FINAL ENVIRONMENTAL ASSESSMENT

Gerlach Geothermal Exploration Project

DOI-BLM-NV-W030-2022-0001-EA

US Department of the Interior
Bureau of Land Management
Winnemucca District
Black Rock Field Office
5100 East Winnemucca Boulevard
Winnemucca, NV 89445

October 2022~~August 2022~~

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The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
°F	degrees Fahrenheit
ALAN	artificial light at night
AMSL	above mean sea level
AOI	area of interest
APE	area of potential effect
BLM	United States Department of the Interior, Bureau of Land Management
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CR-34	Washoe County Road 34
CWA	Clean Water Act of 1972, as amended
dBA	A-weighted decibel
DNL	day-night average sound level
DOI	US Department of the Interior
EA	environmental assessment
Eagle Act	Bald and Golden Eagle Protection Act
EGS	enhanced geothermal systems
EIS	environmental impact statement
EMPSi	Environmental Management and Planning Solutions Inc.
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act of 1973, as amended
GGID	Gerlach General Improvement District
GHG	greenhouse gas
GHMA	general habitat management area
Gold Book	Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development
H_2S	hydrogen sulfide
HMA	herd management area
HUC	Hydrologic Unit Code
IPaC	USFWS Information for Planning and Consultation
KEC	Kautz Environmental Consultants
KOP	key observation point
LWC	lands with wilderness characteristics
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NCA	National Conservation Area

NCA Act	Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000
NDEP	Nevada Division of Environmental Protection
NDOM	Nevada Division of Minerals
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NPS	National Park Service
NRHP	National Register of Historic Places
NSO	no surface occupancy
OHMA	other habitat management area
Ormat	ORNI 26 LLC, a subsidiary of Ormat Nevada, Inc.
pH	potential of hydrogen
PHMA	priority habitat management area
POD	point of diversion
POU	place of use
project	Gerlach Geothermal Exploration Project
RMP	resource management plan
SHPO	Nevada State Historic Preservation Office
SR-447	Nevada State Route 447
SRMA	special recreation management area
SRP	special recreation permit
study area	hydrologic evaluation study area
SWReGAP	Southwest Regional Gap Analysis Project
TMRPA	Truckee Meadows Regional Planning Agency
UNR	University of Nevada, Reno
US	United States
USACE	US Army Corps of Engineers
USC	United States Code
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VRM	visual resource management
WCHD–AQMD	Washoe County Health District–Air Quality Management Division
WSA	wilderness study area

Chapter 1. Introduction

The United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) Black Rock Field Office has prepared this final~~draft~~ environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) revised regulations, effective September 14, 2020, and BLM regulations for implementing NEPA.

1.1 PROJECT SETTING

ORNI 26 LLC, a subsidiary of Ormat Nevada, Inc. (hereinafter collectively referred to as Ormat), is proposing the Gerlach Geothermal Exploration Project (project). The project is within a 2,724-acre area of interest (AOI; see **Section 2.1.1**) in Washoe County, less than 1 mile northwest of Gerlach, Nevada (**Appendix A**, **Figure A-1**, Project Area). The project proposes drilling and testing of up to ~~20~~19 geothermal exploration wells and construction of access roads (proposed action). The proposed wells would be located within federal geothermal leases on public lands administered by the BLM in the Gerlach Geothermal Lease Unit (NVN-88151X); these include leases NVN-55718, NVN-75228, NVN-98640, NVN-98641, and NVN-100029 (**Figure A-2**, Geothermal Lease Areas).

Ormat previously proposed a geothermal development project in the same location, and the BLM conducted a 60-day public pre-scoping period from October 1, 2020, to December 1, 2020 (see **Section 1.7**). During the 60-day pre-scoping period, Ormat withdrew its utilization plan and plan of development, and submitted to the BLM an operations plan for geothermal exploration, which is the proposed action analyzed in this EA.

The geothermal exploration activities analyzed in this EA are the same as geothermal resource confirmation activities described in 43 Code of Federal Regulations (CFR) 3260-3267. The BLM updated and released guidance for this definition as the draft EA was being finalized for publication to ePlanning. For this reason, the proposed action analyzed in this EA is described as geothermal exploration. Language in the accompanying decision record describes the proposed action as geothermal resource confirmation, in accordance with the guidance in the CFR.

1.2 COOPERATING AGENCIES

The BLM invited the US Fish and Wildlife Service (USFWS), the National Park Service (NPS) National Historic Trails Office, the Nevada Department of Wildlife (NDOW), Washoe County, and the Truckee Meadows Regional Planning Agency (TMRPA) to be cooperating agencies in preparing this EA. They were invited because of their jurisdiction by law or special expertise. To date, the USFWS, NPS National Historic Trails Office, and TMRPA accepted the invitation to be cooperating agencies.

The BLM is the lead federal agency for the NEPA process, the Endangered Species Act (ESA) Section 7 consultation process, and the National Historic Preservation Act (NHPA) Section 106 consultation process. NHPA Section 106 consultation is being carried out in accordance with the process described in 36 ~~Code of Federal Regulations (~~CFR~~)~~ 800.8(c). See **Chapter 4**, Consultation and Coordination, for additional information on these consultation processes.

1.3 PURPOSE AND NEED

The BLM's purpose for the federal action is to respond to Ormat's application to explore geothermal energy resources on public lands through the construction of geothermal power exploration wells and associated facilities.

The need for action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, the Geothermal Steam Act of 1970, and the implementing regulations provided under 43 CFR 3200.

1.4 DECISION TO BE MADE

The BLM would decide to grant, grant with modification, or deny Ormat's proposal, in compliance with BLM leasing regulations and other federal laws. Conditions of approval would be applied to the applicable permits and authorizations. Any activities outside the scope of the proposed action would be subject to further NEPA analyses.

1.5 RESOURCE MANAGEMENT PLAN CONFORMANCE

The proposed action would be in conformance with the BLM Winnemucca District Resource Management Plan (RMP; BLM 2015a),[1] as amended. Specifically, the proposed action would be consistent with Objective D-MR 4 (BLM 2015a, p. 2-172), which states, in part, that "Lands within the [Winnemucca District] would be open to geothermal and oil and gas leasing and development except where incompatible with important resource values."

The proposed action would also be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004). Areas within that RMP's planning area but outside the NCA and wilderness areas, including the South Playa,[2] are the focus of leasable mineral decisions in the RMP. Specifically, Ormat's proposed action would be consistent with Objective MIN-4 (BLM 2004, p. 2-43), which states, "The South Playa is open to new geothermal leasing."

1.6 RELATIONSHIP TO LAWS, REGULATIONS, POLICIES, AND PLANS

The alternatives analyzed in this EA are consistent with federal laws and regulations; state and local government laws and regulations; and other plans, programs, and policies, to the extent practicable within federal law, regulation, and policy.

The BLM has prepared this EA in accordance with the following statutes and implementing regulations, policies, and procedures that govern the BLM's actions:

- Mineral Leasing Act of 1920 (30 United States Code [USC] 181), as amended
- Geothermal Steam Act of 1970 (30 USC 23), as amended
- Federal Land Policy and Management Act of 1976 (43 USC 35)
- BLM NEPA Handbook (H-1790-1), as updated (BLM 2008)
- Energy Policy Act of 2005 (42 USC 149), as amended
- Energy Act of 2020
- Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000 (NCA Act) (Public Law 106-554)

1.7 SCOPING AND ISSUE IDENTIFICATION

On October 1, 2020, the BLM issued a press release initiating a 60-day pre-scoping period with the goal of soliciting early public input on Ormat's proposed plan. At the time, Ormat was proposing a geothermal development project, which included two geothermal power plants and a power line. Ormat had submitted to the BLM a geothermal utilization plan and plan of development for the proposed power line. All comments received were summarized in the pre-scoping summary report (BLM 2021a), which is available on the BLM project website (https://eplanning.blm.gov/eplanning-ui/project/2016744/510). During the 60-day pre-scoping period, Ormat withdrew its utilization plan and plan of development, and submitted to the BLM an operations plan for geothermal exploration.

[1] References cited in this EA are included in **Appendix B**, References.
[2] The AOI is in the South Playa, which is located between the NCA's south boundary and Gerlach (BLM 2004, p. 1-4).

The BLM received 70 comment submissions during the 30-day public scoping period for Ormat's proposed geothermal exploration plan. The public scoping period opened on December 10, 2021, and closed on January 10, 2022. Comments were submitted by the US Environmental Protection Agency (EPA) Region 9, NDOW, Nevada State Clearinghouse, Basin and Range Watch, BlueRibbon Coalition, Burning Man Project, Friends of Black Rock High Rock, Friends of Nevada Wilderness, Trails West, and private citizens. From these submissions, there were 283 substantive comments. All comments received are summarized in the public scoping report (BLM 2022a), which is available on the BLM project website (https://eplanning.blm.gov/eplanning-ui/project/2016744/510).

The BLM interdisciplinary team and cooperating agencies held two internal scoping workshops (on January 27, 2021, and January 25, 2022) to identify and discuss issues to be carried forward for analysis in **Chapter 3**, Affected Environment and Environmental Consequences.

