

Visual Resources Technical Report

Tamarack Quarry Expansion Project

Mt. Hood National Forest

US Department of Agriculture, Forest Service

Mt. Hood National Forest

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Acronyms and Abbreviations

DEA	David Evans and Associates, Inc.
DEM	digital elevation model
DOGAMI	Department of Geology and Mineral Industries
FEIS	Final Environmental Impact Statement
FS	Forest Service
GIS	Geographic Information System
LRMP	Land and Resource Management Plan for the Mt. Hood National Forest
ODOT	Oregon Department of Transportation
USDA	US Department of Agriculture
USGS	US Geological Survey
VMS	Visual Management System
VQO	Visual Quality Objective

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1 INTRODUCTION

The US Forest Service (FS) contracted with David Evans and Associates, Inc. (DEA) to conduct a visual resource assessment study to determine and assess the impacts of a proposed quarry expansion on the visual environment in the Mt. Hood National Forest. This technical report presents the findings and recommendations of the study.

1.1 PROJECT AREA LOCATION AND DESCRIPTION

The project area is approximately four miles south of Government Camp and US Highway 26 (US 26), in Section 2, Township 4 South, Range 8½ East, Willamette Meridian, Clackamas County, Oregon, on the Mt. Hood National Forest. The Tamarack Quarry is approximately 1.5 miles south of Trillium Lake. Figure 1 shows the project area and location. The haul route for the quarry is along FS roads 2656 and 2656-955.

The project area encompasses approximately 48 acres adjacent to (generally north and east of) the existing Tamarack Quarry. The existing quarry occupies approximately 22 acres, although it is currently permitted to expand to 29 acres (Oregon Department of Geology and Mineral Industries [DOGAMI] Permit Number 03-0092).

Two perennial streams are near the project area. The first is Mud Creek, the only named stream near the project site, which issues from Trillium Lake. The other is an unnamed stream originating from Summit Meadows. Both are headwater tributaries to the Salmon River. The entire length of the Salmon River, from its headwaters to its confluence with the Sandy River, is designated a Wild and Scenic River. The Sandy River is designated Wild and Scenic from its headwaters to the Mt. Hood National Forest boundary.¹

1.2 PROPOSED ACTION

The proposed action is to expand the existing Tamarack Quarry (formerly known as the Mud Creek Quarry) to encompass up to 70 acres of National Forest System land. Rock would be excavated from the existing quarry and the expansion area. The excavated material would be used by ODOT and the FS for road maintenance and construction, including improvements to US 26 and Oregon Route (OR) 35. Other uses may include road closures and site restoration, such as stream projects.

Vegetation removal and rock excavation would occur over the next 20 years, as rock is needed. ODOT anticipates removing 40,000 to 100,000 cubic yards of rock per year, although needs would vary with annual road and weather conditions. The FS would extract less than 10,000 cubic yards of rock per year for project work other than emergencies. ODOT and the FS would extract rock from the remaining seven acres

¹ In 1968, Congress enacted the Wild and Scenic Rivers Act to preserve the free-flowing conditions of and protect the immediate environment of selected rivers that possess outstandingly remarkable scenic, recreational, fish and wildlife, or other values.

within the current permitted area prior to entering the expansion area. All existing vegetation in the expansion area would be removed for quarry operations.

Activities would include clearing vegetation, blasting, rock crushing, screening, batching, loading and hauling, importing excess materials (such as from slides and ditch cleanings) for reprocessing or quarry reclamation, and short-term stockpiling of excavated rock and soils. Materials would be stockpiled on-site either for reprocessing or for use in reclamation. Rock for sanding roads would be hauled out of the quarry and stockpiled at various locations: the junction of US 26 and OR 35, the Government Camp maintenance station, Bennett Pass, Parkdale, and the junction of OR 216 and US 26. Construction rock would be quarried as needed and used shortly after crushing.

Activities would be subject to timing restrictions. Blasting would be allowed after July 15 only. No noise-generating or hauling activities would occur at night, on weekends, during holidays, or any time between the first measurable snowfall and mid-April, except for emergencies. ODOT would be responsible for plowing two lanes with turnouts on the haul route, as needed, as early as the second full week of April. Typically the FS opens the road a week or two prior to Memorial Day weekend.

The haul route from its junction with US 26 to the quarry is approximately 3.1 miles long, entirely on National Forest System lands, and includes FS roads 2656 and 2656-955. FS road 2656 is surfaced with asphalt. FS spur road 955 is gravel surfaced. No improvements would be made to the haul route except for routine maintenance, which may include resurfacing, structural repairs, striping, placement of safety reflectors, and placement of additional traffic signs. ODOT would pay for a commensurate portion of haul route maintenance. Traffic control, which may include flaggers and signs, would be implemented during hauling. Typical hauling trucks have a 20-cubic-yard capacity. No culvert replacements, road widening, pull-out or turn-around construction would occur as part of the proposed action.

