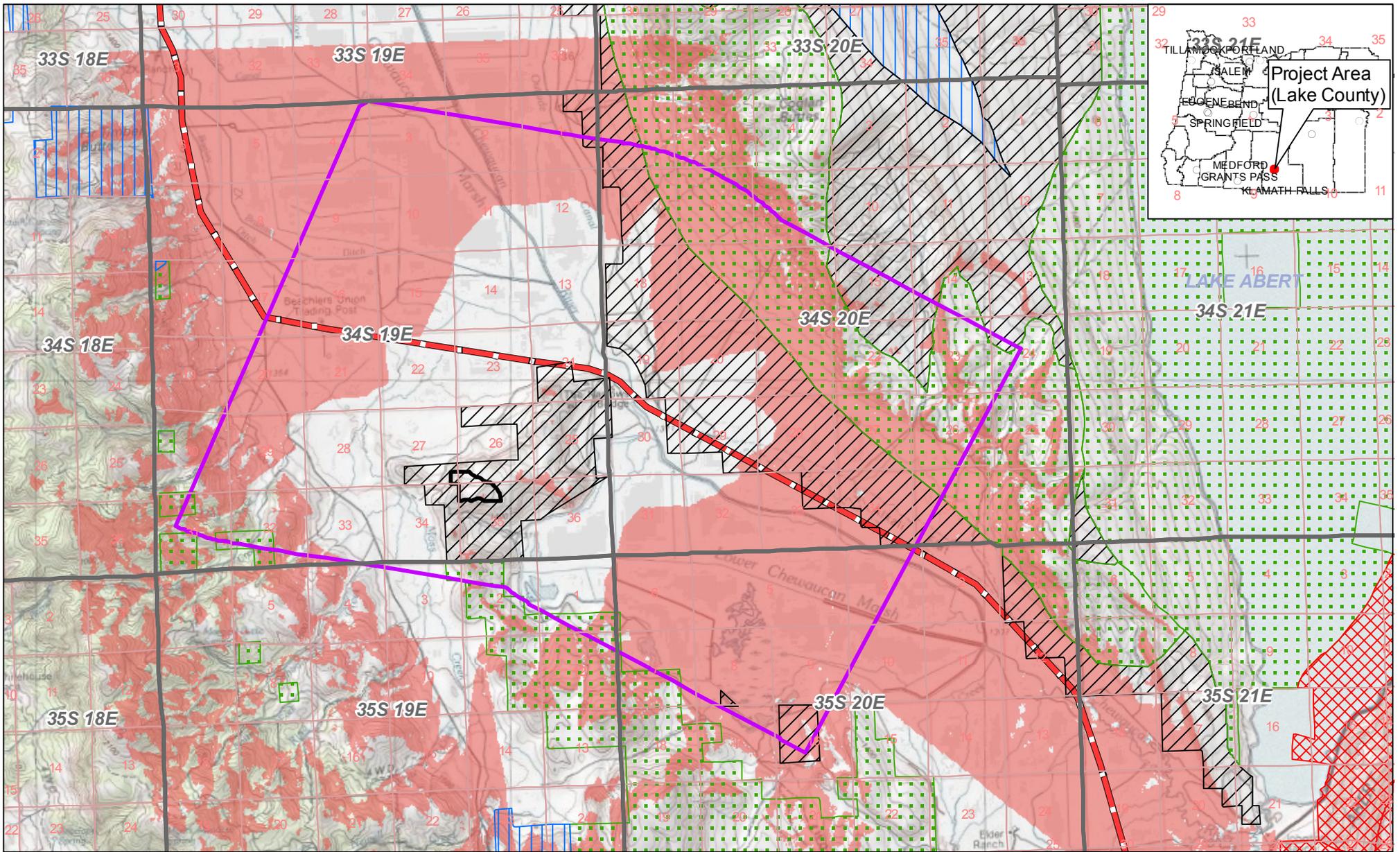
The Project Area is located east of Highway 31 on Tucker Hill. The area falls within an area designated as visual resource management (VRM) Class III (BLM 2003b, Map VRM-3) (Figure 3.16.1). Management objectives for Class III are to “partially retain the existing character of the landscape. Moderate levels of change are acceptable. Management activities may attract attention, but should not dominate the view of a casual observer. Within a VRM Class III, changes should conform to the basic elements of the predominant natural features of the characteristic landscape” (BLM 2001; Appendix M3, page A-290).

The Project Area is also located within a designated scenic buffer associated with the Oregon Outback National Scenic Byway along Highway 31 (Figure 3.16.1). Management direction requires “all developments, land alterations, and vegetation manipulations within a three-mile buffer...of all major travel routes and recreation use areas will be designed to minimize visual impacts. All projects will be designed to maximize scenic quality and minimize scenic intrusions” (BLM 2003b; page 88). This standard applies to only those portions of the Project Area that are visible from the highway (Figure 3.15.2).

When approaching the Project Area from Highway 31 heading east, Tucker Hill is the predominant skyline feature. Incised canyons and rock outcrops on the hill provide contrast to the uniform grey-green-golden vegetation found on visible slopes. Visible juniper trees are located in sporadic locations on the top of Tucker Hill. The more immediate landscape between the highway and Project Area is dominated by agriculture lands and associated features. The existing mine can be seen from locations along the scenic byway or Key Observation Points¹(KOPs). While it is possible to see the topsoil salvage berms along the rim of the quarry (KOPs #2, #3, #4) and waste storage area piles near the highway (KOPs #1 and #5), these berms and piles would likely be unnoticed by the casual observer. KOPs of the Project Area are shown on Figure 3.16.2 and were selected as representative locations from the surrounding landscape.

Photographs were taken by the BLM from these KOPs to show the existing condition. In addition, contrast rating sheets for each of the KOPs. These sheets are located in Appendix A. Photo simulations of KOPs 2 through 5 were prepared to show full build out of the Project and following reclamation. These photos and photo simulations are included in Section 4.15.

¹ KOPs or critical viewpoints are usually established along commonly traveled routes or at likely observation points. Factors considered in selecting KOPs include: angle of observation, number of viewers, length of time the project is in view, relative project size, season of use, and light conditions.



Explanation

-  Project Area
-  Three-mile wide scenic highway corridor
- VRM Class**
-  Class I
-  Class II
-  Class III
-  Class IV

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

-  Highway 31
-  Area along Oregon Outback Scenic Byway from which Growth Medium Berms and Waste Storage Pits are Visible
-  Area along Oregon Outback Scenic Byway from which Growth Medium Berms and Waste Storage Pits are Not Visible

LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Visual Resource Management Classes and Oregon Outback National Scenic Byway, Highway 31

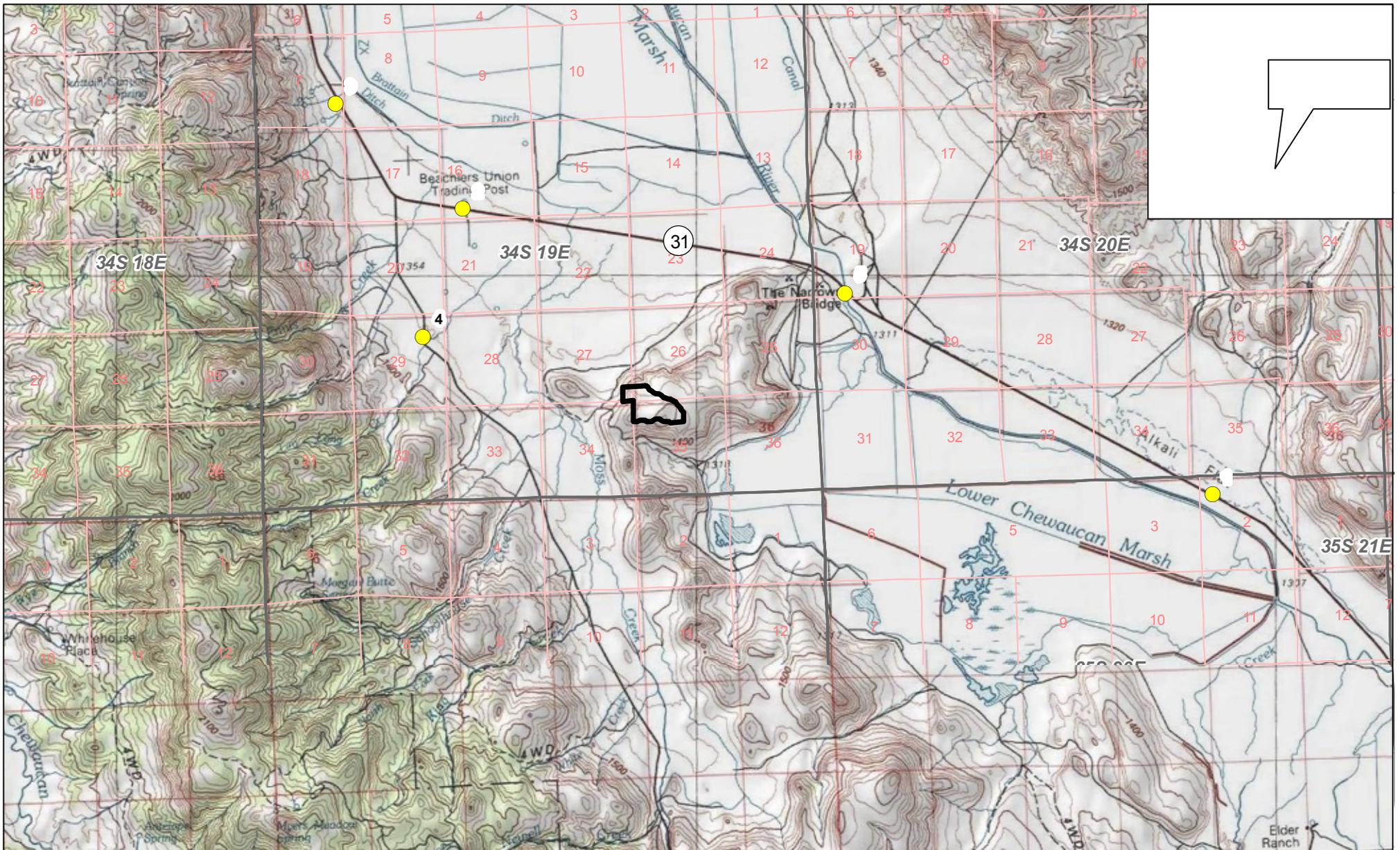
Figure 3.16.1

11/30/2012

0 1 2 3 Miles

Projection: UTM Zone 10 North, NAD83





Explanation

-  Project Area
-  Key Observation Point

LAKEVIEW DISTRICT OFFICE
 1301 S. "G" Street
 Lakeview, OR 97630



BUREAU OF LAND MANAGEMENT

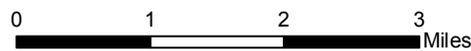
TUCKER HILL PROJECT

Visual Resources
 Key Observation Points

Figure 3.16.2

11/16/2012

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.



Projection: UTM Zone 10 North, NAD83



4 ENVIRONMENTAL CONSEQUENCES

The direct and indirect effects of the Proposed Action and the No Action Alternative on resources present in the area are discussed in this section. Cumulative impacts are discussed separately in Section 4.16. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8).

4.1 Introduction

The impacts of the development and subsequent operation of the original 23-acre perlite mine on top of Tucker Hill were previously analyzed in an EIS completed in 1996. This chapter will focus on describing the site-specific impacts of expanding the Tucker Hill quarry by 47 acres, as described in Chapter 2. Where appropriate, the analysis will incorporate and/or tier off of the analysis of environmental consequences in Chapter 4 of the EIS for *Atlas Perlite, Inc.'s Tucker Hill Perlite Project* (BLM 1995; 1996b). The reviewer should refer to the EIS for additional information. Page numbers referring to the specific sections of the EIS are included in resource impact discussions, as applicable (BLM 1995; 1996b).

It is assumed for this analysis that under the No Action Alternative, the Project would not expand any further. Under the No Action Alternative, the Project would continue current operations until the perlite ore is exhausted and it is no longer economically feasible to mine.

4.2 Air Quality

4.2.1 No Action Alternative

The potential impacts to air quality as a result of the No Action Alternative would have direct short-term and long-term impacts to air quality in the general area of Tucker Hill. Fugitive dust emissions would result from the quarrying process, including the use of haul roads. Haul roads would continue to use water sprays, to reduce fugitive dust emissions. Haul trucks would contribute to fugitive dust emissions as a result of fuel combustion. Impacts to air quality from haul trucks are considered negligible. Long-term impacts would include fugitive dust emissions as a result of general surface disturbance within the Project Area that would subside as a result of the successful reclamation of the waste rock dump and haul road, as outlined in the 1996 EIS (BLM 1996a; pages 6-7).