1.8 CHANGES FROM THE DRAFT ENVIRONMENTAL ASSESSMENT

The BLM released the draft EA on August 19, 2022. During the 30-day draft EA comment period, the BLM received comment submissions from the US EPA, the Nevada State Historic Preservation Office, the Nevada Division of Environmental Protection (NDEP), the Nevada Division of Water Resources (NDWR), the Nevada Department of Conservation and Natural Resources, Ormat, Friends of Black Rock High Rock, Friends of Nevada Wilderness & Center for Biological Diversity, the Burning Man Project, the Iron Butt Association, and private citizens. From these letters, there were 165 substantive comments, primarily regarding the potential impacts of the proposed action on nearby hydrologic and geothermal resources and conditions in Gerlach. Other comments expressed concern over potential impacts on recreation, cultural resources, visual resources, special designation areas, night sky conditions, air quality, and wildlife. Commenters also requested more information on proposed monitoring, mitigation measures, and adaptive management strategies. **Appendix F** is the comment summary report from the draft EA.

Based on comments received from Ormat, changes were made to the alternatives in **Chapter 2** and the figures in **Appendix A** showing the alternatives. These changes include moving previously proposed well and well pad 83-16 and renaming it as 84-16 to reduce cultural resource conflict, removing proposed well and well pad 72-16 from the project following further engineering review, and adjusting the location of well pad 82-16 (the proposed well location did not change). Changes also include resulting adjustments to the amount of new and existing access road improvements to accommodate changes in well pad layout. Changes also include removing one of the two previously proposed aggregate pits, and adjustments to the proposed disturbance acres of proposed project elements.

Changes were made to the water monitoring plan, which is outlined in the revised **Table 3-11**, BLM-Required Stipulations. In summary, spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA), would be supplemented with additional monitoring requirements. If water quality or quantity effects were detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. These could include:

- Increasing monitoring frequency and parameters and adding additional monitoring locations;
- Changing drilling operations (such as drilling wells further away from affected monitoring points prior to drilling wells closer or add additional well casing depth;
- Ceasing well drilling or testing, or,
- Providing alternative water supply to affected water users.

Changes in **Chapter 3** also address comments received regarding cultural resources (also, **Appendix C**, Cultural Resources, was updated in response to comments). Revisions in **Chapter 4** provide updated agency consultation and coordination status. Other minor editorial changes were also made throughout the document.

Changes made from the draft EA to the final EA are in gray highlighted text. Additions are underlined, while deletions are stuck out.

Chapter 2. Proposed Action and Alternatives

2.1 ALTERNATIVE A: PROPOSED ACTION

Alternative A, the proposed action, includes the construction, operation, and maintenance of the project in Washoe County, Nevada (see **Figure A-3** in **Appendix A**). These activities are described in the sections below. Unless otherwise noted, all information describing the elements of Alternative A are from the project operations plan (ORNI 26 LLC 2022).

2.1.1 Area of Interest

The AOI consists of approximately 2,724 acres of public lands administered by the BLM. All proposed surface disturbance would be in the AOI. Proposed surface disturbance in the AOI would be associated with up to ~~20~~19 exploration wells and well pads, new and upgraded access roads, and expansion of an aggregate pit (see **Table 2-1**, below).

Table 2-1
Proposed Disturbance in the AOI

Project Component	Proposed Surface Disturbance (acres)	Proposed Surface Disturbance after Interim Reclamation (acres)
Well pads	~~42.0~~39.9	~~21.0~~20.0[1]
New road construction	2.0	2.0
Existing road improvement	~~2.5~~2.4	~~2.5~~2.4
Aggregate pit expansion	5.0	5.0
Total	**~~51.5~~49.3**	**~~30.5~~29.4**

Source: ORNI 26 LLC 2022

[1] Assumes half of each well pad would be reclaimed during interim reclamation; see **Section 2.1.8**, Surface Reclamation.

2.1.2 Geothermal Well Field

Ormat is proposing to drill and test up to ~~20~~19 geothermal exploration wells, all located on public lands administered by the BLM in the AOI. **Figure A-3** in **Appendix A** shows the locations of the proposed exploration wells. Geothermal exploration wells would typically be drilled and tested one at a time. Ormat would adjust the subsequent well locations as additional geologic, geophysical, and geothermal reservoir information are obtained during the drilling of each well. Ormat would use the data collected from each exploration well to inform the geothermal reservoir model and to determine a commercial geothermal resource's viability. The table below summarizes the geothermal well information.

Temporary surface disturbance for up to ~~20~~19 proposed well pads would be approximately 2.1 acres per pad, or up to approximately ~~42~~39.9 acres in total. Each well pad would be approximately 300 feet by 300 feet. Actual dimensions of the well pad would be modified to best match the site's specific physical and environmental characteristics and to minimize grading (cut and fill). Once drilling is complete, the shoulders of the pad would be reclaimed; however, the majority of the pad would be kept clear for ongoing operations and the potential need to work on or redrill the well. See **Section 2.1.8**, Surface Reclamation, for more details on interim reclamation.

Table 2-2
Geothermal Well Drilling Information

Drilling Rig Type	Drilling Rig Height (feet)	Average Number of Trucks Needed	Drilling Time (days)[1]	Workers On-site	Depth Drilled (feet belowground)
Large rotary drilling rig	160–170	25 or more tractor trailers 8 small trucks	45[2]	9–10 (average) 18 (maximum)	approximately 7,000

Source: ORNI 26 LLC 2022
[1] If difficulties are encountered during the drilling process, including the need to redrill the well, the time required to successfully complete each well could potentially double.
[2] Drilling would be conducted 24 hours a day, 7 days a week.

Only those drill pads scheduled to be drilled would be cleared. Drill pad preparation would include clearing, earthwork, drainage, and other improvements necessary for efficient and safe operation and for fire prevention. Clearing before drilling would involve brush removal, which would either be taken to an appropriate dump site or piled and left on-site. Topsoil would be stripped, typically to the rooting depth, and salvaged during pad construction, as feasible. Salvaged topsoil and any cleared organic material, if saved, would be stockpiled on the pads for use during the subsequent reclamation of the disturbed areas.

Each drill pad would be prepared to a graded, level surface for the drill rig and support equipment. Stormwater runoff from undisturbed areas around the drill pads would be directed into ditches surrounding the drill pad and back onto undisturbed ground, consistent with best management practices (BMPs) for stormwater. The site would be graded to prevent stormwater runoff from the pad, rather, grading would direct stormwater runoff into a reserve pit on the pad in accordance with the standards of the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book; BLM and Forest Service 2007).

Ormat would construct reserve pits on each pad to contain and temporarily store stormwater runoff, geothermal fluid during well testing (see below for more information on well testing), drill cuttings, and circulating drilling mud, in accordance with the BMPs identified in the Gold Book (BLM and Forest Service 2007) and the NDOW's Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps (NDOW, n.d.).

The reserve pits would be fenced on three sides during drilling; once drilling has been completed, the fourth side would be fenced to prevent access by people, wildlife, and livestock. The fence would be built according to rangeland management specifications. It would remain in place until reserve pit reclamation begins. To further prevent people, wildlife, and livestock from becoming entrapped, walls on one side of the reserve pit would be sloped at an approximate 30 percent incline. Each reserve pit would measure approximately 75 feet wide by 200 feet long by 10 feet deep.

Wells would be completed at depths of approximately 1,500 to 7,500 feet, though target depths could change pending the results of well flow testing. Directional drilling could be used to intercept geothermal targets. The casing depth would vary depending on the total depth of the well, but it would comply with the DOI's Geothermal Resources Operational Order No. 2 (DOI 1975) and the Nevada Division of Minerals' (NDOM) requirements, as applicable. In compliance with the DOI order, the well casing depth would be no less than 200 feet belowground to prevent commingling of geothermal fluids and underground aquifers.

Each well could need to be worked over, or redrilled. Well redrilling could consist of 1) reentering and redrilling the existing well bore, 2) reentering the existing well bore and drilling and casing a new well bore, or 3) sliding the rig over a few feet on the same well pad and drilling a new well bore through a new conductor casing.

Short-Term Well Testing

Ormat would conduct one or more short-term flow test(s) of each well drilled. Each test, lasting approximately 3 to 5 days, would consist of flowing the well into the reserve pit or portable steel tanks while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry, and other parameters. Each short-term flow test is expected to discharge approximately 1.5 million gallons per well. Injectivity tests could also be conducted by injecting the produced geothermal fluid from the reserve pit or steel tanks back into the well and the geothermal reservoir.

Long-Term Well Testing

Ormat would likely conduct one or more long-term flow test(s) of each well drilled following the short-term flow test(s) to more accurately determine the long-term well and geothermal reservoir productivity. Each long-term flow test would last approximately 7 to 30 days. Ormat would expect each long-term flow test to discharge approximately 15 million gallons of geothermal fluid. There would be no discharge of the produced geothermal fluid to the ground surface.

The process would be conducted by pumping the geothermal fluids from the well through on-site test equipment to the reserve pit on the well pad. The produced geothermal fluid would then be pumped through a temporary 8- to 10-inch-diameter pipeline to either inject the fluid into one of the other geothermal wells drilled within the project area, ~~or~~ to the reserve pit on another well pad, to portable steel tanks, or a combination of the above. The temporary pipeline would be carried by workers and laid by hand either cross country or on the surface of the disturbed shoulders on the access roads connecting the well pads. If required, roads would be crossed by trenching and burying the temporary pipe. The temporary pipeline typically would consist of aluminum or high-density polyethylene piping appropriately rated for the temperatures and pressures for the long-term flow test(s). Temporary pipeline connections would be bolted or welded together. Ormat personnel or contractor(s), or both, would be on-site monitoring the temporary pipeline and wells during the long-term flow test(s).