A FS geologist estimated the remaining volume of good quality rock to be at least two million cubic yards. The geologist estimated the volume of the remaining in-place rock based on the topographic information from a 1"=100' site map, the location of surface outcrops, limited drill hole information, an assumption that good quality rock extends north beyond the drill hole locations for about 250 feet, and allowing for 20 percent of the volume to be soil and poor quality rock. The basic assumption is that the spur ridge landform is mostly underlain by the same andesite rock unit. Due to the extensive rock outcrops on the south side of the spur ridge there was little need for subsurface exploration until plans developed to excavate an upper bench. The FS drilled three exploratory holes in 1978. These drill holes are located approximately 150 feet northeast of the present quarry development limit. The drill holes were approximately 120 to 200 feet deep and indicated there is 180 feet or more of good quality rock below about 6 to 20 feet of soil. Additional drilling would be completed to verify the presence of good quality rock before expansion.

Figure 1. Vicinity

Detailed excavation and reclamation plans would be developed, approved by the FS, and implemented as expansion occurs. A reclamation plan is a required condition of any approved plan of operations. The reclamation plan would provide details about how ODOT expects to accomplish reclamation objectives. A diagram showing how waste rock will be arranged in the mine and the final grade of the reclaimed area is a mandatory part of the reclamation plan. Reclamation would include filling and stabilizing the quarry, spreading waste rock across the quarried area, adding any topsoil and vegetation removed during excavation, and planting native vegetation. Overburden soil has been and would continue to be saved for use during later reclamation of the quarry. The soil would be pushed back into the quarry benches and floors and planted with erosion-preventing, native grasses and other vegetation when the excavation is completed. The slope of the reclaimed quarry area would be between zero and ten percent. Portions of the quarry could be reclaimed in stages, depending on the final quarry excavation plan. ODOT has the option of hiring specialists to help with the revegetation portion of the reclamation or providing funding for FS assistance. The reclamation plan would follow the water and erosion control, soil salvage and replacement, and land shaping and revegetation best management practices described in the DOGAMI Mineral Land Regulation and Reclamation Program's manual aggregate mines (Open-File Report O-96-2). DOGAMI requires a reclamation plan to be submitted as part of the Division 30 Operating Permit application.

1.3 PURPOSE AND NEED

The purpose of the proposed action is to secure a long-term, economical source of rock material for the FS and ODOT to use on highways and forest roads near Mt. Hood. Current and near-term demand by ODOT and the FS is projected to exceed supply from ODOT and FS sources. Commercial sources are considerably more expensive.

ODOT and the FS estimate that more than two million cubic yards of rock would be needed over the next 20 years for highway and road maintenance, construction, and emergency repairs, as well as for road closures and stream and other site restoration projects in the Mt. Hood area. ODOT (Regions 4 and 6) has historically utilized approximately 40,000 cubic yards of material each year for sanding Mt. Hood area roadways. Planned road improvement projects and emergency repairs would require additional material.

ODOT has been faced with a nearly constant need for highway construction and maintenance materials on US 26 and OR 35 near Mt. Hood. This need became especially apparent after the October 2000 flood, which washed out portions of OR 35. During the emergency repair work it was estimated the cost of the material needed for riprap would total almost \$240,000 if secured from the closest commercial source. The FS agreed to supply the rock material but recognized that expansion of existing sources would be

necessary to meet future demand. ODOT has expressed that, in order to provide a safe and cost-efficient highway system near Mt. Hood, a secure, long-term source of material near Mt. Hood is essential. The need for sanding material has also become critical since the previous primary source of material (White River) is no longer available.

Through analysis, ODOT and the FS have determined that the site of the Tamarack Quarry is preferred over other quarry sites in the vicinity of Mt. Hood. Tamarack Quarry has the potential to be a relatively large quarry. It has been excavated and managed in a manner that facilitates continued excavation and appears to have reserves of quality source rock. The quarry has a relatively short haul route (approximately 3.1 miles) to US 26. However, the size of the existing quarry is inadequate to provide the amount of rock material needed over the next 20 years. Therefore, the quarry needs to be expanded.

1.4 ALTERNATIVES UNDER CONSIDERATION

1.4.1 Alternative 1

Alternative 1 would expand the Tamarack Quarry by approximately 41 acres more than what is currently permitted, for a total area of approximately 70 acres (see Figure 2). Expansion would occur to the north and east of the existing quarry as shown on Figure 2. All existing vegetation would be removed within the 41-acre expansion area. Rock would be excavated first from the remaining seven acres in the currently permitted area, then in the expansion area. The excavated material would be used by ODOT and the FS for road maintenance and construction, including improvements to US 26 and OR 35. The amount of material ODOT would remove each year could range from fewer than 40,000 cubic yards to more than 100,000 cubic yards. According to preliminary estimates by the FS, the total expanded quarry area with Alternative 1 would contain in excess of two million cubic yards of material. Based on extracting 100,000 cubic yards per year, ODOT and the FS would use the quarry for 20 years or more.

Activities would include clearing vegetation, blasting, rock crushing, screening, batching, loading and hauling, importing excess materials (e.g., soils for reclamation and rock from off-site), and some short-term stockpiling of excavated rock and soils. Table 1-1 shows when various activities would be permitted. No noise-generating or hauling activities would occur at night, on weekends, during holidays, or any time between the first measurable snowfall and mid-April, except for emergencies. ODOT would be responsible for plowing two lanes with turnouts on the haul route, as needed, as early as the second full week of April. Typically the FS opens the road one or two weeks prior to Memorial Day weekend.