The annual estimate of carbon dioxide emission from all quarry operations and road maintenance activities is about 0.001623 million metric tons. This represents no more than 0.000091 percent of all annual U.S. transportation related emissions and no more than 0.000028 percent of all U.S. human-related emissions (Table 4.2-1) (EPA 2012).

4.2.2 Proposed Action

Proposed activities at the quarry pit are expected to have air quality impacts within the Project Area that are comparable to, but more than, the No Action Alternative. Specifically, existing levels of fugitive dust and hydrocarbon emissions from haul and water trucks would continue for an additional 15 years. During the Project, fugitive dust from haul roads would be controlled

Table 4.2-1: Project Carbon Dioxide Emissions and the U.S.

Activities	Carbon Dioxide Emissions	Units
U.S. all human-related*	5,730.31	million metric tons
U.S. Transportation*	1,776.40	million metric tons
Project	0.001623	million metric tons
Project's contribution to the U.S. all human-related	0.000028	percent
Project's contribution to the U.S. Transportation	0.000091	percent

*Note: Information from 2010 EPA data

using water sprays. Growth media stockpiles would be seeded to reduce fugitive dust. Following reclamation, all areas but the highwalls would be revegetated, minimizing fugitive dust emissions. Long-term impacts, which would continue until reclamation is complete and approved, to the air quality of the quarrying site would be minimized by the reclamation of the waste rock site and haul road to eliminate the majority of fugitive dust emissions.

Greenhouse Gasses

Carbon dioxide, nitrous oxide, and methane would be generated during quarry operations primarily by equipment use (generators, dozers, track drill rigs, excavators, graders, loaders etc.) and vehicle travel (haul trucks, water trucks, etc.). Generation of carbon dioxide would occur during blasting operations utilizing ANFOs. This Project would have no effect on carbon storage/sequestration processes and cause no measurable increases in U.S. or global nitrous oxide and methane emissions. For this reason, the remainder of this impact discussion focuses on estimating carbon dioxide emissions.

Table 4.2-2: Carbon Dioxide Emissions from Proposed Mining Equipment

Emission Unit	Emission Factors ¹ (lbs/gal)	Fuel Consumption (gal/hr)	Operational Hours (hr/yr)	No. of Units	CO ₂ Emissions (lbs/yr)	CO ₂ Emissions (tons/yr)
Loader 938911 CAT	22.23	4.50	1200	1	1.20E+05	60
Loader 980H CAT	22.23	8.10	1500	1	2.70E+05	135
Dozer D9T CAT	22.23	19.50	1200	1	5.20E+05	260
Grader 12M CAT	22.23	4.50	700	1	7.00E+04	35
Excavator 320 CL CAT	22.23	3.70	700	1	5.76E+04	29
Skidsteer 226 B2 CAT	22.23	2.02	700	1	3.14E+04	16
Driller	22.23	6.00	120	1	1.60E+04	8

¹ 40 CFR 600.113-78 gives carbon content values of 2,778 grams C/gallon for diesel fuel. Heat Contents from the Annual Energy Review 2002, DOE/EIA 0384 (2002), US Department of Energy, Energy Information Administration, Washington, DC, October 2003. Unit Conversion, Emission Factors and Other Reference Data, EPA 2004.

Based on the above calculations, the total carbon dioxide emissions associated with mining equipment would be about 492.6 metric tons annually and the total carbon dioxide emissions associated with the on-site vehicles would be about 996 metric tons annually.

Table 4.2-3: Carbon Dioxide Emissions from On-Site Vehicles

Emission Unit	Emission Factors ² (lbs/gal)	Fuel Rate (miles/gal)	VMT (miles/yr)	Fuel Consumption (gal/yr)	No. of Units	CO ₂ Emissions (lbs/yr)	CO ₂ Emissions (tons/yr)
Haul Truck	22.23	5	115,400	23,088	4	2.05E+06	1,026
Service Truck	19.37	5.5	23,400	4,255	1	8.24E+04	41
Pickup Truck	19.37	18	18,200	1,011	1	1.96E+04	10
Water Truck	22.23	5	9,100	1,820	1	4.05E+04	20

² 40 CFR 600.113-78 gives carbon content values of 2,421 grams C/gallon for gasoline and 2,778 grams C/gallon for diesel fuel. Heat Contents from the Annual Energy Review 2002, DOE/EIA 0384 (2002), US Department of Energy, Energy Information Administration, Washington, DC, October 2003. Unit Conversion, Emission Factors and Other Reference Data, EPA 2004.

The total diesel fuel consumption for the Detroit V12 Diesel Generator of the project is about 45 gallons per hour with 1,500 hours of annual operation. Carbon dioxide emissions from the generator would be about 78 metric tons annually.

The annual ANFO used for the blasting operations for the project is 75,000 pounds per year. The explosive is estimated to release about 1.67 pounds of carbon dioxide per one pound of ANFO (Climate Mitigation Services 2007). Carbon dioxide emissions from the blasting operations would be about 57 metric tons annually.

4.3 Cultural Resources

4.3.1 No Action Alternative

Under the No Action Alternative, impacts to cultural resources were mitigated in accordance with the HPTP to the extent possible. Archeological sites of cultural importance would be avoided as discussed in the 1996 EIS (BLM 1996b; pages 74-76) and approved in the 1996 ROD (BLM 1996a).

4.3.2 Proposed Action

Under the Proposed Action, one site, 35 LK 3065 would be destroyed. During the development of the original mine, this site was evaluated and found not to be eligible for inclusion in the NRHP. It was determined to be within the buffer zone for the original quarry and as such, had been cleared for potential destruction. All required mitigation on the site has been conducted. The Oregon SHPO agrees that the site is not eligible for the NRHP inclusion. No adverse impacts to archaeological resources are expected with the destruction of this site. There are two other archaeological sites within the immediate vicinity of the Proposed Action, sites 35 LK 3048 and 35 LK3056. These sites have been resurveyed to determine their borders and permanent markers have been placed along their borders. During development of the Proposed Action, these sites would be avoided. A buffer zone of 100 feet would be established around the borders of sites 35 LK3048 and 35 LK3056. Both of these sites would remain unevaluated and would be avoided under the Proposed Action. Therefore, no impacts would occur to cultural resources.

4.4 Native American Traditional Values

4.4.1 No Action Alternative

Under the No Action Alternative, many of the impacts to Native American Traditional Values would be similar to those discussed under Cultural Resources above. Visual impacts from the quarry to the spiritual values of the area would be reduced following reclamation activities, but would not be fully mitigated as the result of the permanent loss of a part of the Tucker Hill Formation. Impacts to Native American Traditional Values would be avoided or mitigated to the extent feasible according to the HPTP, and as discussed in the EIS (BLM 1995; pages 72-76) and approved in the 1996 ROD (BLM 1996a).

Culturally important plant species, if present, would likely be permanently removed from the existing quarry site and access road, even after reclamation (BLM 1995; page 78).

4.4.2 Proposed Action

Cultural sites within the quarry expansion area have been resurveyed, and boundaries of the quarry expansion have been demarcated on the ground specifically to avoid sites 35 LK 3048 and 35 LK 3056, which are located along the edge of the Project Area. The Oregon SHPO has concurred that site 35 LK 3065, which is within the Project Area, is not eligible for inclusion in the NRHP (Oregon SHPO 1996 and telephone conversation between BLM Archaeologist and Oregon SHPO dated November 12, 2011). The Project would not result in any adverse impacts to eligible archaeological sites within the Project Area.

During consultation, Native Americans have repeatedly expressed the belief that all archaeological sites should be preserved and protected and that any impacts to sites, even with mitigation, or destruction of sites, regardless of their significance, is a violation of their beliefs. Native Americans consider mitigation to be futile in reducing the impacts of the Project.

Culturally important plant species, if present, would likely be permanently removed from the expanded quarry site, even after reclamation.

4.5 Recreation

4.5.1 No Action Alternative

Recreational opportunities within the Project Area under the No Action Alternative would continue to be limited by low quality habitat for big game and upland game bird hunting, and surrounding private lands (BLM 1995; page 91). In addition, recreation would continue to be limited by the lack of legal road access across private land into the Project Area. These opportunities would be further reduced as the result of the 2002 wildfire that occurred within the Project Area.

4.5.2 Proposed Action

The Proposed Action would increase surface disturbance within the Project Area by 47 acres, which would subsequently reduce potential habitat for big game and upland game bird species

and associated hunting opportunities. However, these impacts would occur within relatively poor quality game habitat, and would therefore, not significantly impact existing recreational opportunities on Tucker Hill or immediately adjacent BLM administered lands.

4.6 Wildlife

4.6.1 No Action Alternative

Under the No Action Alternative, the impacts would be similar to those addressed in the DEIS. Approximately 29.3 acres of native habitat within the Project Area would be unavailable as breeding habitat for small birds, mammals, and reptiles and as foraging habitat for raptors and larger mammals (BLM 1995; page 80).

4.6.2 Proposed Action

The Proposed Action would result in an additional 47 acres of habitat disturbance within the Project Area. However, due to a recent wildland fire in 2002, habitat within the Project Area has been extensively marginalized. This habitat would be unavailable as breeding habitat for small birds, mammals and reptiles and as foraging habitat for raptors and larger mammals. The direct loss of 47 acres of habitat would represent a temporary loss in duration of the life of the mine and subsequent reclamation, relative to the available surrounding habitat. Impacts to wildlife would be minimized by reclaiming disturbed areas as quickly as practicable. The long-term (i.e., for the life of the Project) impacts to wildlife habitat (as a result of the pit area) would be off-set since reclamation and reestablishment of native species would likely take place within a few years of the Project's completion. Wildlife habitat in the Project Area would be improved somewhat as a result of reseeding the area with native species.

4.7 Special Status Wildlife Species

4.7.1 No Action Alternative

No impacts to threatened or endangered species would occur under the No Action Alternative. The small amount of permanent and temporary sagebrush habitat loss associated with the existing mine was determined to have a minimal impact on sage-grouse habitat, relative to the available surrounding habitat (BLM 1995; page 80-81).

Blasting activities would occur outside of raptor breeding season that could potentially impact Bald and Golden eagles or roosting bats (BLM 1995; pages 80-81). In addition, on-site monitoring by the BLM of previous blasting activities associated with the current quarry operations did not result in any eagle nest abandonment or other impacts (personal communication Glenn Lorton, October 25, 2012).

No impacts would occur to other special status species under the No Action Alternative. Peregrine falcons, pygmy rabbits, burrowing owls, Preble's shrew, Marriam's shrew, northern sagebrush lizard, western fence lizard, and kit fox are unlikely to occur in the immediate Project Area (BLM 1995; pages 59-60, 81). Therefore, continued operation of the mine would not likely impact these species.

4.7.2 Proposed Action

Threatened, Endangered and Candidate Species

No threatened or endangered species would be impacted as a result of the Proposed Action. The only candidate species potentially affected by the proposed mine expansion is the greater sage-grouse.

Greater Sage Grouse

In a letter dated December 19, 2011, the Oregon ODFW determined that the current mine and expansion area is located in low density greater sage-grouse habitat. However, the letter also acknowledges that as a result of a wildland fire in 2002, greater sage-grouse habitat within the Project Area has been extensively marginalized, and the potential occurrence of greater sage-grouse in the Project Area is unlikely. The ODFW recommended a 1:1 habitat mitigation ratio based on the current Oregon greater sage-grouse conservation policy. As a mitigation measure, Cornerstone would remove 47 acres of young invasive juniper trees south of the Project Area to benefit greater sage-grouse habitat (Figure 4.7.1). This mitigation would be implemented subsequent to the approval of this EA and would offset impacts to greater sage-grouse habitat.

BLM Sensitive Species

Golden and Bald Eagles

Impacts to Bald and Golden eagles have the potential to occur as a result of Project-related activities. Two Golden eagle nests are located northeast of the Project Area on Tucker Hill, both nests are on cliff faces that are out of sight of the Project Area. The nests are located 1.2 miles and 1.4 miles respectively from the proposed mine expansion.

Bald and Golden eagles may be temporarily disturbed by blasting activities relating to the expansion of the quarry pit. However, these activities are unlikely to affect either species. No bald eagle nests are located within the vicinity of the Project Area. Golden eagle nests are located in areas that would not be impacted by blasting activities such as fly-rock, pressure waves, or excessive noise. Therefore, impacts to Bald and Golden eagles, including a taking of either species, are not expected to occur.

Project activities such as crushing and blasting related to the expansion of the quarry would potentially impact Bald and Golden eagles wintering in the area. Infrequent, seasonal blasting impacts would occur away from nesting sites that would potentially impact Bald and Golden eagles and other raptor species.