Well testing would comply with the State of Nevada Underground Injection Control Program (Nevada Administrative Code [NAC] 445A.908) administered by the ~~Nevada Division of Environmental Protection (~~NDEP~~)~~. Injection and flow testing would also comply with other applicable state and federal permitting requirements, including the NDOM Geothermal Permit.

2.1.3 Access Roads

New Access Roads

Ormat would construct new access roads using a dozer or road grader, or both. Approximately ~~0.9~~0.8 miles (~~4,550~~4,398 feet) of new access roads are proposed (Ormat GIS 2022). The total estimated area of surface disturbance required for new access road construction, assuming a 20-foot-wide area of disturbance, would be approximately 2 acres (**Table 2-1**). Access roads that cross drainages could require culvert installation. Installers would follow BLM design criteria and standards in the Gold Book (BLM and Forest Service 2007). If required, Ormat would obtain all appropriate permits for site access from the Nevada Department of Transportation (NDOT), prior to exploration activities.

Existing Road Improvements

The AOI contains numerous existing access roads and "two tracks."[3] Existing access roads and two tracks would require an additional 10-foot width of surface disturbance for road improvement. Approximately ~~2.1~~2.0 miles (~~11,088~~10,602 feet) of existing roads could be improved to facilitate access (ORNI 26 LLC

[3] A two-track dirt road forms where drivers have operated vehicles enough times in a given area to form a road, though the ground has never been graded.

2022). The total estimated area of surface disturbance required to improve existing access roads, assuming approximately 10 feet of disturbance along the road shoulders, is approximately ~~2.5~~2.4 acres (**Table 2-1**).

2.1.4 Water Requirements and Source

Well drilling could require as much as approximately 35,000 gallons of water per day. Water for grading, compaction, and dust control would be as much as approximately 6,000 gallons per day.

This water would be supplied from one or more shallow water wells drilled from one or more of the proposed drill sites, as approved by the BLM and under a waiver for the temporary use of groundwater from the ~~Nevada Division of Water Resources (~~NDWR~~)~~. Each water well would be temporary, drilled by a licensed water well driller, and cemented with a 7-inch casing to provide a sanitary seal at the surface. The well would be drilled down to a productive interval of sands, gravels, or fractures (estimated at between 100 and 1,000 feet belowground surface).

The well would be plugged and abandoned in accordance with NAC 534.420, with cement plugs across the bottom of the casing and, if needed, additional plugs to isolate individual producing zones, if present. No additional surface disturbance would be associated with the drilling of each temporary water well. This is because the water well would be located on existing geothermal well pads, if they are drilled.

Alternatively, water could be obtained from an established private ranch source under a temporary permit from the NDWR to change an existing water right, and trucked to each drill site, or as a bulk water purchase from the Gerlach General Improvement District (GGID), pending contract and availability from the GGID.

2.1.5 Aggregate Requirements and Source

Aggregate material would be obtained from ~~one of two sources~~the source summarized in **Table 2-3**~~: 1) an existing NDOT aggregate pit (a mineral materials site) northwest of Gerlach (Ormat would obtain a Free Use Permit from the NDOT if this aggregate pit is selected), or 2)~~ which is a private aggregate pit located east of Transfer Station Road (**Figure A-3** in **Appendix A**), or another local source, if found. ~~Whichever aggregate pit is used, the~~ The existing pit would be expanded by up to 5 acres.

Table 2-3
~~Potential~~ Existing Aggregate Sources

Aggregate Source	Township, Range, Section	Approximate Location[1]
~~Aggregate pit 1 (existing public source — NDOT)~~	~~T. 32N., R. 23E., Sec. 16~~	~~299003, 4503666~~
Aggregate pit ~~2~~ (existing private source)	T. 32N., R. 23E., Sec. 15	299851, 4503528

Source: ORNI 26 LLC 2022

[1] Universal Transverse Mercator coordinates are given in easting (meters), northing (meters), North American Datum of 1983

Ormat selected the proposed well pads and access roads to minimize the need for aggregate application, with the majority of the proposed well pads consisting of an approximate even mix of cut and fill to make a stable surface. At most, each drill pad (exclusive of the reserve pit) would be covered with up to 6 inches of gravel. While much less aggregate is likely required, a high estimate for the total aggregate required for well pad construction is ~~40,000~~38,000 cubic yards (approximately 2,000 cubic yards per pad).

Access roads would be covered with up to 4 inches of gravel, as necessary, to create an all-weather surface and to prevent rut formation. The total aggregate required for access road construction is estimated at ~~2,885~~2,778 cubic yards (approximately ~~3~~2.8 miles of access roads by 15-foot drivable width, covered with 4 inches of aggregate) or less (ORNI 26 LLC 2022).

The total aggregate required for the project is estimated at ~~42,885~~40,778 cubic yards.

2.1.6 Personnel

A temporary drilling crew of approximately 10 workers would be at the active drill site for the entire duration of well drilling. The drilling crew is anticipated to consist of current Ormat employees and contractor(s) that would travel to the project site for exploration activities, as needed. Drilling crews typically include one drilling supervisor, one company person,[4] one mud logger, one tool pusher, one worker to operate the derrick, one worker to operate the vehicles, and up to four floor hands.

The drilling supervisor and mud logger would typically sleep in a portable trailer on the active drill site while the well is being drilled. The drilling crew could also live on-site during the drilling operations in a self-contained, mobile bunkhouse (a temporary facility that is comparable in size with a double-wide trailer; it would contain sleeping quarters, a galley, a water tank, and a septic tank) or portable trailers. These temporary drilling crew facilities would be placed on one of the drill sites not being actively drilled. In the case of the first well to be drilled, quarters would be placed on the active well pad. Alternatively, the drilling crew could acquire accommodations in Gerlach, depending on lodging availability.

2.1.7 Applicant-Committed Environmental Protection Measures

All proposed activities would be conducted in compliance with applicable geothermal lease stipulations (see Appendix A in ORNI 26 LLC 2020). Ormat has also committed to implementing the following environmental protection measures:

- Portable chemical sanitary facilities would be available and used by all personnel during periods of well drilling, flow testing, and construction. A local contractor would maintain these facilities.
- To prevent the spread of invasive, nonnative species, all vehicles, heavy earth-moving construction equipment, mobile trailers, and campers brought to and used on the project site would go through high-pressure washing of the entire vehicle/unit at a commercial wash station prior to arriving and being used on the project site.
- If needed, certified noxious weed-free hay and straw bales would be purchased and used on the project site.
- Seed mixes for the rehabilitation and revegetation of all disturbed areas related to this project would be certified as weed free, per BLM standards.
- Following project construction, areas of disturbed land no longer required for operations would be reclaimed to promote the reestablishment of native plant and wildlife habitat.
- To minimize visibility, all wellheads would be painted a color that blends with the surrounding landscape.

Measures to Prevent and Control Fire

All construction and operating equipment would be equipped with applicable exhaust spark arresters. Adequate firefighting equipment and water would be available at each active drill site. Fire extinguishers would be available on-site. Water that is used for construction and dust control would be available for firefighting. Personnel would be allowed to smoke only in designated areas. Ormat has prepared a fire contingency plan (ORNI 26 LLC 2022, Section 3.2) with additional fire prevention and control measures, including keeping adequate firefighting equipment on-site, inspecting and cleaning vehicle catalytic converters, conducting spark-producing activities in vegetation-free areas, complying with BLM fire restrictions or closures, and notifying appropriate parties of any fire.

Measures to Protect Surface Water and Groundwater

Geothermal fluids would not be discharged to the ground under normal operating conditions. Stormwater runoff from undisturbed areas around the drill pads would be directed into ditches surrounding the drill pad

[4] Ormat's on-site representative

and back onto undisturbed ground, consistent with stormwater BMPs. The well pad surface would be graded to prevent the movement of stormwater off the constructed site but rather into the reserve pit in accordance with the standards of the Gold Book (Fourth Edition – Revised 2007) (BLM and Forest Service 2007). A stormwater pollution prevention plan would be developed and implemented for the project per the NDEP Bureau of Water Pollution Control requirements. Well casing would prevent commingling of geothermal fluids and underground aquifers.

Measures to Protect Wildlife

Revegetation and periodic maintenance of temporarily disturbed areas would prevent erosion and protect habitat. Ormat would use suitable, BLM-approved revegetation methods. Topsoil would be stockpiled and applied to enhance revegetation success.

To prevent undue degradation and the removal of habitat, cover, and food, existing roads would be used whenever possible; cross-country travel would be restricted to designated construction areas. Speed limits of 35 miles per hour would be observed on all unpaved roads to minimize dust and avoid collisions with wildlife.

To prevent a potential violation of the Migratory Bird Treaty Act and per lease stipulations, Ormat would contract a qualified wildlife biologist to conduct a pre-construction survey for nesting migratory birds during the breeding season (March 1 through August 31) and prior to any ground-clearing or other surface disturbance. The survey would include the proposed footprint of disturbance and an appropriately sized buffer area. If disturbance is not completed within the time frame established as a condition in the geothermal drilling permit for the pre-construction survey, an additional survey may be required after consultation with the BLM. If active nests are found, and in consultation with the BLM, an appropriately sized buffer would be established to exclude any disturbance around the nest until the nesting attempt has been completed. If active nests are not found, surface-disturbing activities would occur within the survey's validity time frame.