Figure 2. Alternatives Under Consideration

Table 1-1. Dates and Times During which Quarry Activities Would Be Permitted

Activity	Dates	Days and Hours*
Blasting	July 16 – first measurable snowfall (typically in November)	Mon.-Thu. 10 AM to 5 PM Fri. 10 AM to 12 PM
Crushing Screening Batching	Mid-April – first measurable snowfall (typically in November)	Mon.-Thu. 7 AM to 7 PM Fri. 7 AM to 12 PM
Blast Day Preparation Batch Plant Daily Preparation Equipment Repair General Equipment Maintenance (fueling and servicing) Dust Abatement (pre- and post-shift each day)	Mid-April – first measurable snowfall (typically in November)	Days and hours not restricted
Hauling (i.e., large trucks, including semis and rock trucks, on the haul route) Loading	Mid-April – first measurable snowfall (typically in November)	Mon.-Thu. 7 AM to 5 PM Fri. 7 AM to 12 PM

* No activities would be permitted on federal holidays. Restrictions could be modified after Labor Day subject to approval by the FS.

To minimize potential conflicts with recreation traffic, hauling would not occur on weekends beginning on Fridays at noon, or on federal holidays, unless the quarry is being used for emergency road repairs. When hauling would occur, ODOT would implement traffic control measures (e.g., flagging, temporary signage).

No improvements would be made to the haul route except for routine maintenance, which may include resurfacing, structural repairs, striping, placement of safety reflectors, and placement of additional traffic signs. ODOT would pay for a commensurate portion of haul route maintenance. Traffic control, which may include flaggers and signs, would be implemented during hauling. Typical hauling trucks have a 20-cubic-yard capacity. No culvert replacements, road widening, pull-out or turn-around construction would occur as part of this alternative.

To provide a better trail connection and continued year-round use of the quarry for recreation, the FS would relocate the Quarry Connector trail around the quarry and maintain it for winter cross-country skiing (suitable for beginner to intermediate skiers) and summer mountain biking use (suitable for intermediate bikers), as part of the proposed project. ODOT would pay for the trail relocation. The route would be at a grade of less than eight percent with rest grades approximately every 200 feet to accommodate mountain bikers in the summer use season. It would be suitable for grooming with a snow

groomer. Quarry operations would maintain the designed location and grade of the route into the future.

Under Alternative 1 (as with Alternative 2), detailed excavation and reclamation plans would be developed, approved by the FS, and implemented as expansion occurs. Overburden soil has been and would continue to be saved for use during later reclamation of the quarry. The soil would be pushed back into the quarry benches and floors and planted with erosion-preventing, native grasses and other vegetation when the excavation is completed. Portions of the quarry could be reclaimed in stages, depending on the final quarry excavation plan.

1.4.2 Alternative 2

With Alternative 2, the Tamarack Quarry would be expanded by approximately 21 acres over the currently permitted 29 acres, for a total area of approximately 50 acres. The expansion would occur primarily toward the north and east, as shown on Figure 2, but the smaller expansion area would reduce visual impacts of the quarry when viewed from the Timberline Lodge area. All existing vegetation would be removed within the 21-acre expansion area. Rock would be excavated first from the remaining seven acres in the currently permitted area, then from the expansion area. The excavated material would be used by ODOT and the FS for road maintenance and construction, including improvements to US 26 and OR 35. The amount of material ODOT would remove each year could range from fewer than 40,000 cubic yards to more than 100,000 cubic yards. According to preliminary estimates by the FS, the total quarry area with Alternative 2 would contain up to two million cubic yards of material. Based on extracting 100,000 cubic yards per year, ODOT and the FS would use the quarry for approximately 20 years.

Activities would be similar to those described for Alternative 1, with timing restrictions as shown in Table 1-1. Blasting would be allowed after July 15 only. No noise-generating or hauling activities would occur at night, on weekends, during holidays, or any time between the first measurable snowfall and mid-April, except for emergencies. ODOT would be responsible for plowing two lanes with turnouts on the haul route, as needed, as early as the second full week of April. Typically the FS opens the road a week or two prior to Memorial Day weekend.

To minimize potential conflicts with recreation traffic, hauling would not occur on weekends beginning on Fridays at noon, or on federal holidays, unless the quarry is being used for emergency road repairs. When hauling would occur, ODOT would implement traffic control measures (e.g., flagging, temporary signage).

The Quarry Connector trail would be relocated, as described under Alternative 1.

Similar to Alternative 1, no improvements would be made to the haul route except for routine maintenance, which may include resurfacing, structural repairs, striping, placement of safety reflectors, and placement of additional traffic signs. ODOT would pay for a commensurate portion of haul route maintenance. Traffic control, which may include flaggers and signs, would be implemented during hauling. Typical hauling trucks have a 20-cubic-yard capacity. No culvert replacements, road widening, pull-out or turn-around construction would occur as part of Alternative 2.