Peregrine Falcon

The occasional frequency of Project-related blasting activities and the infrequent occurrence of this species in the Project Area makes it unlikely this species would be impacted by the Proposed Action. Therefore, expansion of the mine would not impact this species.

Bats

Impacts to the pallid bat, Townsend's Big-eared bat, fringed myotis, and the spotted bat would have potential to occur as a result of Project-related activities. However, habitat for these species is extremely marginal, and no roost sites have been located within the Project Area (BLM 2011c). Furthermore, the infrequency of blasting would unlikely lead to an impact to bat colonies.

Pygmy Rabbit

Habitat for pygmy rabbit has been marginalized within the Project Area as a result of a 2002 wildland fire that had altered the vegetative community structure of Tucker Hill. Therefore, further impacts to habitat for this species are not likely to occur.

Burrowing Owls

Burrowing owls have marginal habitat within the Project Area. No known nesting areas have been located for this species within the Project Area (BLM 2011c). Therefore, further impacts to habitat for this species are not likely to occur.

Other Special Status Species

Shorebird species that utilize the Chewaucan Marsh would not be negatively impacted by the Project. There is no suitable wetland habitat located within the Project Area and no impacts from the Project would affect the larger Chewaucan drainage or habitat contained therein. Suitable potential habitat for other special status species (Preble's shrew, Marriam's shrew, northern sagebrush lizard, western fence lizard, and kit fox) is limited within the Project Area. Therefore, impacts to these species are not likely to occur.

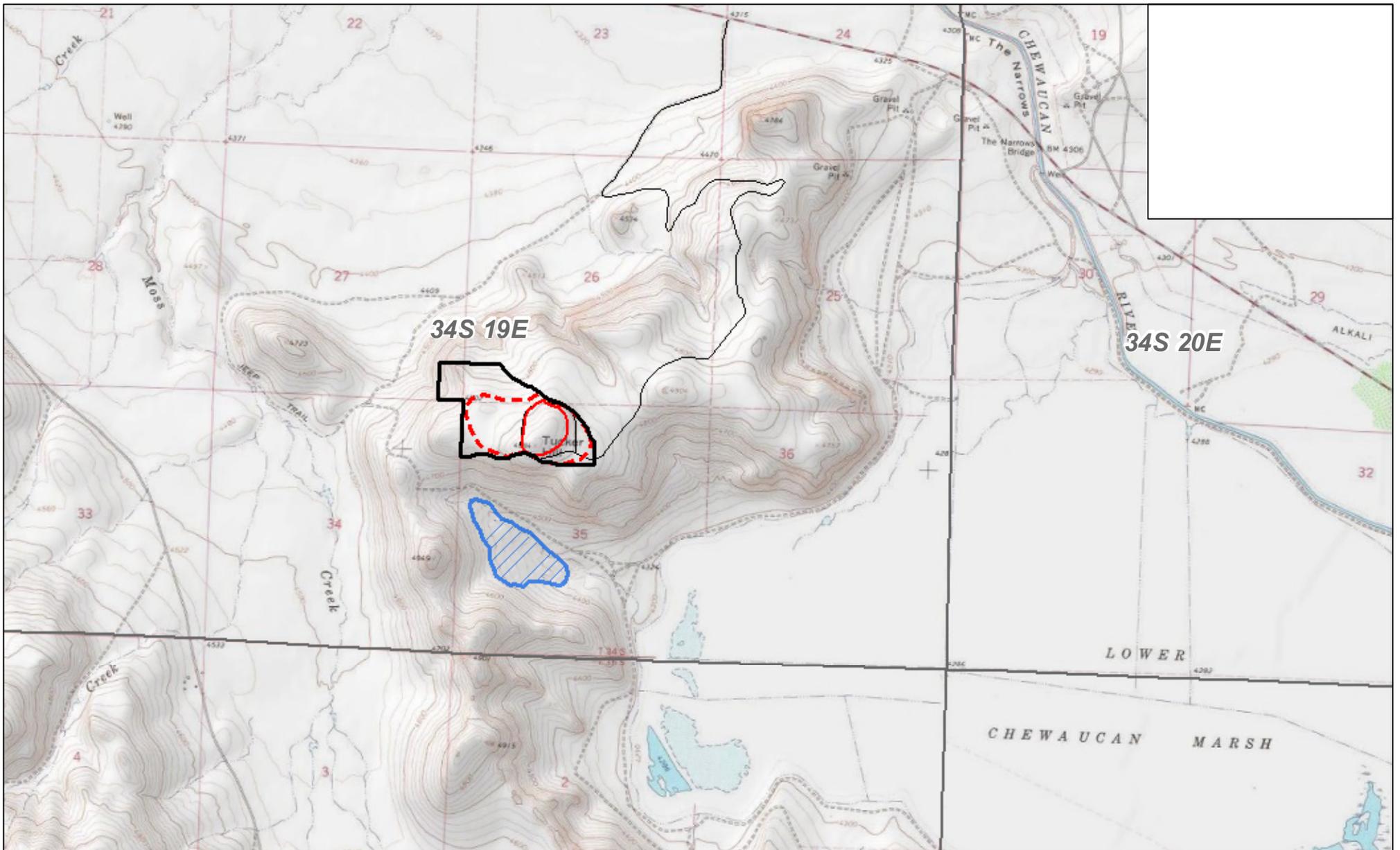
4.8 Vegetation

4.8.1 No Action Alternative

Under the No Action Alternative, impacts to vegetation would be associated with the permanent loss of vegetation associated with up to 23 acres of the quarry, and the temporary loss 17 acres to native vegetation associated with the temporary storage of ore deposits within the Project Area. Reclamation and revegetation would reestablish some native species after mining operations are completed (BLM 1995; page 78). The development of the quarry would result in a permanent loss of up to 20 acres of vegetation (BLM 1995; page 78). A list of species and distribution of revegetation seed mixture can be found in Table 2-4 of the Draft EIS (BLM 1995; page 22).

4.8.2 Proposed Action

The Proposed Action would result in an additional 47 acres of surface disturbance. However, as the result of the 2002 wildland fire within the Project Area, vegetation communities have been extensively altered and replaced with post-fire species that includes cheatgrass and some native grasses. The majority of this disturbance would occur within the quarry and its associated waste

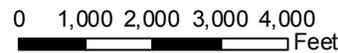


Explanation

-  Project Area
-  Proposed Greater Sage-grouse Mitigation Area
-  Proposed Pit Expansion
-  Existing Pit
-  Existing Roads

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

LAKEVIEW DISTRICT OFFICE
1301 S. "G" Street
Lakeview, OR 97630



Projection: UTM Zone 11 North, NAD83



BUREAU OF LAND MANAGEMENT

TUCKER HILL PROJECT

Proposed Greater Sage-grouse
Mitigation Area

Figure 4.7.1

11/16/2012

rock site. Project related disturbance would result in the removal of existing plant species that include invasive species. Seeding with native species during reclamation would minimize long-term impacts to vegetation.

4.9 Noxious Weeds, Invasive Nonnative Species

4.9.1 No Action Alternative

Under the No Action Alternative, the risk of introduction of new noxious weeds to Tucker Hill would be minimized. Cornerstone would monitor the Project Area for noxious weed invasions throughout the life of the mine operation and reclamation activities. The seed mix used for final reclamation would be certified weed free and approved by the BLM prior to the seeding operation. A monitoring program to annually inspect the Project for potential noxious weeds would prevent the proliferation and growth of newly established noxious weeds. The monitoring program would include an annual inventory during the life of the project, and for three years after closure of the mine. If noxious weeds are found, preferred treatment would be physical or manual extermination with selective chemical treatment at the least preferred method of eradication. (BLM 1996a; pages 12-13). Should weeds be discovered during monitoring, Cornerstone would be required to treat them in accordance with BLM's current integrated weed treatment plans – Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS (2010) and Standard Operating Procedures from the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States PEIS and ROD – Appendix B, Herbicide Treatment Standard Operating Procedures (2007).

4.9.2 Proposed Action

The Proposed Action would result in an additional 47 acres of surface disturbance within the Project Area. This disturbance could promote an increased risk of future ~~in~~ noxious weed infestations. The potential risk for Tucker Hill has been evaluated in accordance with the BLM Handbook 9015 and is considered low. Cornerstone would implement several protection measures to prevent the spread and proliferation of noxious weeds within the Project Area. Seeding of squirreltail grass would provide temporary stability of the soil and would reduce the potential spread of noxious weeds. Reclamation would be conducted with a BLM certified weed-free mix. Cornerstone would continue to implement a noxious weed monitoring program that would include an inventory on an annual basis and for three years after the closure of the Project). Should weeds be discovered during monitoring, Cornerstone would be required to treat them in accordance with BLM's current integrated weed treatment plans.

4.10 Water Quality – Surface and Ground

4.10.1 No Action Alternative

Under the No Action Alternative, no impacts to water resources are expected from mining activities within the Project Area. Pit activities would not encounter or impact the quality of groundwater within the Project Area. Surface water from storm events that infiltrate the quarry pit would not contaminate the quality of groundwater (BLM 1995; page 85).

4.10.2 Proposed Action

Water utilized for dust suppression activities on access roads would be purchased from a nearby ranch. The amount of ground water required for the Project would not increase from current use. No ground water would be encountered during pit expansion activities. Surface waters from storm events would be expected to infiltrate into the open pit floor; however, ground water would not be expected to be contaminated from such operations due to the filtration capacity of the stratigraphy, and the lack of contaminants present as a result of the mining operations (located in Appendix C, Spill Contingency Plan, in the Plan amendment). Therefore, no additional impacts would occur to water quality or quantity as a result of the Proposed Action.

4.11 Geology and Mineral Resources

4.11.1 No Action Alternative

The impacts to geology and mineral resources in the Project Area under the No Action Alternative would include the ongoing permanent removal of perlite minerals from the existing Tucker Hill quarry. The removal of perlite minerals would continue until the ore is exhausted or it is no longer economically feasible to mine the quarry.

4.11.2 Proposed Action

The Project would result in the permanent removal of additional perlite material from an expanded Tucker Hill quarry. There are no identified geologic conditions that would be exacerbated by Project activities or would result in geological hazards. All Project-related activities would conform to regulatory standards to minimize instability.

4.12 Land Use/Access

4.12.1 No Action Alternative

Cornerstone has obtained access to private land along the haul road to the quarry located on BLM land. No impacts as a result of No Action Alternative are expected on Oregon State Highway 31 or U.S. Highway 395 as a result of mining operations (BLM 1995; page 81).

4.12.2 Proposed Action

Potential slope instability within the quarry during operations and post-reclamation could occur. Given the slopes at the site and proposed benching, large slope failures are not anticipated. The benches would be 25 feet to 30 feet high with 25 foot safety benches. The wall slope would be approximately 60 degrees. Access to the Project Area would be controlled during operations to prevent potential public safety issues. In addition, prior to the final reclamation of the quarry, the BLM and DOGAMI would address necessary post-reclamation public safety concerns.

Cornerstone would use existing access from the private landowner similar to the No Action Alternative to allow access along the haul road to the existing gravel pit where mill tailings and waste are stockpiled. No additional measurable impacts to traffic on Oregon State Highway 31 or United States Highway 395 is anticipated as a result of the Project; aside from those already

addressed in the EIS (BLM 1995; page 81) and the few trips that would be made (i.e., five to 15 trips per day). However, this same level of impact, would continue for another 15 years (life of the proposed expansion).

4.13 Socioeconomics

4.13.1 No Action Alternative

Under the No Action Alternative, the expanded Project would not be approved and the mine would continue current operations until all available perlite material is depleted or it is no longer economical to mine.

Cornerstone is the largest shipper on the Lake County Railroad, moving the highest volume of rail cars on the Lakeview Branch Line (greater than 60 percent) (BLM 2008). Cornerstone is the fifth largest employer in Lake County. Approximately 30 jobs would continue and up to 120,000 tons of perlite material would be made available to the marketplace. These economic benefits to the local economy would continue until current perlite resources are depleted.

4.13.2 Proposed Action

As a result of the Proposed Action, there would be a continued economic benefit to Lake County similar to those stated in the No Action Alternative for another 15 years.

4.14 Soils

4.14.1 No Action Alternative

Under the No Action Alternative, soils in the Project Area would continue to be subject to wind and water erosion. The Lorella soil is shallow and subject to high rates of erosion. Environmental protection measures have been implemented to minimize these impacts at the existing quarry site. Soil erosion control measures include seeding the existing stockpiled soils with aggressive native plant species such as squirreltail grass that would minimize erosion of growth medium and potentially out-compete invasive weed infestations (BLM 1995; page 77). Wind erosion associated by fugitive dust would be controlled by waster sprays, cyclones, and a baghouse (BLM 1996b; page 13).