Measures to Protect Cultural Resources

Cultural resource surveys have been conducted. Any areas containing cultural resources eligible for inclusion on the National Register of Historic Places (NRHP) or any cultural resources where eligibility for inclusion on the NRHP is unevaluated would be mitigated, as appropriate. Employees, contractors, and suppliers would be instructed that all cultural resources are protected, and that if previously undiscovered resources are encountered, they will be left in place and reported to the responsible Ormat representative or their supervisor, or both.

Measures to Minimize Air Pollution

Ormat would comply with air quality requirements prescribed by the Washoe County Health District–Air Quality Management Division (WCHD–AQMD). Fugitive dust control measures include placing gravel on access roads and watering construction areas. Water would be applied to the ground during the construction and use of the drill pads, access roads, and other disturbed areas, as necessary to control dust. Ormat would obtain a dust control permit with the WCHD–AQMD and implement the required actions to minimize fugitive dust emissions.

Measures to Minimize Noise Pollution

Mufflers would be used on all drilling rig engines. Each well pad could also use one rock muffler, to attenuate steam venting noise during well testing.

Measures to Minimize Public Health and Safety Hazards

Ormat would conduct construction and operation in a manner to avoid creating any hazards to public health and safety. Ormat has prepared an injury contingency plan, a spill or discharge contingency plan, and a H_2S

contingency plan. These are available in Section 3.8 of ORNI 26 LLC (2022) and are briefly summarized below.

The injury contingency plan includes measures such as requiring safety and first aid training, keeping first aid equipment on-site, and supervising work to ensure safety measures are followed. All drilling operations are required to be in compliance with all existing laws pertaining to safety and environmental protection.

The spill or discharge contingency plan outlines potential sources of accidental spills or discharges, including geothermal fluid, drilling muds, and lubricating or fuel oils and petroleum products. The plan also outlines actions for spill cleanup, abatement, and notification. The plan states that in the event of an accidental geothermal fluid spill or discharge, blowout prevention equipment would be utilized to shut down the flow from the wellhead.

The H_2S contingency plan includes drilling control practices to minimize and avoid potential exposure pathways to non-condensable gases, measures to monitor H_2S during drilling, and blowout prevention measures to stop any unexpected releases.

2.1.8 Surface Reclamation

Once well drilling and testing are complete, liquids in the reserve pits would either evaporate or be removed. The solid contents remaining in each reserve pit, consisting of nonhazardous, nontoxic drilling mud and rock cuttings, would be tested to confirm they are not hazardous. Typical tests could include the Toxicity Characteristic Leaching Procedure (EPA Method 1311), testing for heavy metals, pH (EPA method 9045D), total petroleum hydrocarbons/diesel (EPA Method 8015B), and oil and grease (EPA Method 413.1). Ormat would bury nonhazardous and nontoxic drilling mud and cuttings in the reserve pit, and dispose of any drilling mud and cuttings identified as hazardous or toxic according to NDEP regulations.

The portions of the cleared well sites not needed for operational and safety purposes (that is, the well pad "shoulders") would be recontoured to a final or intermediate contour that would blend with the surrounding topography as much as possible. Areas to be reclaimed would be ripped, tilled, or disked on contour, as necessary; stockpiled topsoil would be applied. A BLM-approved seed mixture would be applied.

If Ormat judges a well to have no commercial potential, it could continue to monitor the well for the duration of the project; or, the well could be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement, until the top of the cement is at ground level. The wellhead and other surface equipment would then be removed, the well casing would be cut off below the ground surface, and the hole would be backfilled to the ground surface. As described above, the surface would be reclaimed. Access roads to plugged and abandoned wells would then be reclaimed. Road reclamation would involve recontouring the roads back to the original contour and seeding with a BLM-approved seed mix.

2.2 ALTERNATIVE B: 3-MILE ACCESS POINT

Under Alternative B: 3-Mile Access Point, access to proposed well pads 71-3, 63-3, 66-3, and 58-3 would utilize the 3-Mile Access Point, an existing dirt road between Washoe County Road 34 (CR-34) and the Black Rock Desert playa. This existing dirt road would not require improvements. From the 3-Mile Access Point, a new access road on the Black Rock Desert playa would extend to the proposed well pads to the south. This is shown in **Figure A-4**, 3-Mile Access Point (Alternative B), in **Appendix A**. A portion of this access road, approximately 0.4 miles, would be outside the AOI, and as a result, outside the area surveyed for biological resources during baseline data collection (Ormat 2021).

This alternative would minimize the number of project ingress and egress points along CR-34. Minimizing the number of ingress and egress points would decrease the potential for traffic conflicts between project vehicles and recreationists, in turn reducing the potential for public health and safety issues. It would also

minimize vegetation disturbance and the potential for soil erosion along the Black Rock Desert playa shoreline.

The length of new access road construction proposed under Alternative B would differ from that under Alternative A. Up to approximately 1.9 miles of new access roads would be constructed, which is an increase of approximately 1.1 mile from Alternative A. The acres of proposed disturbance associated with the new access roads would also increase. Up to approximately 4.6 acres of disturbance from new access roads are proposed, which is an increase of 2.6 acres from Alternative A. The total proposed disturbance under Alternative B is summarized in the table below.

Table 2-4
Proposed Disturbance in the AOI, Alternative B

Project Component	Proposed Surface Disturbance (acres)	Proposed Surface Disturbance after Interim Reclamation (acres)
Well pads	~~42.0~~39.9	~~21.0~~20.0[1]
New road construction	4.6	4.6
Existing road improvement	~~2.5~~2.4	~~2.5~~2.4
Aggregate pit expansion	5.0	5.0
Total	**~~54.1~~51.9**	**~~33.1~~32.0**

Sources: ORNI 26 LLC 2022; BLM GIS 2022

[1] Assumes half of each well pad would be reclaimed during interim reclamation; see **Section 2.1.8**, Surface Reclamation

Similarly, the amount of aggregate required to surface the new access roads would increase under Alternative B. Up to approximately ~~3,908~~3,783 cubic yards of aggregate are proposed, which is an increase of ~~1,023~~1,005 cubic yards from Alternative A.

2.3 ALTERNATIVE C: EXISTING WELL 68-3 ACCESS POINT

Under Alternative C: Existing Well 68-3 Access Point, project ingress and egress from CR-34 to proposed well pads 71-3, 63-3, 66-3, and 58-3 would use an existing dirt road between CR-34 and an existing geothermal exploration well pad (well 68-3). This existing dirt road would not require improvements. Existing well 68-3 is east of proposed well pad 58-3. From well pad 58-3, a new access road would extend to the three additional proposed well pads to the north. This is shown in **Figure A-5**, Existing Well 68-3 Access Point (Alternative C), in **Appendix A**.

As described for Alternative B: 3-Mile Access Point, this alternative would also minimize the number of project ingress and egress points along CR-34. This would decrease the potential for traffic conflicts and health and safety issues, vegetation removal, and soil erosion. Unlike Alternative B: 3-Mile Access Point, no proposed access roads would be outside the AOI.

Under this alternative, up to approximately 1.4 miles of new access roads would be constructed, which is an increase of ~~0.5~~0.6 miles from Alternative A. The acres of proposed disturbance associated with the new access roads would also increase. Up to approximately 3.4 acres of disturbance from new access roads are proposed, which is an increase of 1.4 acres from Alternative A. The total proposed disturbance under this alternative is summarized in the table below.

Table 2-5
Proposed Disturbance in the AOI, Alternative C

Project Component	Proposed Surface Disturbance (acres)	Proposed Surface Disturbance after Interim Reclamation (acres)
Well pads	~~42.0~~39.9	~~21.0~~20.0[1]
New road construction	3.4	3.4
Existing road improvement	~~2.5~~2.4	~~2.5~~2.4
Aggregate pit expansion	5.0	5.0
Total	**~~52.9~~50.7**	**~~31.9~~30.8**

Sources: ORNI 26 LLC 2022; BLM GIS 2022

[1] Assumes half of each well pad would be reclaimed during interim reclamation; see **Section 2.1.8**, Surface Reclamation

Similarly, the amount of aggregate required to surface the new access roads would increase under this alternative. Up to approximately ~~3,428~~3,303 cubic yards of aggregate are proposed, which is an increase of ~~546~~ 525 cubic yards from Alternative A.

2.4 ACTION ALTERNATIVE SUMMARY

The amount of proposed surface disturbance under each action alternative is summarized in the table below. Under all action alternatives, surface reclamation would occur as described in **Section 2.1.8**.

Table 2-6
Proposed Disturbance Summary by Action Alternative

Project Component	Alternative A: Proposed Action Proposed Surface Disturbance	Alternative B: 3-Mile Access Point Proposed Surface Disturbance	Alternative C: Existing Well 68-3 Access Point Proposed Surface Disturbance
Well pads	~~42.0~~39.9 acres	~~42.0~~39.9 acres	~~42.0~~39.9 acres
New road construction	~~0.9~~0.8 miles (2.0 acres)	1.9 miles (4.6 acres)	1.4 miles (3.4 acres)
Existing road improvement	~~2.1~~2.0 miles (~~2.5~~2.4 acres)	~~2.1~~2.0 miles (~~2.5~~2.4 acres)	~~2.1~~2.0 miles (~~2.5~~2.4 acres)
Aggregate pit expansion	5.0 acres	5.0 acres	5.0 acres
Total	**~~51.5~~49.3 acres**	**~~54.1~~51.9 acres**	**~~52.9~~50.7 acres**

Sources: ORNI 26 LLC 2022; Ormat GIS 2022

2.5 ALTERNATIVE D: NO-ACTION ALTERNATIVE

Under Alternative D, the no-action alternative, the BLM would not approve Ormat's application to construct, operate, and maintain up to ~~20~~19 geothermal exploration wells and the associated facilities.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

No alternatives other than Alternative A, the proposed action; Alternative B, 3-Mile Access Point; Alternative C, Existing Well 68-3 Access Point, and Alternative D, the no-action alternative, were proposed during internal scoping.