Detailed excavation and reclamation plans would be developed, approved by the FS, and implemented as expansion occurs. Generally, reclamation would occur as described for Alternative 1.

1.4.3 No Action Alternative

The quarry would not be expanded under the No Action Alternative. The FS would be the primary user of the quarry and would continue to extract rock from the site within the existing permitted boundaries (approximately 29 acres). The FS estimates that the existing quarry would yield approximately 750,000 additional cubic yards of material.

To meet projected needs maintenance and construction projects, the FS may need to supplement the material removed from the Tamarack Quarry with material from other sources, and ODOT would need to obtain material from other sources. Those sources may include other quarries in the Forest as well as private, commercial suppliers.

Currently, ODOT has only one private supplier as a potential source (Barnhart, pers. comm., 2003). It is the nearest commercial quarry to the Mt. Hood area and is approximately 20 miles from Tamarack Quarry. Other commercial suppliers are considerably farther from the area, and transporting rock from those suppliers would be cost-prohibitive (Barnhart, pers. comm., 2004). Current price is approximately \$16 per cubic yard of material (Barnhart, pers. comm., 2003). Assuming ODOT uses an average of 100,000 cubic yards of material each year, the annual cost of using a private supplier would be in excess of \$1.6 million.

Activities within the existing permit area would be similar to those described for Alternative 1, although less activity would occur each year with the FS as the primary user. Activities, including hauling, would occur on weekdays (Mondays through Thursdays from 7:00 a.m. to 5:00 p.m., and Fridays from 7:00 a.m. to noon) during the spring, summer, and fall when the haul road is clear of snow. Blasting would be allowed only after July 15 of each year. The haul route would receive normal maintenance. Expansion to the currently permitted boundaries would affect the Quarry Connector trail, which would be relocated under the No Action Alternative.

The quarry is operated under a DOGAMI permit (permit number 03-0092). DOGAMI has a reclamation plan on file for the quarry. According to the reclamation plan for the

No Action Alternative, reclamation would begin 30 days after mining is completed at the quarry. Topsoil and overburden piles would be seeded for stabilization, and all areas where overburden is replaced would be stabilized. Because natural landform and existing vegetation provide screening for the quarry, additional screening would not be needed. A vegetated buffer of at least 1,000 feet would provide screening around the entire quarry once mining is completed. All structures, equipment, and refuse would be removed from the site prior to completing reclamation. Benches would be cut into vertical slopes. Topsoil would be stored on-site, then replaced and seeded with species recommended by the FS. Planting methods and times would also be in accordance with FS recommendations.

2 METHODS

The FS and DEA collaborated to develop the purpose and need statement for the proposed project. Once the project purpose and need were understood, DEA identified a key observation point, established baseline conditions at the project site, and gained an understanding of management guidelines affecting the visual environment. This was accomplished through meetings with FS and ODOT staff, literature review and background research, a seen area analysis, and site reconnaissance. DEA then created a visual simulation to model likely future conditions for the two action alternatives. These models were used to compare the likely future conditions against the criteria established in the management guidelines. Mitigation measures were then proposed to offset probable impacts resulting from the development of the project.

2.1 LITERATURE REVIEW AND BACKGROUND RESEARCH

Relevant and available documents were reviewed by DEA. Of special value were the LRMP and the Final Environmental Impact Statement (FEIS) for the LRMP. Other documents reviewed included initial public comment to the proposed actions, various draft reports, agency meeting minutes, and FS and ODOT correspondence regarding the need and coordination of various aspects of the proposed project.

DEA also met on several occasions with FS and ODOT staff to discuss the project and gain agency insight to key viewing areas, user concerns, and potential mitigation measures.

2.2 SEEN AREA ANALYSIS

In order to determine the likely viewshed from which the proposed project would be visible, DEA conducted a seen area analysis. Ten-meter digital elevation models (DEMs) and Mt. Hood National Forest vegetation classification geographical information system (GIS) data were downloaded from the Regional Ecosystem Office Internet site. Canopy height values were assigned to the FS vegetation polygons and later ground-truthed for accuracy. The canopy heights were then overlaid onto the DEMs to simulate the elevation of the top of the canopy. A visibility analysis was performed on the top-of-canopy-DEM,

identifying areas visible from Timberline Lodge. Several potential quarry configurations were extracted from the top-of-canopy-DEM, and the visibility analysis was re-run for each potential quarry configuration.

The GIS analysis was also used to determine the approximate limits of expansion for Alternative 2. The limits were established by modeling the area of expansion at which the proposed activities would just become visible.

2.3 SITE RECONNAISSANCE

Site visits to Timberline Lodge were conducted on January 20 and February 20, 2003, to document the existing landscape character, and to consider views and potential impacts seen from the lodge. Photographs of the project site were taken from several locations at the lodge for use in visual simulations described below.

A site visit to the quarry was conducted in March 2003 to ground-truth the forest stand heights and GIS modeling. During that visit, it was also confirmed that the proposed expansion would not be visible from Trillium Lake and its associated campground because the site is screened by vegetation and landform.