Furthermore, as detailed in the Reclamation Plan, Project-activities would be carried out in a manner designed to prevent unnecessary or undue degradation of the environment. These measures include the reclamation of the waste rock dump, road reclamation, drainage and sediment control, and revegetation (BLM 1996b; page 6, 18-21).

4.14.2 Proposed Action

The Proposed Action would result in a maximum of 47 acres of additional surface disturbance within the Project Area. Pit expansion activities would occur within the Lorella gravelly sandy loam soil association (soil 145C). The Lorella soil is shallow (less than 12 inches) and subject to high rates of erosion. Construction activities would likely contribute to the wind and water erosion potential of this soil (BLM 1995; page 77). Soil erosion protection measures similar to

those outlined in the 1996 EIS would be implemented during Project-related activities to minimize the impact of the Proposed Action on soils. Soil erosion control measures under reclamation include seeding the existing stockpiled soils with aggressive native plant species such as squirreltail grass that would minimize erosion of growth medium and potentially out-compete invasive weed infestations (BLM 1995; page 77). Wind erosion associated by fugitive dust would be controlled by waster sprays, cyclones, and a baghouse (BLM 1996b; page 13). Additionally, the salvage of growth media and reclamation outside of the active quarry, which would including re-seeding, would minimize impacts to soils and reduce potential surface erosion.

4.15 Visual Resources

4.15.1 No Action Alternative

Portions of the mining activities (growth media and waste rock dump) and haul road would be visible from Highway 31. Three KOP locations (1-3) were established in the EIS to analyze the visual impacts from various points along Highway 31 (see Figure 3.16.2). Most of the impacts from the growth media stockpiles and waste rock dump to visual resources would be temporary and would be much less noticeable following reclamation activities. The level or magnitude of visual impact expected to result from the No Action Alternative were found to be consistent with Class III VRM objectives (BLM 1995; pages 76–77).

4.15.2 Proposed Action

The Project Area lies within a VRM Class III designation. Five KOPs were established for the Project to rate the degree of visual contrast from the Proposed Action. The Proposed Action includes an expansion of the existing quarry and the placement of stockpiled growth media around the edges of the quarry. The KOPs are located along Highway 31, northwest and east of the Project Area, and along a county road to the southwest. The locations of the KOPs are shown on Figure 3.1.2. Visual contrast rating sheets (Form 8400-4) were prepared to describe the existing landscape and the proposed activities. Contrast ratings were then determined for the features of land/water body, vegetation, and structures. The degree of contrast was evaluated for the following elements under each feature: form, line, color, and texture.

The quarry itself cannot be seen from any of the KOPs, but the existing stockpiled material is visible from some of the KOPs. Photo simulations from that EIS (BLM 1996a and b) indicated that the disturbance from the mining activities would be visible as a band of white contrasting material at the top of Tucker Hill. Photos taken in the fall of 2011 show that the material is actually brown, a color that is common in undisturbed areas in the fall, and does not show a sharp contrast. These photos form the basis of the current existing condition.

Photo simulations showing full build out and post reclamation were prepared for those KOPs where the Project was visible. The following sections describe each KOP and the impact of the Proposed Action.

4.15.2.1 KOP #1 – Highway 31 Southeast of Project Area

KOP #1 is located approximately 5.7 miles from the Project Area on Highway 31 at an approximate 45 degree angle from the highway to the Project Area. Figure 4.15.1 shows the existing condition. The landscape consists of flat golden-brown patchy vegetation in the foreground, tan-brown, and orange-brown clumpy vegetated valley floor in the middle ground, and golden tan, light brown and navy rolling hills with flat to angular features in the background. Tucker Hill is in the background and is labeled on the photograph. The Waste Storage Area is also in the background parallel to the highway. The existing mining operation cannot be seen from this KOP and the Waste Storage Area can be identified if you know that it is in the view; however, it is indistinct and blends with the existing surroundings. The proposed activities would not be discernible from this KOP. No simulations were prepared for this KOP as there would be no impact from the Proposed Action to KOP #1.

Visual contrasts are mitigated by the distance of the Project Area from this KOP. Similar lines, colors and textures exist that are the same as the proposed activities; therefore, the additional disturbance would add little, if any, contrast to the landscape. Contrast discrepancies would be mitigated once vegetation is reestablished at the site. Reclamation would mimic the existing topography on Tucker Hill minimizing impacts and meeting the requirements under VRM Class III.

4.15.2.2 KOP #2 – Highway 31 Northwest of the Project Area

KOP #2 is located on Highway 31, approximately 2.6 miles northwest of the Project Area. Looking south from this KOP location, Tucker Hill is a flat prominent feature that forms the background of the photo. Figure 4.15.2a shows the existing condition. The landscape consists of flat to angular golden-yellow grasses in the foreground, flat to angular golden to tan colored valley floor in the middle ground, and rolling hills with flat to angular features of golden tan to light brown to blue gray in the background. The Waste Storage Area is not visible from this location. The mine area shows as a thin light brown band at the top of the ridge.

Figure 4.15.2b is a photo simulation that shows the Proposed Action at full build out. The view is essentially the same as the existing condition. Figure 4.15.2c is a photo simulation showing the landscape as it would appear post-reclamation under the Proposed Action.

Visual contrasts are mitigated by the distance of the Project Area from this KOP. Similar lines, colors and textures exist that are the same as the proposed activities; therefore, the additional disturbance would add little, if any, contrast to the landscape. Contrast discrepancies would be mitigated once vegetation is reestablished at the site. Reclamation would mimic the existing topography on Tucker Hill, minimizing impacts and meeting the requirements under VRM Class III.

4.15.2.3 KOP #3 – Highway 31 Northwest of Project Area

KOP #3 is located on Highway 31, approximately 4.3 miles northwest of the Project Area. This KOP has a direct view of the Project Area while traveling south southeast on the highway. The existing mining operation can be seen from this KOP, but does not create much visible contrast

Figure 4.15.1: KOP #1 Existing Condition

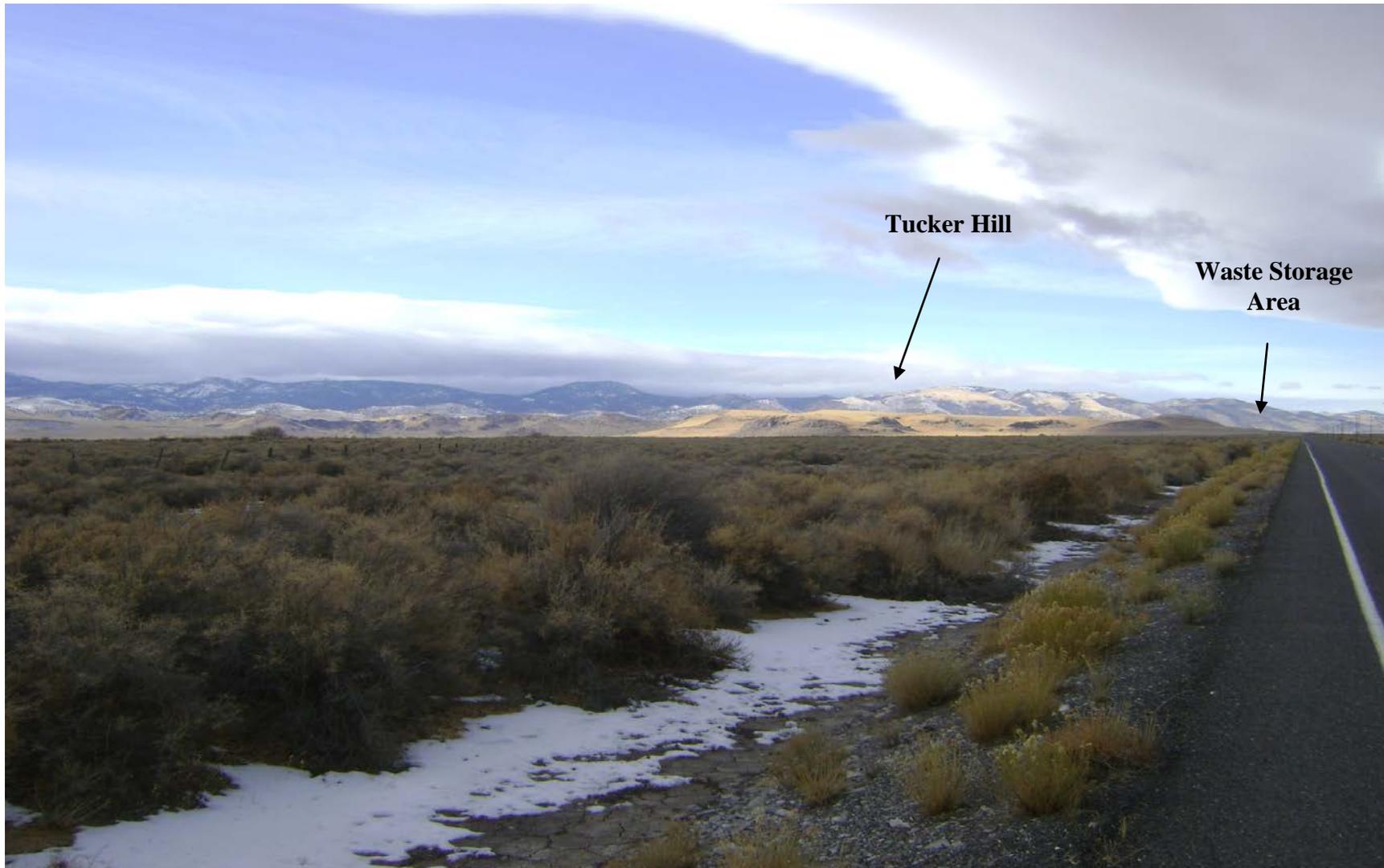


Figure 4.15.2a: KOP #2 Existing Condition



Figure 4.15.2b: KOP #2 Proposed Action at Full Build Out



Figure 4.15.2c: KOP #2 Proposed Action Post-Reclamation



to the observer. Based on the distance to the Project Area from this KOP location, it would be difficult to discern disturbances from existing and proposed mining activities.

Figure 4.15.3a shows the existing condition. The landscape consists of golden yellow grasses in the foreground, a flat valley floor of gold to sage green vegetation in the middle ground, and rolling hills with flat angular features of pink tan to gold and dark navy in the background. In the foreground there is a fence line and a powerline.

Figure 4.15.3b is a photo simulation that shows the Proposed Action at full build out. The view is essentially the same as the existing condition. Figure 4.15.3c is a photo simulation showing the landscape as it would appear after mining and post-reclamation under the Proposed Action. Reclamation would mimic the existing topography on Tucker Hill minimizing impacts and meeting the requirements under VRM Class III.

4.15.2.4 KOP #4 – County Road Northwest of Project Area

KOP #4 is located on a county road, approximately 2.2 miles from the Project Area. The Project Area is located west of this KOP. The existing mining operation can be seen from this KOP, but the visible contrast is slight. The Proposed Action would look similar to the existing condition.

Figure 4.15.4a shows the existing condition. The landscape consists of flat dark brown and sage green vegetation in the foreground, a flat regular valley floor of gold to tan to brown colors in the middle ground, and rolling hills of tan to dark navy colors in the background.

Figure 4.15.4b is a photo simulation that shows the Proposed Action at full build out. The view is essentially the same as the existing condition. Figure 4.15.4c is a photo simulation showing the landscape as it would appear after mining and post-reclamation under the Proposed Action. Reclamation would mimic the existing topography on Tucker Hill, minimizing impacts and meeting the requirements under VRM Class III.

4.15.2.5 KOP #5 – Highway 31 Northeast of Project Area

KOP #5 is located on Highway 31 approximately 2.2 miles northeast of the Project Area, and 0.6 mile from the Waste Storage Area. The existing mining operation cannot be seen from this KOP. The Waste Storage Area, which is an old county gravel pit, is located in the middle ground. The Proposed Action includes the continued use of the Waste Storage Area for process waste. The view of the Waste Storage Area is likely to remain in similar stockpile forms throughout the life of the Project. Following reclamation, the stockpiles would be recontoured to fill in the county gravel pit to match the surrounding land forms.

Figure 4.15.5a shows the existing condition. The landscape consists of gently rolling banks and with golden yellow vegetation in the foreground, rolling hills of tan, brown and orange-brown in the middle ground, and rolling hills with flat to angular features of gold to tan to light brown to blue gray/navy in the background.