During the 60-day pre-scoping period discussed in **Section 1.7**, a commenter suggested that Ormat should consider including a solar component, similar to the solar component at the Tungsten Mountain geothermal facility in Churchill County, Nevada (BLM 2021a). The electricity generated from the Tungsten Mountain solar component will be used to offset the geothermal facility's energy use and increase the renewable energy delivered by the project (Ormat 2019). This potential alternative was eliminated from detailed analysis because Ormat is no longer proposing a geothermal development project.

Further, the project is in an area that is not open for solar leasing and development, per the Winnemucca District RMP (as amended by the BLM's Approved Resource Management Plan Amendments and Record of Decision for Solar Energy Development in Six Southwestern States [BLM 2012]) and the Black Rock Desert-High Rock Canyon Emigrant Trails NCA and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004). Solar development in this area would require the BLM to grant a variance to the plans.

During the 30-day public scoping period, a commenter asked about alternative project locations, including moving the project east of Gerlach (BLM 2022a). This potential alternative was eliminated from detailed analysis because this location would be inconsistent with the known geothermal resource areas and federal geothermal leases held by Ormat in the AOI.

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Chapter 3. Affected Environment and Environmental Consequences

3.1 INTRODUCTION

This chapter describes the affected environment, which is the existing or baseline conditions relevant to each issue identified during scoping. Following the affected environment is a description of the direct and indirect effects relative to each issue; these effects are analyzed under Alternative A, the proposed action; Alternative B, 3-Mile Access Point; Alternative C, Existing Well 68-3 Access Road; and Alternative D, the no-action alternative. The cumulative effects of the alternatives are described following the analysis of the direct and indirect effects.

3.1.1 Supplemental Authorities and Resource Areas Considered

The CEQ regulations under 40 CFR 1500 and the BLM NEPA handbook require the BLM to identify significant issues for analysis and focus only on those issues. The BLM NEPA handbook defines an issue as "a point of disagreement, debate, or dispute with a proposed action based on some anticipated environmental effect" (BLM 2008, p. 40). In addition, an issue "has a cause and effect relationship with the proposed action and alternatives; is within the scope of analysis; has not [been] decided by law, regulation, or previous decision; and is amenable to scientific analysis rather than conjecture" (BLM 2008, p. 40).

The issues identified during scoping and carried forward for analysis include those elements of Alternatives A, the proposed action; Alternative B, 3-Mile Access Point; or Alternative C, Existing Well 68-3 Access Road that would cause or have the potential to cause significant environmental effects. This chapter provides an analysis of identified issues and the resources affected by those issues. **Table 3-1**, below, provides a summary of issues and affected resources. **Table 3-2** summarizes the resources not significantly affected under Alternatives A, B, or C.

Table 3-1
Supplemental Authorities and Resource Areas Analyzed by Issue

Issue Number	Issue Statement	Supplemental Authorities and Resources Analyzed
1	How would geothermal exploration affect greenhouse gas (GHG) emissions?	Greenhouse gas emissions and climate change
2	How would the presence of equipment, fencing, traffic, and personnel affect resources in the AOI?	Migratory birds;* recreation; special designations and visual resources, including night skies; wildlife (general and sensitive species); cultural resources (national historic trails)*
3	How would ambient noise levels change and what would be the effect on sensitive resources?	Migratory birds;* recreation; special designations and visual resources, including night skies; wildlife (general and sensitive species); cultural resources (national historic trails)*
4	How would geothermal exploration affect the geology, mineral rights, and water resources?	Geology and minerals; water resources (surface and ground);* migratory birds;* wildlife (general and sensitive species)
5	How would ground disturbance and vegetation removal affect resources in the AOI?	Migratory birds;* geology and minerals; soil resources; vegetation and invasive, nonnative species; wildlife (general and sensitive species); cultural resources (national historic trails);* special designations and visual resources, including night skies

*Indicates supplemental authority (BLM 2008)

Table 3-2
Resource Effects Determination and Rationale for Analysis

Supplemental Authority[a] or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
Air Quality*	***Present/Not Affected***[b] The action alternatives, which would result in vehicle and equipment use, construction of access roads and well pads, and drilling, would have the potential to generate particle pollution (dust), carbon monoxide, ozone, nitrogen dioxide, and sulfur dioxide. The EPA sets National Ambient Air Quality Standards (NAAQS; 40 CFR 50) for these criteria air pollutants. The NDEP Bureau of Air Pollution Control ensures compliance with the NAAQS. To avoid, minimize, and mitigate air quality impacts and ensure compliance with the NAAQS, Ormat would implement the applicant-committed environmental protection measures described in **Section 2.1.7** to minimize fugitive dust emissions. These measures include placing gravel on access roads, watering construction areas, implementing speed limits on access roads, and obtaining and complying with a dust control permit from the WCHD–AQMD. Based on the temporary nature of activities and disturbance, along with Ormat's compliance with the NAAQS and measures to minimize emissions, no effects on air quality are anticipated as a result of the action alternatives. The action alternatives also are not anticipated to be a substantial source of new odor.				
Cultural Resources*	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.3**	***Present/May be Affected*** Carried forward in **Section 3.3.4**	***Present/Not Affected*** Carried forward in **Section 3.3.5**	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Environmental Justice*	***Present/Not Affected*** Changes in night sky conditions could have disproportionate effects on people and economies that rely on visitation from those seeking night sky viewing opportunities. New sources of artificial light at night (ALAN)[5] also have the potential to disproportionately affect populations living near the new ALAN source. The Night Sky Baseline Report (BLM 2022b) analyzed anticipated impacts from ALAN produced during exploration well drilling. As described in the baseline report, for both Washoe and Pershing Counties, the percentages of minority populations and low-income populations are below the statewide averages for Nevada. Evidence from simulated night sky conditions indicates that adverse impacts from proposed nighttime lighting during the drilling period would occur indiscriminately and nearly imperceptibly on area communities. It is unlikely that any measurable adverse effects would be experienced disproportionately by low-income and minority populations in the vicinity.				
Fish Habitat*	***Present/Not Affected*** The nearest fish habitat is in streams in the Granite Basin north of the AOI, between approximately 7 miles and 16 miles north of the AOI. These include Granite Creek, Cottonwood Creek, Wagontire Creek, and Red Mountain Creek. These streams are considered to be potential habitat for the federally threatened Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) (Ormat 2021, p. 17). A number of these streams support brook trout (*Salvelinus fontinalis*) (FishNV 2022). There is also Lahontan cutthroat trout, federally endangered cui-ui (*Chasmistes cujus*), and other sport fish habitat in Pyramid Lake, approximately 32 miles from the AOI. There is federally threatened desert dace (*Eremichthys acros*) habitat in the Soldier Meadows area of the NCA, approximately 47 miles north of the AOI. There is no hydrological connection between the AOI and streams in the Granite Basin, Pyramid Lake, or Soldier Meadows (Ormat 2021, p. 17). Because of this, there is no potential for the action alternatives to affect fish habitat in these areas.				

[5] ALAN is any light source that is produced by electricity or other means for human activity. Wildfires, moonlight, and lightning are not considered to be ALAN.

Supplemental Authority[a] or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
Floodplains*	***Not Present*** The AOI is located in Federal Emergency Management Agency Zone X, Area of Minimal Flood Hazard (FEMA 2009).				
Forests and Rangelands*	***Not Present*** There are no US Forest Service-managed forests or rangelands in or near the AOI. The nearest US Forest Service-managed lands, in the Humboldt-Toiyabe National Forest, are over 30 miles from the AOI.				
Geology and Minerals	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** The presence of equipment, fencing, traffic, and personnel would not affect the geology, seismology, or minerals.	***Present/Not Affected*** Changes in ambient noise levels would not affect the geology, seismology, or minerals.	***Present/May be Affected*** Carried forward in **Section 3.3.5**	***Present/Not Affected*** Ground disturbance and vegetation removal would not affect the geology, seismology, or minerals.
Geothermal Resources	***Present/Not Affected*** As described in the Conceptual Hydrologic Model in the Hydrologic Evaluation (Stantec 2022a, Section 5.5), the target geothermal resource is likely partially fed by groundwater recharge from the adjacent Granite Range, which circulates to depth in fractured granite and is heated to temperatures as high as 356 to 392 degrees Fahrenheit (°F). Subvertical fractures allow the heated geothermal fluid to rapidly ascend into the shallow groundwater aquifer, which discharges at thermal springs in the AOI. The action alternatives are not anticipated to affect the geothermal resource, because geothermal utilization is not proposed. The volume of geothermal fluid produced during well flow tests is anticipated to be a minor component of the total reservoir. Spring discharges would be monitored to allow early detection of potential changes (Broadbent and Associates Inc. 2022; also see the BLM-Required Stipulations for water resources in **Table 3-11**). If water quality or quantity effects were detected, appropriate measures to mitigate effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented.				
Greenhouse Gas Emissions and Climate Change	***Present/May be Affected*** Carried forward in **Section 3.3.2** and **Appendix E**, Greenhouse Gas Emissions	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** Not applicable to this issue
Land Use and Infrastructure	***Present/Not Affected*** There would be no changes in land uses or ownership. Constructing geothermal exploration wells, well pads, and access roads would increase the amount of infrastructure on BLM-administered lands, and could require the BLM to issue rights-of-way for access road construction. Project vehicles would access the AOI using State Route 447 (SR-447) and CR-34, resulting in potential road surface deterioration. Potential impacts on road surface condition would be addressed through normal maintenance performed by the NDOT or Washoe County, or both. The project would not affect the GGID's ability to provide sewer, sanitary, and water service in the community. This is because the project would use portable chemical sanitary facilities, and trash would be contained on-site and hauled to an approved landfill.				