2.4 VISUAL SIMULATIONS

A visual simulation was prepared for Alternatives 1 and 2 to estimate the probable impacts to the landscape. Using AutoCAD 3D modeling tools and Photoshop computer software, DEA created a topographic model of the two build alternatives, created a line and angle of sight from which to view the model based on the location of the key observation point (Timberline Lodge), determined the areas visible along that sightline, and created a visual simulation of likely impacts by superimposing the models of the two build alternatives over a recent photograph taken from the key observation point.

2.5 COMPARISON OF PROPOSED ACTIONS AGAINST MANAGEMENT REQUIREMENTS

To determine compliance with management requirements, DEA used the visual simulations to compare the project alternatives to the existing landscape character in terms of scale, size, extent, and the amount of contrast in form, line, color, and texture as viewed from the key observation point. This method relies primarily on professional judgment because there are no quantifiable interval measurements that can be used as thresholds.

The primary criterion for determining the project's effect is the Visual Quality Objective (VQO) that would result from the proposed action (i.e., implementing one of the project alternatives). Failure to achieve the VQO specified in the management guidelines would result in an "adverse" effect. Achievement of the specified VQO would result in a

“neutral” effect, and achievement of a VQO higher than that specified would result in a “beneficial” effect.

3 **AFFECTED ENVIRONMENT**

3.1 **SCENIC RESOURCE MANAGEMENT**

The LRMP and associated FEIS provide the primary direction for management of scenic resources on the project site. The LRMP designates the existing quarry as C1 Timber Emphasis and the surrounding landscape as B2 Scenic Viewshed, specifically, the Timberline Lodge Viewshed with the viewer position being the lodge and the background extending to approximately twelve miles (FS 1990). The C1 designation applies to areas currently screened from Timberline Lodge by the existing landform (Figure 3). Both of the proposed Action Alternatives would remove portions of the landform and expose C1 areas to view from the lodge. Therefore, for the purposes of this study, the areas that would become visible through the proposed Action Alternatives will be considered part of the B2 Scenic Viewshed.

VQOs are established in the LRMP and describe the degree of acceptable alteration to the landscape in terms of visual contrast with the surrounding landscape within Distance Zones from selected viewer positions (FS 1990).

The FEIS identifies five VQOs, which are defined as (FS 1990a):

- **Preservation:** Limited to ecological changes.
- **Retention:** Retains a predominantly natural landscape. Human activities are not evident to casual observers.
- **Partial Retention:** Evidence of human activities is permissible, but is subordinate to characteristics of the natural landscape.
- **Modification:** Human activities may dominate the landscape, but their evidence must blend with the landscape’s natural characteristics. Human modifications should appear to be natural occurrences when viewed from a close or moderate distance.
- **Maximum Modification:** Although human activities may dominate the landscape, they must still appear to be natural occurrences when viewed from long distances.

There are three Distance Zones, which are defined in Table 3-1.

Table 3-1. Distance Zone Definitions

Distance Zone	Viewing Distance
Foreground	Up to 0.5 miles
Middleground	0.5 to 5 miles
Background	Beyond 5 miles

Figure 3. LRMP Management Area Designations

Management activities must be consistent with the prescribed VQO for the viewshed shown in Table 3-2.

Table 3-2. Timberline Lodge Viewshed Visual Quality Objectives

Distance Zone	Visual Quality Objective
Foreground	Retention
Middleground	Partial Retention
Background	Partial Retention

Desired future conditions have been established in the LRMP. Given the key viewing area of Timberline Lodge (see Section 3.2.1) which is located approximately 5.7 miles north of the quarry, the Middleground and Background objectives of Partial Retention apply to the management intensity for the project. Timberline Lodge is approximately 5.7 miles north of the project area. The LRMP provides specific direction for these objectives:

- Natural appearing forest landscape, with little evidence of human alteration
- Dominant visual impression is mostly continuous tree canopies, with diversity in occasional natural appearing openings
- Mosaic of species and age classes add texture and color contrast in natural patterns
- Management activities repeat form, line, color and texture common to the characteristic landscape

3.2 LANDSCAPE SETTING

Recreational activities abound in the Mt. Hood National Forest with nearby trails, roads, rivers, lakes, campgrounds, and ski areas. Highways 26 and 35 serve as the major access corridors to the area; numerous FS roads provide a well-used network throughout the project vicinity. The site is approximately 1.5 miles south of Trillium Lake, which receives significant, year-round recreation. The approximate elevation of the project area is 3,800 feet above mean sea level. Historically, the Salmon River Watershed has been used by American Indians as a major huckleberry picking area, particularly in the Sherar Burn, Mud Creek, and High Rock areas (FS 1995). The Sherar Burn area (an area burned by wildfire approximately 70 years ago) is still used by American Indians for huckleberry picking and bear grass harvesting, and by recreation users for berry picking. There are no mature trees to screen the view of the quarry from the Sherar Burn.