Figure 4.15.3a: KOP #3 Existing Condition



Figure 4.15.3b: KOP # 3 Proposed Action at Full Build Out



Figure 4.15.3c: KOP #3 Proposed Action Post-Reclamation



Figure 4.15.4a: KOP #4 Existing Condition

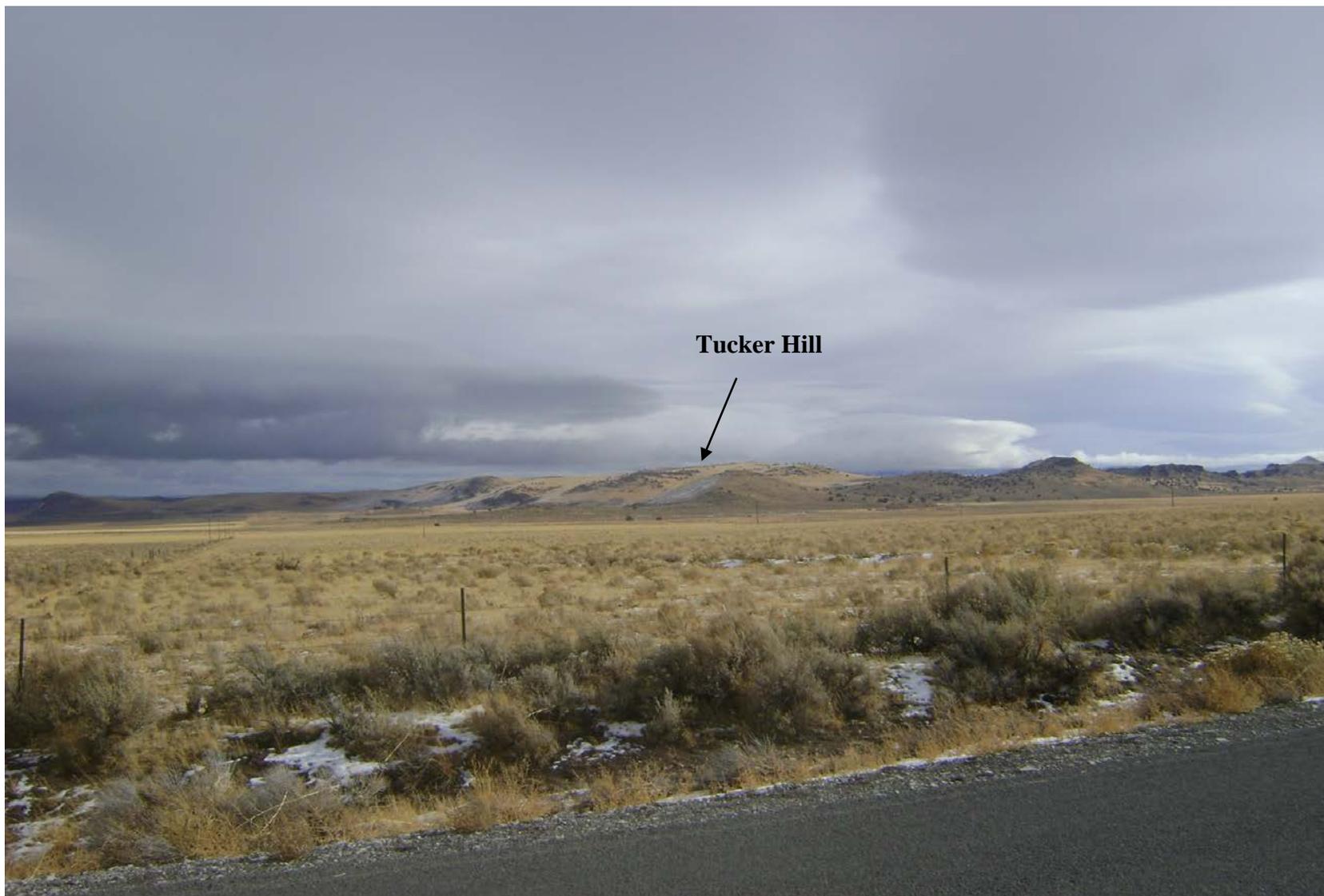


Figure 4.15.4b: KOP #4 Proposed Action at Full Build Out



Figure 4.15.4c: KOP #4 No Action Alternative at Full Reclamation



Figure 4.15.5a: KOP #5 Existing Condition



Figure 4.15.5b: KOP #5 Proposed Action at Full Build Out

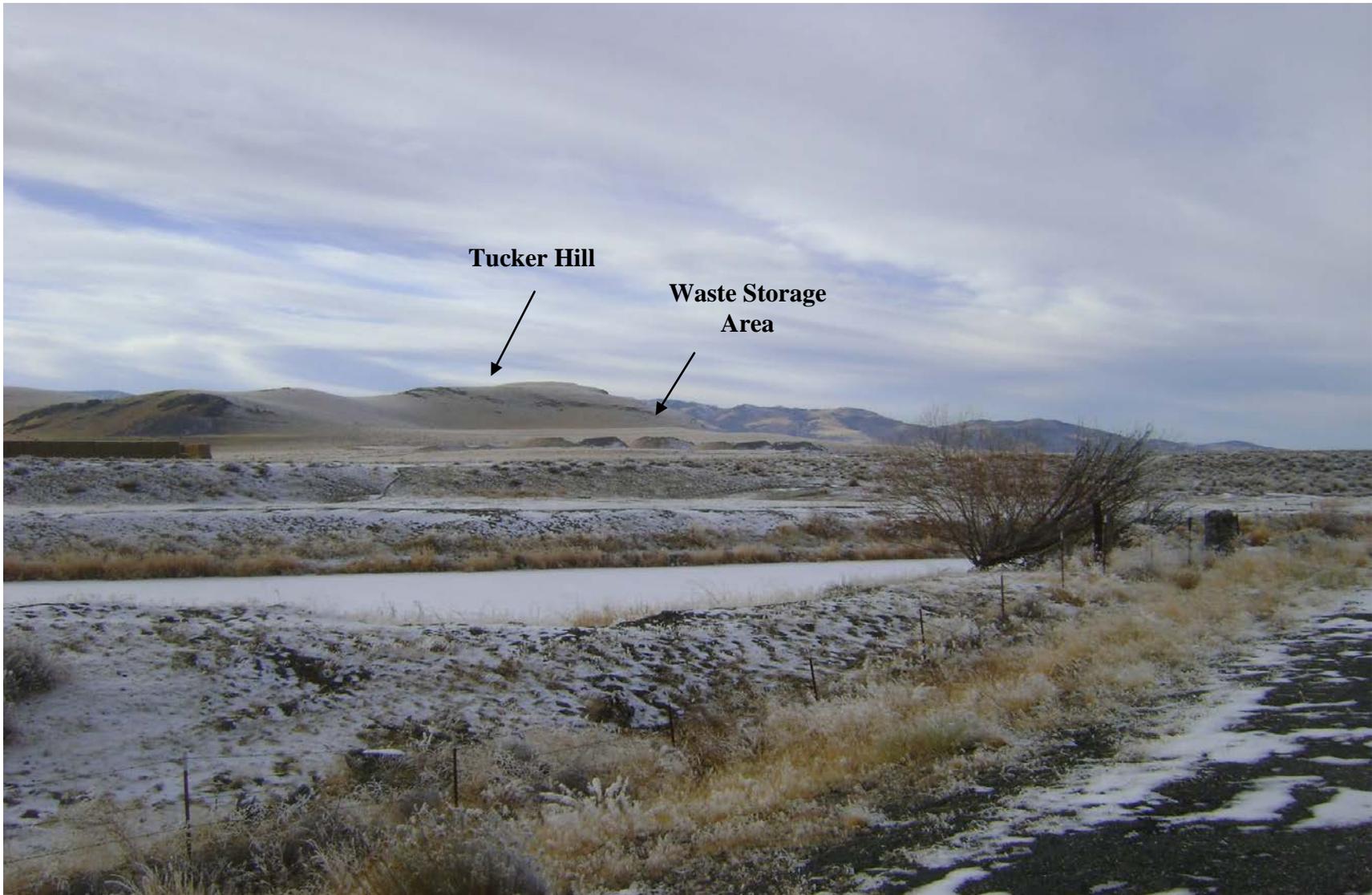


Figure 4.15.5c: KOP #5 Proposed Action at Full Reclamation



Figure 4.15.5b is a photo simulation that shows the Proposed Action at full build out. The view is essentially the same as the existing condition but with additional stockpiles. Figure 4.15.5c is a photo simulation showing the landscape as it would appear after mining and post-reclamation under the Proposed Action. Reclamation efforts would include recontouring and reseeding the Waste Storage Area to match the topography and vegetation of the surrounding landscape.

Visual contrasts are mitigated by the distance of the Project Area from this KOP. Similar lines, colors and textures exist that are the same as the proposed activities; therefore, the additional disturbance would add little, if any, contrast to the landscape. Contrast discrepancies would be mitigated once vegetation is reestablished at the site. Reclamation would mimic the existing topography on Tucker Hill minimizing impacts and meeting the requirements under VRM Class III.

4.16 Cumulative Impacts

The current conditions on the land affected by the Proposed Action resulted from a multitude of natural and human actions that have taken place over many decades. A catalogue and analysis, comparison, or description of all individual past actions and their effects which have contributed to the current environmental conditions would be difficult to compile. Cataloguing the effects of each of these individual past actions would not provide a clearer understanding of the existing environmental conditions. It is possible to implement more accurate ways to obtain the information concerning those past actions which are necessary for an analysis of the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.” (See definition of “cumulative impact” in 40 CFR 1508.7.)

A description of the current state of the affected environment inherently includes the effects of past actions and serves as a more accurate and useful starting point for a cumulative effects analysis, rather than attempting to establish such a starting point by “adding up” the described effects of all individual past actions. The importance of “past actions” is to set the context for understanding the incremental effects of the Proposed Action. This context is determined by combining the current conditions with available information on the expected effects of other present and reasonably foreseeable future actions. Here the cataloguing and analysis of the effects of other similar present and reasonably foreseeable actions is necessary and has been described below. By comparing the total effect of the no action alternative to the effects described when adding the Proposed Action or any action alternative, one can discern the incremental cumulative impact resulting from a given alternative.

Further, the information available on individual past actions is largely anecdotal and does not constitute a scientifically acceptable methodology capable of illuminating or predicting the direct or indirect effects of the Proposed Action and its alternatives. The basis for predicting the direct and indirect effects of the Proposed Action and its alternatives should be based on generally accepted scientific methodologies such as empirical research. That said, a brief discussion of the types of past mineral exploration and development activities that have occurred in the Lakeview Resource Area is included in the Lakeview Proposed RMP/Final EIS (BLM 2003b), pages 2-90 to 2-95. This analysis provides a broader (resource area scale) context within which to consider the potential incremental cumulative impacts of the Proposed Action alternative. Mining activity occurs in three distinct categories governed by different mining laws and

regulations: salable, leasable, and locatable. The proposed mining plan of operation amendment falls under the locatable mineral category. A discussion of the cumulative impacts of all three mineral activities at the resource area scale is included below.

Appendix N1 of the Draft Lakeview RMP/EIS (BLM 2001), pages A-292 and A-293, summarized historic mineral activity within the resource area. In 1997 and 1998, 34 historic mining districts and two isolated prospect areas were inventoried to document historic, abandoned, or unreclaimed mining sites. A total of 491 small, individual abandoned workings were found, each generally under an acre in size. Abandoned mine workings are currently being reclaimed within the Lakeview Resource Area under the abandoned mine lands program at a rate of one or two sites each year based on site priority and funding. When new mineral development occurs in one of these old, abandoned sites, they are also reclaimed when the recent mineral development is done.

A detailed discussion of historic salable mineral activity is included in Appendix N1, pages A-292 to A-297 (BLM 2001). For salable minerals there are an estimated 50 to 100 existing sand, gravel, rock, and cinder pits scattered across the Lakeview Resource Area (Map M-3). These sites disturb an average of approximately 15 to 20 acres of land each, but may be as large as 40 acres. The Lakeview Proposed RMP/Final EIS (BLM 2003b) estimated and analyzed opening 15 to 30 new salable mineral sites over the life of the plan. This represents 600 to 1,200 acres of potential additional mining disturbance (based on an estimated average size of 40 acres), the impacts of which are discussed in the secondary, indirect, and cumulative impacts section on page 4-139. Since the Lakeview Proposed RMP/Final EIS was completed, six new pits have been analyzed or approved for development (Walnut Orchard, Rabbit Hills, West Gulch, Winter Rim, Miners Draw, and Pitcher Lane). These new pits represent approximately 195 additional acres of surface disturbance.