Supplemental Authority[a] or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
Lands with Wilderness Characteristics	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.3**	***Present/May be Affected*** Carried forward in **Section 3.3.4**	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Migratory Birds*	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.3**	***Present/May be Affected*** Carried forward in **Section 3.3.4**	***Present/May be Affected*** Carried forward in **Section 3.3.5**	***Present/May be Affected*** Carried forward in **Section 3.3.6**
National Conservation Areas	***Present/Not Affected*** The NCA Act of 2000 established the Black Rock Desert-High Rock Canyon Emigrant Trails NCA to conserve, protect, and enhance the historic, cultural, paleontological, scenic, scientific, biological, educational, wildlife, riparian, wilderness, endangered species, and recreational values and resources associated with the Applegate-Lassen and Nobles Trails corridors and surrounding areas. Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone. The southern border of the NCA is approximately 4 miles north of the AOI (see **Figure A-9**, Special Designations). Given the distance between the AOI and the NCA boundary, and applicant-committed environmental protection measures (**Section 2.1.7**) and BLM-required stipulations (**Table 3-11**) to minimize and avoid effects on cultural resources, visual resources, and recreation values, there would be minimal if any effects on NCA values.				
Native American Religious Concerns*	***Not Present*** Native American religious concerns have not been identified to date. Additional information can be found in **Section 4.1.1**, Government-to-Government Consultation.				
Noise	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.4**	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** Not applicable to this issue
Paleontological Resources	***Not Present*** The AOI is composed of areas of potential fossil yield classification 1 and 2 (BLM GIS 2022). Classification and recommended management actions for each class are described in the BLM Instruction Memorandum 2016-124.[6] In summary, management concerns are generally nonexistent to low in these classes, and further assessment and mitigation are usually unnecessary.				
Prime or Unique Farmlands	***Present/Not Affected*** Approximately 46 acres (2 percent) of the AOI, the Mazuma-Swingler association soil map unit, is classified as prime farmland, if it is irrigated and reclaimed of excess salts and sodium (Web Soil Survey 2020). Further, approximately 670 acres (25 percent) of the AOI, the Veta-Langston association soil map unit, is classified as farmland of statewide importance, if irrigated (Web Soil Survey 2020). No agricultural activities occur in this area. In areas occupied by well pads and access roads, the action alternatives would cause conversion to non-farmland. In general, the action alternatives would be compatible with agriculture uses and would not reduce opportunities to implement agricultural practices on the remaining prime farmlands, in areas not occupied by well pads and access roads.				

[6] Internet website: https://www.blm.gov/policy/im-2016-124.

Supplemental Authority[a] or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
Public Health and Safety	***Present/Not Affected*** Valley fever (coccidioidomycosis) is an infection caused by breathing in spores of the fungus *Coccidioides* (CDC 2020). The fungus is known to live in soils in the Black Rock Desert-High Rock Canyon Emigrant Trails NCA, including the Black Rock Desert playa (BLM 2019c). The Black Rock Desert playa also contains alkaline gypsum and silica dust that can become airborne in high concentrations during high wind conditions (Adams and Sada 2010). Exposure to alkaline gypsum dust with a silica component is regulated by the Occupational Safety and Health Administration as a known carcinogen. Project workers may be temporarily exposed to these risk factors during surface-disturbing activities on the playa, especially during high winds. However, the temporary nature of potential exposure, lasting the duration of construction, would limit the overall risk. H_2S is a colorless gas with a strong odor of rotten eggs that can be hazardous to humans at certain exposure levels (NIOSH 2019). H_2S concentrations are likely low enough in the target geothermal system that abatement measures are not needed (ORNI 26 LLC 2022). Nonetheless, Ormat has prepared a H_2S contingency plan (ORNI 26 LLC 2022, p. ~~15~~16) that outlines standard procedures that would be followed during drilling to minimize risk of exposure, including discharging steam and gases well above head level, continuous H_2S monitoring, and signage. There are no known sources of elevated naturally occurring radioactive materials in the AOI, such as young marine shales or potassium-rich granitic geology (ORNI 26 LLC 2022, p. ~~15~~16). Finally, Ormat has prepared an injury contingency plan (ORNI 26 LLC 2022, p. ~~15~~13) that requires drilling operators to safety train workers and to have first aid equipment on-site. Drilling operations would comply with all existing safety and environmental laws.				
Range	***Present/Not Affected*** Portions of the AOI are in the Rodeo Creek and Buffalo Hills grazing allotments (BLM 2015c, p. 3-120), which are authorized for cattle grazing. Therefore, active cattle grazing may occur in the AOI. Cattle trailing may also occur in the AOI with herds moved between the allotments in the spring and fall. Construction of the geothermal exploration wells and access roads would displace livestock from construction areas. The amount of displacement would account for less than 1 percent of the land area in the allotments and would have a negligible effect on grazing opportunities. Sheep trailing also occurs in the AOI. See the discussion in **Section 3.2.4**, Wildlife, under Big Game, for more information.				
Recreation	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.3**	***Present/May be Affected*** Carried forward in **Section 3.3.4**	***Present/May be Affected*** Carried forward in **Section 3.3.5**	***Present/Not Affected*** Not applicable to this issue
Socioeconomics	***Present/Not Affected*** Gerlach is a known astrotourism destination, attracting visitors from outside the region. The Night Sky Baseline Report (BLM 2022b) analyzes anticipated impacts on astrotourism from ALAN produced during exploration well drilling. Anticipated astrotourism impacts from the project would be negligible. Under a worst-case scenario, which assumes 1.5 times the amount of expected lighting would be produced, the radiance of the drill rig would increase to about the same level as the baseline observed radiance of Gerlach (BLM 2022b, Section 3.3.1). The modeled changes in sky glow would be observable to those engaged in astrotourism; however, it would be highly unlikely that the changes would be of a magnitude to discourage astrotourism in the region or displace visitors engaged in the activity. Further, impacts would be temporary in nature, lasting for the duration of drilling. Construction would likely result in short-term, induced economic effects in Gerlach, including from purchasing rental accommodations for workers (should they stay in Gerlach), groceries, and other items. This effect would be temporary, lasting the duration of construction.				

Supplemental Authority[a] or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
Soil Resources	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** The presence of equipment, fencing, traffic, and personnel would not affect soil resources.	***Present/Not Affected*** Changes in ambient noise levels would not affect soil resources.	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Traffic and Transportation	***Present/Not Affected*** SR-447 and CR-34 are the primary access routes used by Burning Man Event participants (BLM 2019b). A traffic analysis conducted in preparation of the Burning Man Event Special Recreation Permit Environmental Impact Statement (EIS) found that traffic volume on these roads was highest on the first and last day of the event, with a corresponding level of service[7] rating of C or better in the AOI vicinity (Solaegui Engineers 2018). Should construction overlap with the event, given the volume of event traffic, the addition of relatively few construction-related vehicles is not anticipated to meaningfully contribute to a lowered level of service on SR-447 and CR-34. Outside of the event timeframe, construction-related vehicles are also not anticipated to meaningfully contribute to a lowered level of service on these roadways.				
Vegetation and Invasive, Nonnative Species	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.3**	***Present/Not Affected*** Changes in ambient noise levels would not affect vegetation and invasive, nonnative species.	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Visual Resources, Including Night Sky	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.3**	***Present/Not Affected*** Changes in ambient noise levels would not affect visual or night sky resources.	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Wastes, Hazardous or Solid*	***Not Present*** The project would not use or generate hazardous wastes, and no hazardous wastes or hazardous materials are known to occur in or near the project area. As outlined in the applicant-committed environmental protection measures (**Section 2.1.7**), portable chemical sanitary facilities would be available and maintained by a local contractor. As outlined in Ormat's spill or discharge contingency plan (ORNI 26 LLC 2022, p. 13), trash would be contained on-site and hauled to an approved landfill.				

[7] The level of service describes the operational status of a roadway network. An intersection or roadway segment's level of service can range from an "A," which indicates free-flowing traffic conditions with little or no delay, to "F," which indicates oversaturated conditions where traffic flows exceed design capacity, resulting in delays and a higher probability for vehicle crashes. The NDOT strives to maintain ratings of D or better on all of its roadways (Solaegui Engineers 2018).