The project is in an area of high visual quality importance, dominated with mature Douglas fir (*Pseudotsuga menziesii*) forest. Snow-capped peaks of Mt. Hood, Mt. Jefferson, and ridgelines in the Cascade Range augment the area's scenic quality. Timber harvest activities have resulted in an unnatural patchwork pattern in several areas and

create strong visual contrast when viewed from Timberline Lodge. Trillium Lake, also viewed from Timberline Lodge, creates a distinct, natural appearing contrast amid the surrounding forested landscape.

Climatic conditions vary dramatically and affect the visual environment. The vicinity receives a significant amount of rain and snow annually. Fog and low clouds are common and block views beyond the foreground. Haze and smoke may also affect the seen environment depending on local conditions. During exceptionally clear winter weather, snow glare may affect the views in the foreground and exacerbate contrast in the middle and background.

3.2.1 Key Viewing Areas

Conversations with FS staff, a review of relevant and available mapping, visitor use information, limited GIS spatial analyses, and public comment led to the conclusion that Timberline Lodge is the only key viewing area for this project (Tierney, pers. comm. 2003, Walker, pers. comm. 2003). Therefore, the following discussions on landform and waterform, effects, and impacts are presented in the context of being viewed from Timberline Lodge. Furthermore, depending on one's specific viewpoint from the Lodge, the proposed activity is screened from view by vegetation and landform.

The key viewing area for the analysis is from the "picture window" on the second floor of the main entrance to Timberline Lodge.

The campground and dam at Trillium Lake are also considered important viewing areas, as are Sherar Burn Road and the Salmon River corridor. Therefore, limited analysis was conducted to determine potential visual impacts of the project from those areas.

3.2.2 Landform

The surrounding landform is mountainous and bold, typical of the Cascade Range. The jagged peak of Mt. Jefferson and distant ridges to the south are silhouetted against the skyline as shown on Figures 4 and 5. As viewed from Timberline Lodge, the foreground features strong, interesting contrast in form, line, color, and texture created by the juxtaposition of mature forest canopy, snags, ski runs, the slopes of Mt. Hood, talus, the horizon line, and middleground/background imagery. Structures associated with the lodge, such as buildings, ski lifts, utilities, and other hardscape elements, are part of the existing landscape character.

Figure 4. Existing Conditions: View from Timberline Lodge in Winter

Figure 5. Existing Conditions: View from Timberline Lodge in Summer

The project area, viewed from the lodge, is approximately 5.7 miles to the south. The existing quarry is tucked behind a ridgeline and is not visible. A small, forested knoll north of the quarry has the potential to screen or partially screen the proposed expansion from view. Undulating horizontal bands of color, shadow, and texture create visual interest in the middleground and background as forested slopes fade into the distance. Colors fade from dark green to blue and gray depending on light conditions. Several prominent buttes and ridgelines dominate the middleground. Previous timber harvest practices have resulted in an unnatural-appearing patchwork plainly visible from the lodge. A short section of FS road 2656 is visible east of Trillium Lake during winter conditions and appears as a natural scar on the landscape. Mt. Jefferson's silhouette on the horizon creates a focal point in the distant background.

3.2.3 Waterform

Trillium Lake is the only water body visible from the key viewpoint and creates strong, natural appearing contrast in color and texture against the dark green forest canopy. The lake also provides a middleground focal point throughout the year.

4 ENVIRONMENTAL CONSEQUENCES

This section addresses the effects of the proposed project on the scenic qualities of the project area and as seen from the key viewing area. The visual simulations presented in this section are of the view from the picture window at Timberline Lodge. When viewing the visual simulations included in this section, it is important to note that the simulations have been based on U.S. Geological Survey (USGS) 7.5-minute quadrangle contour lines and use the 10-meter grid DEMs provided by the FS. The simulations are intended to best represent future conditions for both action alternatives using the available information. The actual appearance of the quarry upon completion of expansion may vary from the visual simulations.

4.1 ALTERNATIVE 1

Visual simulations from Timberline Lodge of Alternative 1 in winter and summer conditions are shown on Figures 6 and 7, respectively. They depict two visible areas of the expanded quarry. The simulations present a worst-case scenario in that they show the expansion at its maximum limits, with no revegetation, even though the reclamation plan likely would require the importation of topsoil and revegetation of the site. The photograph used in the winter simulation was intentionally taken on a clear winter day to intensify the potential contrast in color between the snowy white quarry openings and the surrounding forest canopy.

When compared against the existing landscape character, Alternative 1 would result in low contrast in form and line, and low contrast in texture. Color contrast would be high in winter and moderate in summer. The form, line, and texture of the proposed expansion would be generally consistent with other openings in the viewshed. Although contrast in

color would be high, the openings would mimic the appearance of Trillium Lake in winter conditions. Contrasts in color would likely become negligible as the reclamation plan to establish vegetation is successfully executed. Reclamation could occur in stages, so that portions of the quarry would be revegetated as the rock source is exhausted.

Under Alternative 1 (as with Alternative 2), detailed excavation and reclamation plans would be developed, approved by the FS, and implemented as expansion occurs. Overburden soil has been and would continue to be saved for use during later reclamation of the quarry. The soil would be pushed back into the quarry benches and floors and planted with erosion-preventing, native grasses and other vegetation when the excavation is completed. Portions of the quarry could be reclaimed in stages, depending on the final quarry reclamation plan.