Leasable mineral activity includes all energy minerals and sodium. In 1999, there was no leasable mineral activity in the Lakeview Resource Area. The Lakeview Proposed RMP/Final EIS (BLM 2003b), pages 2-90 to 2-95, and Appendix N2, pages A-215 to A-219, estimated that two to four oil and gas leases or geophysical activities would occur per year in the resource area disturbing up to 670 acres. Up to four geothermal exploration actions per year were expected with approximately 12 acres of disturbance. Currently, four geothermal leases totaling 250 acres are active and were issued in 2007, south of Paisley, Oregon.

A discussion of locatable mineral exploration and development and historical activity is also included in the Lakeview Proposed RMP/Final EIS (BLM 2003b), pages 2-90 to 2-95, and in Appendix N2, pages A-209 to A-219. As of September 1999 (immediately prior to initiation of the Lakeview RMP), there were 368 active mining claims recorded in the resource area. Eighty percent of those claims were located in the Rabbit Basin sunstone area. The remaining claims were in the Tucker Hill perlite area and Christmas Valley diatomaceous earth area. In 2012, the total number of mining claims on the Lakeview Resource Area has increased to 439. In 1999, activity on these claims included 67 mining notices and two mining plans of operations. Disturbance for mining notices averaged 2.3 acres per notice. Disturbance for mine development requiring mining plans of operation ranged from five to several hundred acres. The Lakeview Proposed RMP/Final EIS (BLM 2003b) estimated an average of 67 mining notices and two mining plans would be open at any point in time during the life of the plan (with a total estimated disturbance ranging from 160 to 660 acres). In 2012, there were a total of 30 mining notices and

15 mining plans active. The no action alternative represents no additional or incremental acres of mining related surface disturbance. The Proposed Action represents an additional or incremental 47 acres of locatable mineral surface disturbance.

The current estimated acres of total mining related surface disturbance, including the incremental acres associated with the No Action and Proposed Action alternatives, are well within the range of mineral development impacts anticipated and previously analyzed within the Lakeview Proposed RMP/Final EIS (BLM 2003b; Table 1).

In addition, cumulative impacts associated with the Tucker Hill Perlite Quarry were also analyzed at the basin scale in the previous EIS (BLM 1995; pages 93-95, and 1996b; page 22). The reader should refer to this EIS for a more detailed discussion. The following section addresses the incremental or additive cumulative impacts that have been identified in addition to the direct impacts described by specific resource sections earlier in Chapter 4.

Table 4.16-1: Total Acres of Mining Related Disturbance in the Lakeview Resource Area

	Historic (pre-RMP)	Expected after the RMP (2003)	Actual to Date (post-RMP)
Abandoned Mine Lands	<500	0	0
Salable	750–2,000 acres	600-1,200 acres	210 acres
New Pits (post 2003)			
Walnut Orchard			73
Rabbit Hills			11
Winter Rim			5
West Gulch			1
Miners Draw			45
Pitcher Lane			60
Miners Draw Quarry			15
Locatable	No estimate available	160-660	
New Operations(post 2003)			90 acres
Sunstone Exploration and Development			80 acres
Tucker Hill Waste Rock Disposal (2008)			10 acres
Leasable	0	682	0

As described in Tucker Hill Perlite Quarry EIS (BLM 1995; page 93), the landscape within the 322,000-acre Chewaucan River basin has been modified greatly. The marshes have been drained and used for agriculture, along with the development of two small communities and roads. Tucker Hill has been explored for minerals since 1948 with intensive exploration beginning in 1982. The landscape on Tucker Hill has been modified as the result of road construction, drill site construction, and perlite mining. Previous exploration has been rehabilitated; however, evidence of previous and current exploration is visible. The disposal site is located in an area of past and present gravel quarry operations managed by various state, county, and private operators.

The surrounding Tucker Hill area is part of the larger Chewaucan River Basin that was historically important for Native Americans based on previous archaeological inventories in the Area and communication with tribal members. Tucker Hill was utilized in conjunction with other

areas in the river basin as an important source of obsidian and was utilized for a variety of traditional activities.

Impacts to the spiritual/religious nature of the Tucker Hill formation have occurred in the vicinity of the Project area due to past quarry development. Continued operation of the perlite mine would continue to produce visual and auditory impacts to traditional use areas inside and outside of the Project Area. Access to traditional use areas on Tucker Hill, which is limited due to mine operations and concerns for safety, as well as private property issues, would continue to exist. However, the Red Knoll ACEC, which was established as a replacement area for Tucker Hill for plant gathering, hunting and religious practices would continue to be available for these types of traditional uses (MOA, Appendix B).

The BLM may also utilize weed treatments involving herbicides within the area as necessary to address existing or new weed infestations, both during and subsequent to mining operations. While the quantity or aerial extent of such future treatments is not possible to predict accurately, the effects of such treatments would be similar to those previously addressed in other analyses (BLM 2004, 2007, 2010).

The cumulative incremental impacts of an additional 47 acres of surface disturbance on range resources, wildlife, soils, vegetation, air quality, land use, water quality, socioeconomics, and health and safety are within the range of those previously addressed in the Lakeview Proposed RMP/Final EIS (BLM 2003b).

4.17 Irreversible/Irretrievable Impacts

Irreversible/irretrievable impacts associated with the Project include Native American Traditional Uses, Archeological Resources, Visual Resources, and Mineral Resources:

- Native American Traditional Uses – The impacts of the proposed Project would permanently impact an additional 47 acres located at Tucker Hill. The impacts to Native American Traditional Uses include the disturbance of the area, the presence of non-native people within the area, visual impacts to the site and its viewshed, and the audible impact of the mining operation.
- Archeological Resources – Any physical removal of archeological resources would result in a permanent impact to archeological resources. Site 35 LK 3065 would no longer be available for archeological research. However, this site has been determined not eligible for inclusion on the National Register of Historic Sites and Places and the appropriate mitigation has already been performed on the site (as determined by the Oregon SHPO, October 29, 1996).
- Visual Resources – The expansion of the quarry would be consistent with the objectives prescribed for a Visual Resources Management Class III area. Irreversible impacts associated with the Project on visual resources would be mitigated to the extent possible as analyzed in this EA.

- Mineral Resources – The Project would result in the permanent removal of perlite from the Project Area. These impacts would be confined to the existing quarry and proposed quarry expansion.

5 CONSULTATION AND PUBLIC INPUT

5.1 List of Preparers

Bureau of Land Management

Todd Forbes	Project Manager
Paul Whitman	Planning and Environmental Coordinator
Steve Flock	Geologist
Vernon Stofleth	Wildlife Biologist
James Leal	Fisheries Biologist
Chris Bishop	Recreation Specialist
Bill Cannon	Archaeologist

Enviroscientists, Inc.

Opal Adams	Project Principal, Visual Resources
Michele Lefebvre	Project Manager
Nick Mitrovich	Environmental Specialist
Gail Liebler	GIS Specialist

5.2 Persons, Groups and Agencies Contacted

A complete compendium of people, agencies, and groups contacted is available for review at the BLM Lakeview office.

6 LITERATURE CITED

- ASM Affiliates, Inc. 2011. Appendum to Archaeological Testing and Evaluation of 13 Sites at Tucker Hill, Lake County, Oregon.
- Bureau of Land Management (BLM). 1995. Draft Environmental Impact Statement (DEIS). Atlas Perlite, Inc. Tucker Hill Perlite Project. Lakeview District Office.
- _____. 1996a. Record of Decision and Plan of Operations Approval for Atlas Perlite, Inc. Lakeview District Office.
- _____. 1996b. Final Environmental Impact Statement (FEIS). Atlas Perlite, Inc. Tucker Hill Perlite Project. Lakeview District Office.
- _____. 2001. Draft Lakeview Resource Management Plan/Environmental Impact Statement. 3 volumes.
- _____. 2003a. Lakeview Resource Management Plan and Record of Decision. 2 volumes. Lakeview District Office.
- _____. 2003b. Lakeview Proposed Resource Management Plan/Final Environmental Impact Statement. 4 volumes.
- _____. 2004. Integrated Noxious Weed Management Program. Environmental Assessment #OR-OR-010-2004-03.
- _____. 2007. Standard Operating Procedures from the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States PEIS and ROD – Appendix B, Herbicide Treatment Standard Operating Procedures. September 2007.
- _____. 2008. Cornerstone Industrial Minerals, Inc. Tucker Hill Quarry Plan of Operations Amendment. .
- _____. 2008b. National Environmental Policy Act Handbook. BLM Handbook H-1790-1.
- _____. 2010. Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS.
- _____. 2011a. Greater Sage-grouse Interim Management Policies and Procedures. IM-2012-043. BLM Washington Office.
- _____. 2011b. Wilderness Characteristics Evaluation – Tucker Hill Area.
http://www.blm.gov/or/districts/lakeview/plans/files/Tucker_Hill_wild_char_forms.pdf
- _____. 2011c. Notes of wildlife present for contactor. Received December 1, 2011.
- _____. 2011d. Botanical Clearance Request, June 21, 2011.
- Climate Mitigation Services. 2007. Greenhouse Gas Emissions Inventory: Minnesota Steel

- Industries' Proposed Integrated Iron Mine, DRI, Pelletizer, and 2.5 Mt/yr Steel Mill. July 10, 2007.
- Connelly, John and Knick, Steven. 2011. Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats. University of California Press: Berkeley and Los Angeles.
- Cornerstone Industrial Minerals . 2012. History and Local Geology.
<http://www.cornerstonemineral.com/histgeo.html>.
- Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland, 2007: Changes in Atmospheric Constituents and in Radiative Forcing. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Kautz Environmental Consultants, Inc. 1996. Archaeological Testing and Evaluation of 13 Sites at Tucker Hill, Lake County, Oregon.
- Oregon Department of Agriculture. 2011. Noxious Weeds Quarantine: Effective 9/29/2011.
http://www.oregon.gov/ODA/PLANT/603_052_1200.shtml
- Oregon Department of Fish and Wildlife. 2005. Greater Sage-Grouse Conservation Assessment and Strategy.
- _____. 2011. Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. April 2011.
- Oregon State Historic Preservation Office (Oregon SHPO). 1996. Tucker Hill Project, Kautz Environmental Consultants, Determinations of Eligibility, Effect Lake County.
- Natural Resource Conservation Service (NRCS). 2007. Web Soil Survey.
<http://websoilsurvey.nrcs.usda.gov/app>.
- U.S. Environmental Protection Agency (EPA). 2004. Unit Conversions, Emissions Factors, and Other Reference Data.
- _____. 2009. Inventory of U.S. greenhouse gas emissions and sinks: 1990-2007. USEPA, Washington, DC.
- U.S. Fish and Wildlife Service (USFWS). 1918. Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956

_____. 1940. Bald Eagle Protection Act of 1940. (16 U.S.C. 668-668d, 54 Stat. 250) as amended -- Approved June 8, 1940, and amended by P.L 86-70 (73 Stat. 143) June 25, 1959; P.L. 87-884 (76 Stat. 1346) October 24, 1962; P.L. 92-535 (86 Stat. 1064) October 23, 1972; and P.L. 95-616 (92 Stat. 3114) November 8, 1978.

_____. 2010. Endangered and Threatened Wildlife and Plants: 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered. Federal Register 75(5132):13910-14014.

U.S. Census Bureau. 2007. Lakeview, Oregon. [Factfinder.census.gov](http://factfinder.census.gov).

Winthrop, Robert. 1995. Tucker Hill Quarry Project, Tribal Consultation.