Supplemental Authority[a] or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
Water Resources—Surface and Ground*	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** Presence of equipment, fencing, traffic, and personnel would not affect water resources.	***Present/Not Affected*** Changes in ambient noise levels would not affect water resources.	***Present/May be Affected*** Carried forward in **Section 3.3.5**	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Wetlands—Riparian Zones*	***Present/Not Affected*** Not applicable to this issue	***Present/Not Affected*** The presence of equipment, fencing, traffic, and personnel would not affect wetlands or riparian zones.	***Present/Not Affected*** Changes in ambient noise levels would not affect wetlands or riparian zones.	***Present/May be Affected*** Carried forward in **Section 3.3.5**	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Wild and Scenic Rivers*	***Not Present*** The nearest wild and scenic river, the Feather River in Lassen and Plumas Counties, California, is over 50 miles from the AOI and outside of the Great Basin region.				
Wild Horses and Burros	***Present/Not Affected*** The northern portion of the AOI is within 2 miles of the 103,800-acre Granite Range Herd Management Area (HMA). As of March 2022, there were an estimated 196 wild horses in the HMA, which is within the appropriate management level of 155 to 258 horses, as outlined in Table 3-19 of the Winnemucca District Proposed RMP/Final EIS (BLM 2015c, p. 3-83). Typical wild horse and burro management strategies within HMAs are outlined in the Proposed RMP/Final EIS (BLM 2015c, p. 3-80). Noise and activity during well pad and access road construction in the AOI could temporarily displace animals or restrict animal movement for the duration of construction; however, this would be limited to the portion of the HMA nearest the AOI. This effect would not be expected to occur in the remainder of the HMA. The project would not remove rangeland and forage areas for wild horses and burros in the HMA.				
Wilderness*	***Present/Not Affected*** The southern boundary of the Calico Mountains Wilderness is approximately 15 miles north of the AOI (**Figure A-9**, Special Designations). Applicant-committed environmental protection measures for fugitive dust control (**Section 2.1.7**) would limit dust generated during construction; as such, dust is not anticipated to be visible from the wilderness. Similarly, given the distance from the AOI to the edge of the Calico Mountains Wilderness and the presence of existing ALAN and sky glow from Gerlach and Empire, changes to wilderness character from ALAN generated during drilling would likely be imperceptible (BLM 2022b, p. 3-4). Public access to the wilderness on CR-34 would not be affected. The project would not affect wilderness character or public use of designated wilderness areas.				

Supplemental Authority[a] or Other Resource Area	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
Wilderness Study Areas	***Present/Not Affected*** There are two wilderness study areas (WSAs) near the AOI (**Figure A-9**, Special Designations). The Selenite Mountains WSA (NV020-200) is in the northern portion of the Selenite Range, east of SR-447 and the Black Rock Desert playa. The western border of the WSA is approximately 2 miles east of the AOI. The Fox Range WSA (NV020-014) is southeast of the AOI in the Fox Range. The northern end of this WSA is approximately 2 miles south of the AOI. Construction activity and vehicles could generate dust and ALAN that would be visible from the WSAs. Visible dust and ALAN would temporarily diminish the naturalness character of the WSAs. These impacts would last only for the duration of construction. Also, they are expected to be minor due to applicant-committed environmental protection measures (**Section 2.1.7**) for fugitive dust control and project design features that minimize construction lighting visibility from surrounding areas, such as using downward-facing lighting and only lighting the immediate work area. During well drilling, ALAN, radiance, and sky glow (see BLM 2022b, Section 3.2) would be noticeable to observers located along the western ridge of the Selenite Mountains in the Selenite Mountains WSA. However, due to the distance between the WSA and proposed drilling locations, and because wilderness characteristics are influenced by the existing ALAN from Gerlach and Empire, it is unlikely that the modeled changes in ALAN, radiance, and sky glow would change the existing wilderness character (BLM 2022b, p. 3-4). Effects would likely be similar for the Fox Range WSA.				
Wildlife (General and Sensitive Species)	***Present/Not Affected*** Not applicable to this issue	***Present/May be Affected*** Carried forward in **Section 3.3.3**	***Present/May be Affected*** Carried forward in **Section 3.3.4**	***Present/May be Affected*** Carried forward in **Section 3.3.5**	***Present/May be Affected*** Carried forward in **Section 3.3.6**
Wildlife (Threatened or Endangered Species)*	***Not Present*** No threatened, endangered, or proposed species or designated or proposed critical habitat are present in or near the AOI (Ormat 2021, p. 17). Therefore, the project would not affect them. The monarch butterfly (*Danaus plexippus plexippus*) became a candidate for listing in December 2020; it is not currently listed or proposed for listing under the ESA. The monarch butterfly is analyzed in *Wildlife (General and Sensitive Species*).				

[a] See BLM Handbook H-1790-1 (BLM 2008), Appendix 1, Supplemental Authorities to be Considered.

[b] Supplemental authorities that are determined to be not present or present/not affected need not be carried forward or discussed further in the document.

[c] Supplemental authorities that are determined to be present/may be affected must be carried forward in the document.

*Indicates supplemental authority

3.2 AFFECTED ENVIRONMENT

3.2.1 Water Resources

For the purpose of inventorying hydrologic features in the vicinity of the AOI, a hydrologic evaluation study area (study area) was designated. The study area encompasses a 5-mile buffer around the AOI, which is reasonably beyond any potential zone of influence. The hydrologic conditions in the study area are described in detail in the Hydrologic Evaluation (Stantec 2022a) and the supplemental memorandum, Gerlach Hydrologic Evaluation – Response to US Geological Survey (USGS) Comments (Stantec 2022b). Brief summaries of existing hydrologic conditions, including hydrologic units and hydrographic basins, climate, surface water features, groundwater conditions, water rights, and jurisdictional waters, are included below. These topics are described in greater detail in the Hydrologic Evaluation (Stantec 2022a).

Additional information on groundwater resources in the study area, including long-term trends in groundwater levels, potentiometric surface, well yield, hydraulic transmissivity, and water quality parameters, are not summarized below; instead, they are described in detail in the Hydrologic Evaluation (Stantec 2022a).

Hydrologic Units and Hydrographic Basins

The AOI is in the Great Basin, which is divided into progressively smaller hydrologic units. These units have unique Hydrologic Unit Codes (HUCs), defined by the US Geological Survey (USGS). The AOI is in the Black Rock Desert (160402) HUC-6 Accounting Unit, and in portions of two HUC-8 Accounting Units: the Lower Quinn (16040202) and Smoke Creek Desert (16040203) (see Table 1 and Figure 2 of Stantec 2022a).

The basins of the Great Basin have also been divided into numbered and named administrative groundwater basins used by the USGS and the NDWR. The AOI is in the San Emidio Desert (hydrographic basin 022) and the Black Rock Desert (hydrographic basin 028). Within 5 miles of the AOI, there are the Smoke Creek Desert (hydrographic basin 021), Granite Basin (hydrographic basin 023), and Hualapai Flat (hydrographic basin 024) (see Figure 3 of Stantec 2022a).

Climate

The Gerlach weather station[8] (USC00263090) is approximately 0.5 miles southeast of the AOI at an elevation of 3,954 feet above mean sea level (AMSL), which is similar in elevation to the AOI. Average minimum monthly temperatures are between approximately 22 and 60°F; average maximum temperatures range between approximately 41 and 93°F.

Annual total precipitation (rainfall, snowmelt, etc.) averages 7.70 inches and generally occurs throughout the year; however, the monthly totals are lower (less than 0.5 inches) in July through October. The average annual snowfall totals 9.9 inches with snowfall occurring November through April (see Table 2 in Stantec 2022a). Nearby mountain ranges, including the Granite Range, Selenite Range, and Fox Range, receive higher precipitation; the highest parts of the Granite Range (8,974 feet AMSL at Granite Peak) have documented over 20 inches of annual precipitation.

[8] Weather has been monitored and recorded at the Gerlach weather station since 1948, though the station did not operate from February 1951 to May 1962 and from September 1973 to August 1985. It has not been operational since May 2019.

Surface Water

Wetlands

The AOI includes approximately 436 acres of wetlands (16 percent of the AOI), as mapped by the USFWS National Wetlands Inventory Wetlands Mapper[9] (USFWS 2021). Of this total, approximately 197 acres are classified as lakes (that is, the Black Rock Desert playa), 127 acres are freshwater emergent wetlands, 40 acres are freshwater ponds, 39 acres are freshwater forested/shrub wetland, and 33 acres are riverine features (see Table 3 and Figure 4 of Stantec 2022a). Generally, these areas correspond to the following ground-truthed Southwest Regional Gap Analysis Project (SWReGAP) land cover types: Intermountain Basins Playa, Western Great Plains Saline Depression Wetland, Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland, and North American Arid West Emergent Marsh. These are discussed in **Section 3.2.3**, Vegetation.

The actual extent of wetlands in the AOI is ~~likely~~ less than indicated by the USFWS National Wetlands Inventory Mapper and ground-truthed SWReGAP land cover types. Ormat completed an aquatic resources delineation report to refine the boundaries of aquatic resources in the AOI (McGinley & Associates 2021). According to the delineation, approximately 15.87 acres of aquatic resources were delineated. Findings in the report suggest that all wetland features identified are isolated, intrastate non-navigable, and nonregulated wetlands under the Clean Water Act (CWA). In a letter dated October 17, 2022, Ormat ~~has requested~~ received concurrence from the US Army Corps of Engineers (USACE) on the report's findings.

Springs

The location and details of springs and seeps (collectively referred to as "springs") in the study area were derived from the USGS National Water Information System, the USGS National Hydrography Dataset, the Great Basin Groundwater Geochemical Database, and by field sampling conducted by Ormat in August 2019 and by Stantec Consulting Services Inc. (Stantec) starting in March 2020 and continuing quarterly to the present date.