Given the distance of approximately 5.7 miles from Timberline Lodge to the quarry, it is not likely that batching and stockpiling operations or equipment could be observed with the naked eye. Ample opportunity exists at the quarry to keep batch facilities and stockpiles screened from view using topography. The haul route is not visible from the lodge, so no effect is anticipated from additional traffic along the haul route.

Dust from rock extraction, crushing, screening, batching, loading, and hauling would cause localized air quality impacts to the Trillium Lake basin area. FS road 2656 is paved. The amount of dust created would be minimized by sprinkling when necessary, so dust would not create significant adverse visual impacts. The distance from the lodge to the quarry further reduces the likelihood of visual impacts from dust. It is highly unlikely that exhaust from equipment would cause a plume that would be visible from Timberline Lodge, as typically exhaust plumes do not appear unless there is a large concentration (more than 20) of heavy vehicles that are idling simultaneously in one location (Moore, M., pers. comm., 2004). ODOT would have fewer than a half-dozen vehicles operating at any one time.

In the short term, Alternative 1 would not directly affect the scenic environment because it would be approximately 10 to 15 years before the quarry expansion would daylight into the knoll and sideslopes that currently screen the quarry from the lodge. Long-term effects to the scenic environment, when compared to the existing landscape character, would be consistent with the VQO of Partial Retention (evidence of human activities is permissible, but is subordinate to characteristics of the natural landscape). Even though the quarry expansion area would be partially visible, it would be subordinate to the characteristics of the natural landscape.

The expanded quarry would not be visible from Trillium Lake, the campground, or the dam—or the Salmon River corridor. Vegetation and topography would screen views of the quarry from these areas.

Figure 6. Visual Simulation of Alternative 1 in Winter

Figure 7. Visual Simulation of Alternative 1 in Summer

The existing quarry is visible from the Sherar Burn huckleberry and bear grass harvesting area, and the proposed expansion would create more of a visual impact to users' experience. Due to the lack of trees in the Sherar Burn area and the topography between that area and the quarry, views of the quarry from Sherar Burn could not be screened. As reclamation of the quarry is implemented, visual impacts would be reduced. Sherar Burn is not a key viewing area.

4.2 ALTERNATIVE 2

Visual simulations from Timberline Lodge of Alternative 2 in winter and summer conditions are shown on Figure 8 and Figure 9, respectively. They depict two small areas of the expanded quarry that appear as horizontal slivers on the landscape. Similar to Alternative 1, the winter simulation also presents a worst-case scenario in that it shows the expansion with no revegetation and in bright, winter conditions.

While the simulation indicates that small portions of the expansion would be visible, the level of detail in the 10-meter DEM and USGS contour information used to model the simulations makes it very difficult to determine the exact line at which the expansion would become visible. The resolution of the available information is not high enough to enable an exact determination, but it does provide a good estimate of where that line might occur. Because the intent of Alternative 2 is to expand the quarry to a point just before it would become visible from the key viewing area (Timberline Lodge), monitoring the expansion to determine visibility from the lodge is discussed as a mitigation measure in Section 5.

For the purposes of this study, the visual impact analysis for Alternative 2 is based on the simulations in Figure 8 and Figure 9. It is anticipated that the actual impacts would be less than shown in the simulations because the expansion would be monitored and revised so as not to be visible from Timberline Lodge.

When compared to the existing landscape character, Alternative 2 would result in low contrast in form and line, moderate to low contrast in color, and low contrast in texture. The form, line, and texture of the proposed expansion would be generally less obtrusive than other openings in the viewshed. The contrast in color would be moderate to low because the extent of the impact would be relatively small when compared to other openings such as Trillium Lake and clearcuts. Although the visible clearcuts were harvested 10 to 20 years ago, they have been slow to revegetate and still present a contrast in color. In winter conditions, the quarry openings would also be similar in appearance to Trillium Lake. Contrasts in color would likely become negligible as the reclamation plan to establish vegetation is successfully executed. Reclamation could occur in stages, so that portions of the quarry would be revegetated as the rock source is exhausted.

Given the distance of approximately 5.7 miles from Timberline Lodge to the quarry, and the fact that most of the landform screening the expansion would be left in place, it is unlikely that batching and stockpiling operations or equipment would be visible. The proposed haul route is not visible from the lodge, so no effect is anticipated from additional traffic along the haul route.

Based on the simulation, the proposed action would not directly affect the scenic environment in the short term because it would be approximately 10 to 15 years before expansion activities breached the area visible from Timberline Lodge. Long-term effects to the scenic environment, when compared to the landscape character in 10 to 20 years, would be minor, if not negligible.

In summary, based on the visual simulations, Alternative 2 would meet the VQO of Partial Retention (evidence of human activities is permissible, but is subordinate to characteristics of the natural landscape) and would be less visible than Alternative 1. Furthermore, if recommended mitigation measures to monitor and revise the expansion area are implemented, the quarry would not be visible from Timberline Lodge.