APPENDIX A

**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

VISUAL CONTRAST RATING WORKSHEET

Date: 1/17/2012

District: Lakeview District Office

Resource Area: Lakeview

Activity (program): 43 CFR 3809 Minerals

SECTION A. PROJECT INFORMATION

1. Project Name: Cornerstone Industrial Minerals Corp. Tucker Hill Perlite Mine Expansion	4 Location	5 Location Sketch: Also See Photo and Map 4716372N 718862E N Waste Storage Highway 31 Tucker Hill KOP#1
	Township <u>34 South</u>	
	Range <u>19 East</u>	
2 Key Observation Point: KOP#1	Sections <u>23-26, 35</u>	
3 VRM Class: Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Patchy MG - Clumpy BG - Homogeneous	FG - Near vertical road MG - Diagonal fence BG - NA
LINE	FG - Angular diagonal road MG - Horizontal BG - Horizontal, rolling, undulating to angular	FG - Irregular MG - Undulating BG - Horizontal to diagonal	FG - Diagonal, vertical MG - Diagonal BG - NA
COLOR	FG - Gray road, golden yellow grasses MG - Tan, brown, orange-brown BG - Gold-tan to light brown to blue-gray/navy	FG - Golden-brown MG - Tan, brown, orange-brown BG - Golden tan, light brown, navy	FG - Dark Gray w/ white stripe MG - Brown BG - NA
TEXTURE	FG - Coarse-grained/very fine-grained MG - Coarse-grained BG - Very fine-grained to medium-grained	FG - Very coarse MG - Coarse-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - NA

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Patchy MG - Clumpy BG - Homogeneous	FG - Near vertical road MG - Diagonal fence BG - NA
LINE	FG - Angular diagonal road MG - Horizontal BG - Horizontal, rolling, undulating to angular	FG - Irregular MG - Undulating BG - Horizontal to diagonal	FG - Diagonal, vertical MG - Diagonal BG - NA
COLOR	FG - Gray road, golden yellow grasses MG - Tan, brown, orange-brown BG - Gold-tan to light brown to blue-gray/navy	FG - Golden-brown MG - Tan, brown, orange-brown BG - Golden tan, light brown, navy	FG - Dark Gray w/ white stripe MG - Brown BG - NA
TEXTURE	FG - Coarse-grained/very fine-grained MG - Coarse-grained BG - Very fine-grained to medium-grained	FG - Very coarse MG - Coarse-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - NA

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)
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	
					X				X				X	
ELEMENTS	Form				X				X				X	3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side)
	Line				X				X				X	
	Color				X				X				X	
Evaluator's Names												Date		
Opal Adams												1/17/2012		
Photostaken by Steve Flock (BLM) in Fall 2011														

	Texture				X				X				X
--	---------	--	--	--	---	--	--	--	---	--	--	--	---

SECTION D. (Continued)

Comments from item 2. Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape could 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.

The existing mining operation cannot be seen from this KOP. The Waste Storage Area can be seen but is indistinct and blends with the existing surroundings. The proposed activities would not be discernible from this KOP.

Additional Mitigating Measures (See item 3)

Existing Condition from KOP #1



**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

VISUAL CONTRAST RATING WORKSHEET

Date: 1/17/2012

District: Lakeview District Office

Resource Area: Lakeview

Activity (program): 43 CFR 3809 Minerals

SECTION A. PROJECT INFORMATION

1. Project Name: Cornerstone Industrial Minerals Corp. Tucker Hill Perlite Mine Expansion	4 Location	5 Location Sketch: Also See Photo and Map 4721313N 705915E N ↑ KOP #2 Highway 31 Tucker Hill
	Township <u>34 South</u>	
	Range <u>19 East</u>	
2 Key Observation Point: KOP #2	Sections <u>23-26, 35</u>	
3 VRM Class: Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

1. LANDWATER		2 VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Perpendicular to angular MG - Flat BG - Patchy	FG - Horizontal to vertical Fence line & road post MG - Square, blocky buildings BG - Flat benches from mining operation
LINE	FG - Angular diagonal fence line MG - Horizontal BG - Horizontal to angular	FG - Angular - vertical MG - Slight diagonal to horizontal BG - Horizontal to diagonal	FG - Diagonal, vertical MG - Horizontal and vertical BG - Horizontal
COLOR	FG - Gray soils, golden yellow grasses MG - Gold to tan BG - Gold - tan to light brown to blue-gray	FG - Golden MG - Golden BG - Golden tan	FG - White, red, brown MG - Gray, white, brown BG - Tan to light brown
TEXTURE	FG - Coarse-grained MG - Fine-grained BG - Very fine-grained to coarse	FG - Very coarse MG - Fine-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - Fine-grained

SECTION C. PROPOSED ACTIVITY DESCRIPTION

1. LANDWATER		2 VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Perpendicular to angular MG - Flat BG - Patchy	FG - Horizontal to vertical Fence line & road post MG - Square, blocky buildings BG - Flat benches from mining operation
LINE	FG - Angular diagonal fence line MG - Horizontal BG - Horizontal to angular	FG - Angular - vertical MG - Slight diagonal to horizontal BG - Horizontal to diagonal	FG - Diagonal, vertical MG - Horizontal and vertical BG - Horizontal
COLOR	FG - Gray soils, golden yellow grasses MG - Gold to tan BG - Gold - tan to light brown to blue-gray	FG - Golden MG - Golden BG - Golden tan	FG - White, red, brown MG - Gray, white, brown BG - Tan to light brown
TEXTURE	FG - Coarse-grained MG - Fine-grained BG - Very fine-grained to coarse	FG - Very coarse MG - Fine-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - Fine-grained

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

ELEMENTS	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)
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	
				X					X				X	
					X				X				X	
				X			X				X			
3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side)													3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side)	
Evaluator's Names											Date			
Opal Adams											1/17/2012			
Photostaken by Steve Flock (BLM) in Fall 2011														

SECTION D. (Continued)

Comments from item 2. Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape would 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.

The proposed activities include an expansion of existing operations on a flat hill top. Visual Contrasts are mitigated by the distance from the KOP. Similar lines, colors, and textures exist that are the same as the proposed activities; therefore, the additional disturbance will add little, if any, contrast to the landscape. The contrast will be mitigated once vegetation is reestablished at the site.

Additional Mitigating Measures (See item 3)

Existing Condition from KOP #2



**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

Date: 1/17/2012

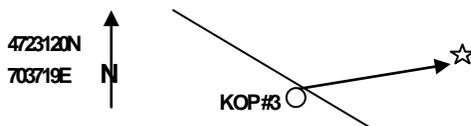
District: Lakeview District Office

Resource Area: Lakeview

Activity (program): 43 CFR 3809 Minerals

VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name: Cornerstone Industrial Minerals Corp. Tucker Hill Perlite Mine Expansion	4. Location Township <u>34 South</u> Range <u>19 East</u> Sections <u>23-26, 35</u>	5. Location Sketch: Also See Photo and Map 472312N 703719E 
2. Key Observation Point: KOP#3		
3. VRM Class: Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Perpendicular to angular, clumps MG - Flat to clumpy BG - Patchy	FG - Diagonal Road and fence MG - Diagonal power line, horizontal-vert buildings BG - Flat berm from Tucker Hill Mine
LINE	FG - Angular diagonal fence line, power lines, road MG - Horizontal BG - Horizontal to undulating to angular	FG - Angular-vertical MG - Diagonal to horizontal BG - Horizontal to diagonal to undulating	FG - Diagonal, vertical MG - Horizontal, vertical, diagonal BG - Horizontal, curvy
COLOR	FG - Dark gray road, golden yellow grasses MG - Cold to tan to sage green BG - Pink-tan to dark navy	FG - Golden MG - Golden & sage green BG - Golden tan to pink	FG - Dark gray, brown, red MG - Brown, gray, white BG - Light-medium pinkish brown
TEXTURE	FG - Very fine-grained to coarse-grained MG - Fine-grained w/ coarse-grained clumps BG - Very fine-grained	FG - Very coarse MG - Coarse-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - Very fine-grained

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Perpendicular to angular, clumps MG - Flat to clumpy BG - Patchy	FG - Diagonal Road and fence MG - Diagonal power line, horizontal-vert buildings BG - Flat berm from Tucker Hill Mine
LINE	FG - Angular diagonal fence line, power lines, road MG - Horizontal BG - Horizontal to undulating to angular	FG - Angular-vertical MG - Diagonal to horizontal BG - Horizontal to diagonal to undulating	FG - Diagonal, vertical MG - Horizontal, vertical, diagonal BG - Horizontal, curvy
COLOR	FG - Dark gray road, golden yellow grasses MG - Cold to tan to sage green BG - Pink-tan to dark navy	FG - Golden MG - Golden & sage green BG - Golden tan to pink	FG - Dark gray, brown, red MG - Brown, gray, white BG - Light pinkish brown
TEXTURE	FG - Very fine-grained to coarse-grained MG - Fine-grained w/ coarse-grained clumps BG - Very fine-grained	FG - Very coarse MG - Coarse-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - Very fine-grained

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

ELEMENTS	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)
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side)
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Evaluator's Names
				X					X				X	Date
					X				X				X	Opal Adams Photostaken by Steve Flock (BLM) in Fall 2011
				X				X				X	1/17/2012	

SECTION D. (Continued)

Comments from item 2. Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape would 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.

The existing mining operation can be seen from this KOP but does not create much contrast. The proposed activities would essentially look the same as the existing condition. It would be difficult to discern a difference in the size of the disturbance due to the distance from the KOP.

Additional Mitigating Measures (See item 3)

Existing Condition from KOP #3



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Date: 1/17/2012

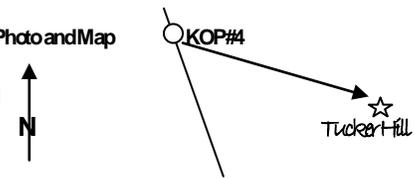
District: Lakeview District Office

Resource Area: Lakeview

Activity (program): 43 CFR 3809 Minerals

VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name: Cornerstone Industrial Minerals Corp. Tucker Hill Perlite Mine Expansion	4. Location Township <u>34 South</u> Range <u>19 East</u> Sections <u>23-26, 35</u>	5. Location Sketch: Also See Photo and Map 47°19'13"N 70°52'18"E 
2. Key Observation Point: KOP#4		
3. VRM Class: Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Clumps MG - Distinct clumps BG - Patchy	FG - Diagonal Road and fence MG - Horizontal powerline BG - Thin flat berm at Tucker Hill Mine
LINE	FG - Diagonal MG - Horizontal, Diagonal BG - Horizontal to undulating to angular	FG - Irregular MG - Horizontal BG - Horizontal to diagonal to undulating	FG - Diagonal, vertical MG - Vertical BG - Horizontal
COLOR	FG - Dark gray road, sage green shrubs MG - Cold to tan to brown BG - Tan to dark navy	FG - Dark brown, sage green MG - Golden tan, light green BG - Golden tan to navy blue	FG - Dark gray MG - Brown BG - Light brown
TEXTURE	FG - Very fine-grained to coarse-grained MG - Fine-grained w/ coarse-grained clumps BG - Very fine-grained w/ coarse clumps	FG - Very coarse MG - Coarse-grained BG - Very fine-grained w/ coarse clumps	FG - Fine-grained MG - Fine-grained BG - Very fine-grained

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Flat MG - Flat, regular valley floor BG - Rolling hills w/ flat to angular features	FG - Clumps MG - Distinct clumps BG - Patchy	FG - Diagonal Road and fence MG - Horizontal powerline BG - Thin flat berm at Tucker Hill Mine
LINE	FG - Diagonal MG - Horizontal, Diagonal BG - Horizontal to undulating to angular	FG - Irregular MG - Horizontal BG - Horizontal to diagonal to undulating	FG - Diagonal, vertical MG - Vertical BG - Horizontal
COLOR	FG - Dark gray road, sage green shrubs MG - Cold to tan to brown BG - Tan to dark navy	FG - Dark brown, sage green MG - Golden tan, light green BG - Golden tan to navy blue	FG - Dark gray MG - Brown BG - Light brown
TEXTURE	FG - Very fine-grained to coarse-grained MG - Fine-grained w/ coarse-grained clumps BG - Very fine-grained w/ coarse clumps	FG - Very coarse MG - Coarse-grained BG - Very fine-grained w/ coarse clumps	FG - Fine-grained MG - Fine-grained BG - Very fine-grained

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)	
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
ELEMENTS		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side)	
				X					X				X		
				X					X				X		
					X				X				X		
		Evaluator's Names												Date	
		Opal Adams Photostaken by Steve Flock (BLM) in Fall 2011												1/17/2012	

SECTION D. (Continued)

Comments from item 2. Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape would 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.

The existing mining operation can barely be seen from this KOP but does not create noticeable contrast. The proposed activities would essentially look the same as the existing condition. The size would increase slightly but this would not be readily apparent to the casual observer.

Additional Mitigating Measures (See item 3)

Existing Condition from KOP #4



**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

Date: 1/17/2012

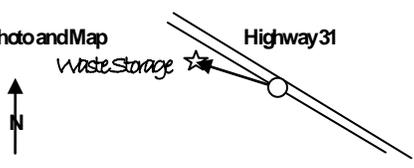
District: Lakeview District Office

Resource Area: Lakeview

Activity (program): 43 CFR 3809 Minerals

VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name: Cornerstone Industrial Minerals Corp. Tucker Hill Perlite Mine Expansion	4. Location	5. Location Sketch: Also See Photo and Map 4719847N 719847E N ↑ 
	Township <u>34 South</u>	
	Range <u>19 East</u>	
2. Key Observation Point: KOP #5	Sections <u>23-26, 35</u>	
3. VRM Class: Class III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Rolling banks and flat water (ice) MG - Rolling hills BG - Rolling hills w/ flat to angular features	FG - Patchy MG - Clumpy BG - Homogeneous	FG - Diagonal road and fence MG - Pyramidal stockpiles BG - NA
LINE	FG - Angular diagonal road MG - Horizontal, pyramidal BG - Horizontal, rolling, undulating to angular	FG - Diagonal MG - Horizontal to diagonal BG - Horizontal to diagonal	FG - Diagonal, vertical MG - Pyramidal BG - NA
COLOR	FG - Gray road, golden yellow grasses MG - Tan, brown, orange-brown BG - Gold-tan to light brown to blue-gray/navy	FG - Golden-yellow MG - Tan, brown, orange-brown BG - Golden yellow, navy	FG - Dark gray road/red posts MG - Dark gray BG - NA
TEXTURE	FG - Coarse-grained/fine-grained MG - Coarse-grained BG - Very fine-grained to medium-grained	FG - Very coarse MG - Coarse-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - NA

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	FG - Rolling banks and flat water (ice) MG - Rolling hills BG - Rolling hills w/ flat to angular features	FG - Patchy MG - Clumpy BG - Homogeneous	FG - Diagonal road and fence MG - Pyramidal stockpiles BG - NA
LINE	FG - Angular diagonal road MG - Horizontal, pyramidal BG - Horizontal, rolling, undulating to angular	FG - Diagonal MG - Horizontal to diagonal BG - Horizontal to diagonal	FG - Diagonal, vertical MG - Pyramidal BG - NA
COLOR	FG - Gray road, golden yellow grasses MG - Tan, brown, orange-brown BG - Gold-tan to light brown to blue-gray/navy	FG - Golden-yellow MG - Tan, brown, orange-brown BG - Golden yellow, navy	FG - Dark gray road/red posts MG - Dark gray BG - NA
TEXTURE	FG - Coarse-grained/fine-grained MG - Coarse-grained BG - Very fine-grained to medium-grained	FG - Very coarse MG - Coarse-grained BG - Very fine-grained	FG - Fine-grained MG - Fine-grained BG - NA

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)
		LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	
				X									X	
					X								X	
ELEMENTS	Form			X					X				X	3. Additional mitigating measures recommended? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side)
	Line			X					X				X	
	Color				X				X				X	
	Texture				X				X				X	
Evaluator's Names												Date		
Opal Adams												1/17/2012		
Photostaken by Steve Flock (BLM) in Fall 2011														

SECTION D. (Continued)

Comments from item 2. Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape could 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.

The existing mining operation cannot be seen from this KOP. The Waste Storage Area, which is located in an existing gravel pit can be seen in the middleground. The proposed activities include the use of this storage area but also propose alternate waste storage at the mine site. The view is likely to remain as it is with pyramidal stockpile forms. Following reclamation, the stockpiles will be recontoured to match surrounding land forms.

Additional Mitigating Measures (See item 3)

Existing Condition from KOP #5



APPENDIX B



RECEIVED
MAY 1 U 1996
LAKEVIEW, B.L.M.

MEMORANDUM OF AGREEMENT
among
ADVISORY COUNCIL ON HISTORICAL PRESERVATION
and
USDI, BUREAU OF LAND MANAGEMENT, LAKEVIEW DISTRICT
and
OREGON STATE HISTORIC PRESERVATION OFFICE
regarding
TUCKER HILL MINING PROJECT
pursuant to 36 CFR 800.6(a)

WHEREAS, the Bureau of Land Management (BLM) has determined that the Tucker Hill Mining Project will have an effect upon properties eligible for inclusion in the National Register of Historic Places, and has consulted with the Oregon State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and,

WHEREAS, the BLM has consulted with The Klamath Tribes and Burns Paiute Tribe, and has invited them to concur in this agreement; and,

WHEREAS, the BLM has determined an archaeological district, eligible to the National Register of Historic Places, is located within the area of effect of the proposed project; and,

WHEREAS, The Klamath Tribes and Burns Paiute Tribe have informed BLM that the district retains values of traditional cultural importance to the tribes; and,

WHEREAS, the BLM has consulted with the Atlas Corporation (Atlas), project proponent, and has invited them to concur in this agreement;

NOW, THEREFORE, the Advisory Council on Historic Preservation (Council), BLM and the Oregon SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

Stipulations

The BLM will ensure the following measures are carried out:

- A. The Testing Plan for Archaeological Sites Located at Tucker Hill (Attachment A), designed to determine the informational values of the archaeological properties within the area of potential effect (APE) in relation to their informational contribution to the Archaeological District, is fully implemented and results evaluated in consultation with the SHPO, The Klamath Tribes, and the Burns Paiute Tribe;

- B.** The BLM in consultation with The Klamath Tribes and Burns Paiute Tribe and Atlas shall attempt to identify measures that may diminish impacts of the project on the traditional cultural values of the project area. Any such measures identified and agreed to among these parties shall be specified in an attachment (Attachment B) to this agreement and submitted to the SHPO and Council for review.
- 1.** The SHPO and Council shall be provided 30 days from receipt to concur or reject the measures.
 - 2.** If the SHPO and Council concur in the measures, they shall be incorporated into this agreement by attachment, and shall carry the full force of this agreement.
 - 3.** If either the SHPO or Council object to the measures, the BLM shall resolve the objection in accordance with Stipulation D of this Agreement.
- C.** The BLM shall ensure that a Historic Properties Treatment Plan (HPTP) is developed in consultation with the parties to this agreement. The HPTP shall integrate information derived from the implementation of the Testing Plan (see Stipulation A) and through consultation with the Tribes regarding traditional cultural values and the agreed upon mitigation measures. If archaeological data recovery is warranted, the HPTP shall include a research design and shall be consistent with the *Secretary of Interior's Standards and Guidelines for Archeological Documentation* (48 FR 44734-37), take into account the ACHP publication, *Treatment of Archeological Properties* (Advisory Council on Historic Preservation, 1980), address responsibility for curation and/or disposition of cultural and archaeological artifacts obtained through implementation of the Treatment plan in conformance with 43 CFR 79 and 43 CFR 10, and include discovery procedures integrating 36 CFR 800.11 and 43 CFR 10.
- D.** Should the parties to this agreement object in a timely manner to any documents or actions provided or conducted under the terms of this agreement, the BLM shall consult with the objecting party to resolve the objection. If the BLM determines that the objection cannot be resolved, the BLM shall forward the documentation relevant to the dispute to the Council.
- 1.** Within 30 days of receipt of all pertinent documentation, the Council shall provide the BLM with recommendations, which the BLM shall take into account in reaching a final decision regarding the dispute.
 - 2.** If the dispute merits a high level resolution, the Council may issue comments to the BLM Director for consideration.

The BLM's responsibility to carry out all actions under this agreement that are not the subjects of the dispute shall remain unchanged.

- E. The BLM, SHPO, and Council may seek to terminate the Agreement by providing thirty (30) days written notice to the other parties of their intent. Consultations during this period will be undertaken to seek agreement on amendments or other actions that would avoid termination.
- F. In the event this agreement is terminated and negotiations do not produce a revised agreement, the BLM will comply with 36 CFR Section 800.6(b) with regard to the undertaking covered by this Agreement.
- G. No member or delegate of Congress or state legislator, or resident Commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.

This MOA shall remain in effect from the date of signing by the Advisory Council on Historic Preservation through December 31, 1996, and may be renewed pending concurrence of all parties.

Execution of this Memorandum of Agreement by the BLM, the Oregon SHPO, and the Council, and implementation of its terms, evidence that the BLM has afforded the Council an opportunity to comment on the mining project and its effects on historic properties, and that the BLM has taken into account the effects of the undertaking on historic properties.

BUREAU OF LAND MANAGEMENT

By: Ed Singleton Date: 4-8-96
 (Ed Singleton, District Manager)

OREGON DEPUTY STATE HISTORIC PRESERVATION OFFICER

By: James M. Hamrick Date: 4/5/96
 (James M. Hamrick, Deputy SHPO)

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: Robert D. Bush Date: 4/26/96
 (Robert D. Bush, Executive Director)

CONCUR by THE KLAMATH TRIBES

By: *Jeff Mitchell* *Acting Chairman* Date: 6-19-96
(Jeff Mitchell, Chairman)

CONCUR by the BURNS PAUTE TRIBE

By: *Wanda Johnson* Date: 10-20-96
(Wanda Johnson, Chairwoman)

CONCUR by the ATLAS CORPORATION

By: *John R. Leahy* Date: 5-7-96
(John R. Leahy, Project Manager)

Attachment A

A Testing Plan for Archaeological Sites Located at Tucker Hill, Lake County, Oregon

**Prepared by
Kautz Environmental Consultants, Inc.
March 1996**

Attachment B**Measures for Diminishing Impacts on Traditional Cultural Uses of Tucker Hill**

The following measures have been identified and agreed upon by parties to this agreement and shall be incorporated into the project's Historic Properties Treatment Plan:

1. BLM agrees to provide an archeological monitor, in addition to the standard project compliance monitor, during site construction, consisting of one (1) day per week during the initial construction phase (approximately 4 weeks) and subsequent periods of quarry enlargement.
2. Atlas agrees to pay salary and expenses for one member of either Tribe (Tribes may rotate weeks) to serve as archeological project monitors every day during the initial ground disturbing activities of construction phase (approximately four weeks) and subsequent periods of quarry enlargement to monitor construction activities and curb potential illegal artifact collection and during periods of archeological testing and mitigation work except in instances in which Atlas or its contractors are performing ground disturbing work at multiple sites simultaneously. In such circumstance, Atlas agrees to pay salary and expenses for additional tribal monitors at each work site where ground disturbing activities occur.

For purposes of this agreement, ground disturbing activities means disturbance of surface soils and rocks by any mechanical means normally associated with construction. It does not include blasting of bedrock after soil and earth have been removed by other means.
3. BLM agrees to work with the tribes to identify and designate an alternate plant collecting site(s), preferably within the Chewaucan/Lake Abert region.
4. Atlas agrees to negotiate with the private landowner (East 1/2 of Section 23) on behalf of the tribes to provide reasonable vehicle access to public lands on Tucker Hill for tribal activities (including plant collecting, religious practices, education, and monitoring) during the life of the project. Atlas also agrees to accommodate the tribal use of the area by not hauling materials or blasting on the specified days. The Tribes agree to give a minimum of two weeks advance notice when requesting the specified days except five days notice will be required for root gathering.
5. Atlas agrees to have their archaeological contractor, Kautz Environmental Consultants, employ a minimum of one qualified member of the Burns Paiute Tribe and one qualified member of the Klamath Tribe as a part of site testing and mitigation crews. Such employment is dependent upon the employment application and the employment acceptance by qualified tribal members.

6. BLM and the Tribes will negotiate a long-term curation agreement for archaeological materials acquired from archaeological site testing and mitigation efforts at tribal facilities consistent with Federal rules for curation (36CFR79). Until such time that long term curation agreements are negotiated, the BLM, the Tribes and Atlas agreed that the Museum of Natural History, University of Oregon shall be the designated facility for curation of archaeological materials acquired from archaeological site testing and mitigation efforts. Atlas agrees to have their archaeological contractor, Kautz Environmental Consultants, designate the Museum of Natural History, University of Oregon as the designated facility for curation of archaeological materials acquired from archaeological site testing and mitigation efforts.
7. Atlas agrees to provide direct notice to the Tribes of any further development and/or enlargement of the project area beyond the currently approved Plan of Operations. This notice is in addition to any notice that Atlas may be required to provide to the BLM.
8. The Tribes will identify rock rings within the area of direct impact which are religious sites to be removed and relocated prior to any construction or mining activities by Atlas. Atlas agrees to have their archaeological contractor, Kautz Environmental Consultants, record the sites. The Tribes will be responsible for any archaeological testing of these rings and shall remove the rings pursuant to tribal customs and religious practices. The Tribes, in consultation with BLM and Atlas, will relocate the rings to an appropriate location. Atlas agrees to bear the costs to remove, record and relocate the rock rings.
9. BLM, Atlas, and the Tribes agree that Phase II of the Historic Properties Treatment Plan to be prepared by Kautz Environmental Consultants will incorporate the following actions:

In areas identified as areas of indirect impact, Kautz Environmental Consultants, Atlas' archaeological contractor, will establish perimeters within sites identified by the archaeological survey as high density areas in the original survey and will record general features associated within these sites. The Tribes will inventory and record archaeological features within the perimeters and maintain tribal records of these features.
10. BLM agrees to protect documents containing archeological data gathered by Kautz Environmental Consultants pursuant to the Historic Treatment Plan as confidential documents not subject to release under federal and state laws.