The existing quarry is visible from the Sherar Burn huckleberry and bear grass harvesting area, and the proposed expansion would create more of a visual impact to users' experience, although less of an impact than Alternative 1. Due to the lack of trees in the Sherar Burn area and the topography between that area and the quarry, views of the quarry from Sherar Burn could not be screened. As quarry reclamation is implemented, visual impacts would be reduced. Sherar Burn is not a key viewing area.

As with Alternative 1, the expanded quarry would not be visible from Trillium Lake, the campground, or the dam, or the Salmon River corridor, because vegetation and topography would screen the quarry from view.

4.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, the FS would expand the quarry from its current size of approximately 22 acres to the existing permitted boundary of approximately 29 acres. Blasting, crushing, screening, batching, and loading would occur as with Alternatives 1 and 2. Based on the available information and modeling, the expansion area would not encroach far enough into the knoll and sideslopes for the No Action Alternative to be visible from Timberline Lodge. Therefore, the No Action Alternative would meet the VQO of Partial Retention and have a neutral effect.

Figure 8. Visual Simulation of Alternative 2 in Winter

Figure 9. Visual Simulation of Alternative 2 in Summer

As noted above, the existing quarry is visible from the Sherar Burn area, and the expansion that would occur under the No Action Alternative would increase visual impacts to users' experience. However, the impacts would be much less than under the Action Alternatives. Views of the quarry from Sherar Burn cannot be screened, but as quarry reclamation is implemented, visual impacts would be reduced. Sherar Burn is not a key viewing area.

The quarry would not be visible from the Salmon River corridor, or from Trillium Lake and its associated campground and dam because of topography and vegetation.

4.4 CUMULATIVE IMPACTS

Other known projects planned in the project vicinity include the Salmonberry #5 commercial thinning project, the Timberline Express Lift, the Timberline fuels reduction project, and trail development in accordance with the Government Camp Trails Master Plan for the Mt Hood area. None of these projects are in the immediate vicinity of the quarry. No other new quarry operations are proposed in the Mt. Hood National Forest.

Of the projects listed above, only trail development is expected to occur the viewshed seen from Timberline Lodge. Due to their nature and their distance from the lodge, the trails would not be visible from the lodge. Therefore, there would be no cumulative effects. However, if logging, road improvements, or other clearing activities occur within the viewshed, the cumulative impacts may exceed the VQO of Partial Retention. Additional studies would be required to assess impacts resulting from potential future projects. Given the relatively minor impacts resulting from the proposed action alternatives, it is not likely that the quarry expansion would contribute significantly to cumulative impacts.

5 POTENTIAL MITIGATION MEASURES

Although both proposed Action Alternatives would meet the VQO of Partial Retention, the following mitigation measures could be implemented to mitigate and/or reduce potential impacts to the scenic environment.

1. Monitor expansion from Timberline Lodge to determine when impacts are becoming visible. The expansion project would take an extended period of time and would be accomplished in phases. Monitoring the success of reclamation efforts would help determine actual visual impacts by showing if reclaimed areas have a natural appearance before new areas are opened and become visible from Timberline Lodge. Monitoring the actual expansion footprint from the lodge would help determine where the limits of visibility occur.
2. Locate processing equipment and batching facilities on the lower levels of the quarry. Existing topography and vegetation could screen equipment and facilities placed on the quarry floor from view.

3. Augment forest cover on the north side of the expansion area. Supplementing existing vegetation with additional plantings would, in time, provide a screen for portions of the expansion area. The area would be planted when specific quarry development plans are proposed for the northernmost portion of the expansion area. Planting plans would be coordinated with a FS wildlife biologist to meet wildlife goals for the area.

6 ENVIRONMENTAL CONSULTATION, REVIEW AND PERMIT REQUIREMENTS

This study follows the protocol for assessing visual impacts as outlined in the Visual Management System (VMS) (FS 1974). The proposed actions meet the VQO of Partial Retention as stated in the LRMP. Therefore, no additional consultation is required. No known permits are required for potentially impacting visual resources.

7 INDIVIDUALS AND AGENCIES CONSULTED

Jim Tierney, USFS, January 10, 2003, project meeting

Mike Redmond, USFS, January 10, 2003, project meeting

Charlie Scisione, ODOT, January 10, 2003, project meeting

Kevin Bracy, ODOT, January 10, 2003, project meeting

Jim McNamee, ODOT, January 10, 2003, project meeting

8 LIST OF PREPARERS

Sean Sullivan, L.A. is the principal author of this report. Kristina Gifford McKenzie provided quality review. Tannen Printz performed the visual simulations; Aaron Turecek performed the seen area analysis. Sharon Johnson provided word processing.

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9.1 PERSONAL COMMUNICATIONS

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Moore, Martha, Principal, TW Environmental, Inc. Telephone conversations. January 27 and February 3, 2004.

Walker, Kathleen, Recreation Assistant, Zigzag Ranger District, US Forest Service, Mt. Hood National Forest. Electronic mail communication. September 16, 2003. Sent to James Tierney, Infrastructure Team Leader, Clackamas River Ranger District, US Forest Service, Mt. Hood National Forest.