Springs in the AOI include Great Boiling Spring, Ditch Spring, Horse (Corral) Spring, Mud Spring, and three unnamed springs (see Figure 5 in Stantec 2022a). In the larger study area, there are approximately 50 mapped springs. Because springs are present in clusters and have multiple outlets, the reported number of springs is an estimate. The location, flow, and temperature data for springs in the study area are summarized in Table 4 of Stantec (2022a).

Groundwater

Recharge, Discharge, and Basin Interflow

Recharge rates for the hydrologic basins intersecting the study area are summarized in **Table 3-3**. The methods for estimating recharge rates are described in the Hydrologic Evaluation (Section 5.2.2 in Stantec 2022a).

Recharge is likely higher in the mountainous areas and mountain fronts due to higher rainfall and less evapotranspiration. Bedrock in mountains is typically less permeable than alluvium in the valleys and may lead to runoff and mountain front recharge.

[9] The mapper shows the wetland type and extent using a biological definition of wetlands. There is no attempt to define the limits of proprietary jurisdiction of any federal, state, or local government, or to establish the geographical scope of the regulatory programs of government agencies. Further, the mapper shows reconnaissance-level information on the location, type, and size of these resources. Wetlands are identified based on vegetation, visible hydrology, and geography from an analysis of high-altitude imagery, not detailed on-the-ground inspection. Additional information can be found on the mapper's data limitations, exclusions, and precautions page at https://www.fws.gov/node/264582.

Table 3-3
Hydrographic Basin Recharge Estimates

Basin and Size (acres)	Maxey-Eakin Recharge (acre-feet per year and inches per year)	Basin Characterization Model Recharge (acre-feet per year and inches per year)
021 Smoke Creek Desert (707,137)	13,000 and 0.22	16,428 and 0.28
022 San Emidio Desert (194,846)	2,100 and 0.13	4,858 and 0.30
023 Granite Basin (6,982)	2,000 and 3.44	154 and 0.26
028 Black Rock Desert (1,404,835)	13,900 and 0.12	5,847 and 0.05

Source: Table 7 in Stantec 2022a

Groundwater discharge occurs at springs and seeps located in and at the margins on mountain ranges and in the valleys of the San Emidio, Black Rock, and Smoke Creek Deserts hydrographic basins. Groundwater discharge may also occur where the water table is near or above the ground surface. In these locations, discharge occurs through evaporation from the bare ground and evapotranspiration from vegetation in springs and wetlands.

Groundwater discharge through well withdrawals in the Smoke Creek Desert, San Emidio Desert, Granite Basin, and Black Rock Desert hydrographic basins was last compiled for the year 2017 (see Figure 11 in Stantec [2022] for well locations in these basins). **Table 3-4** summarizes this information.

Groundwater flow paths are largely contained within individual hydrographic basins, though topographic gradients and transmissive pathways between basins may result in interbasin flow. Estimated interbasin flows are summarized in **Table 3-5**.

Table 3-4
Hydrographic Basin Well Withdrawals, 2017

Basin and Size (acres)	Total (acre-feet)	Use (percent)
021 Smoke Creek Desert (707,137)	1,049	Irrigation (47), Wildlife (43), Stock (8), Domestic (1), Commercial (1)
022 San Emidio Desert (194,846)	4,841	Irrigation (80), Industry (18), Quasi-municipal (2), Domestic (<1)
023 Granite Basin (6,982)	0	—
028 Black Rock Desert (1,404,835)	7,835	Irrigation (98), Mining and milling (2), Stock, domestic, quasi-municipal (<1)

Source: Section 5.2.2.2 in Stantec 2022a

Table 3-5
Interbasin Flows

Basin and Size (acres)	Total (acre-feet per year)[1]	Contributing or Receiving Basin
021 Smoke Creek Desert (707,137)	+5,680	San Emidio Desert, Dry Valley, Honey Lake Valley
022 San Emidio Desert (194,846)	-300	Smoke Creek Desert, Black Rock Desert
023 Granite Basin (6,982)	0	—
028 Black Rock Desert (1,404,835)	+3,860	Pine Forest Valley, San Emidio Desert, Hualapai Flat, Desert Valley

Source: Section 5.2.2.3 in Stantec 2022a

[1] A plus symbol (+) indicates flow to the basin, while a minus symbol (-) indicates flow from the basin.

Perennial Yield

The NDWR has adopted perennial yield estimates to manage groundwater resources and to reasonably limit the lowering of groundwater elevation. **Table 3-6** summarizes the adopted perennial yields, which are estimated from recharge, discharge, and interbasin flows.

Table 3-6
Perennial Yields

Basin and Size (acres)	Perennial Yield (acre-feet per year)
021 Smoke Creek Desert (707,137)	16,000
022 San Emidio Desert (194,846)	4,600
023 Granite Basin (6,982)	200
028 Black Rock Desert (1,404,835)	30,000

Source: Section 5.2.2.4 in Stantec 2022a

Water Quality

Water quality samples have been collected from springs and wells in the AOI and wider region (see Stantec 2022a, Section 5.4, and Table 9; spring and well locations are shown on Figures 5 and 7 in Stantec 2022, respectively). These include sites within and near the AOI, such as Great Boiling Spring, Ditch Spring, Mud Spring, Horse (or Corral) Spring, several cold and geothermal wells, a geothermal exploration borehole, and the GGID hot pool well and community center well. Water from geothermal sources near the AOI has sodium chloride-type water, whereas water samples from cold wells have higher ratios of bicarbonate relative to chloride. Furthermore, water from hot springs and hot wells shows little to no mixing with non-geothermal groundwater, as indicated by magnesium concentrations.[10] Past studies have concluded that mixing between geothermal and cool groundwater in the system probably is not significant (Stantec 2022a, p. 29).

Conceptual Hydrologic Model

As described in the Hydrologic Evaluation (Stantec 2022a, p. 32), the AOI is located at the base of the Granite Range at the boundary between the San Emidio, Smoke Creek, and Black Rock Desert hydrographic basins. Recharge to the groundwater system is likely primarily within the Granite Range and at the mountain block front. Groundwater flows from the fractured rock aquifers of the Granite Range into alluvial aquifers located in the valleys. The coarser alluvium deposits at the Granite Range's base likely also serve as transmissive aquifers, which are locally pumped for irrigation and livestock watering. Unconsumed groundwater flows west and southeast. It discharges at geothermal and cold springs, or continues to the playa zones of the basins where it may be lost to evapotranspiration. Regional groundwater elevations have decreased within the last decades, which may be localized and attributed to withdrawals for irrigation.

The geothermal system at the AOI likely begins with a portion of recharge to the Granite Range that circulates to a depth within the fractured granite bedrock, where heats to temperatures that may be as high as 356°F to 392°F. Subvertical, permeable faults in granite at depth allow the rapid ascent of geothermal fluids into a shallow aquifer.

The bedrock near the AOI generally has low permeability unless it is heavily fractured through seismic activity over geological time. Permeability in the AOI is likely enhanced by three structural features: (1) the intersection of two sets of normal faults that bound the Granite Range on the western and eastern flanks; (2) the southward termination of these fault zones, which likely result in main faults horse-tailing into smaller,

[10] Cool groundwater contains magnesium from water-rock interactions. Due to the lower solubility of carbonate and sulfate minerals at high temperatures, magnesium concentrations are lower in geothermal fluids. The presence of magnesium in geothermal fluids can indicate mixing with non-geothermal groundwater (Stantec 2022a, p. 29).

permeable fractures zones; and (3) local complex structures that result from the former two regional features. Groundwater in the shallow aquifer discharges to Great Boiling Spring, Mud Spring, Ditch Spring, or Horse Spring, or it outflows to the southeast where it progressively cools.

Water Rights

A total of 30 water rights associated with points of diversion (PODs) or places of use (POUs) were identified within the study area; these are summarized in the hydrologic evaluation (see Table 5 and Figure 10 in Stantec 2022a). The PODs are categorized as irrigation (seven), municipal (six), livestock (five), wildlife (three), and commercial (one). Sources for these water rights include well/underground (13), spring (six), and stream (three). The statuses of all municipal water rights are listed as ready for action (protested), while the irrigation, livestock, and wildlife water rights are listed as certificate, vested right, permit, or reserved.

While the community of Gerlach is located immediately southeast of the AOI, water for the community is sourced from beyond the study area; it is supplied by the GGID. Water rights owned by the GGID are associated with PODs Granite Spring and Garden Springs, which are located on the western margin of the Granite Mountains. Granite Spring is located just beyond the study area (5 miles northwest from the AOI). Garden Springs is located 7.8 miles northwest of the AOI. The associated POU for these water rights corresponds with Gerlach in portions of T. 32N., R. 23E., Sections 14, 15, and 22; some of these overlap the AOI (see Figure 10 in Stantec 2022a).

Jurisdictional Water

The surface water features described above may be considered jurisdictional Wetlands and Other Waters of the US by the USACE. This potentially places them under USACE jurisdiction under Section 404 of the CWA. Ormat is coordinating with the USACE to determine the jurisdictional status of these features. Ormat would obtain a Section 404 permit if the project could impact jurisdictional Wetlands and Other Waters of the US.

3.2.2 Geology and Minerals

Geology

Geological conditions are described in detail in the Hydrologic Evaluation (Stantec 2022a). The evaluation uses the same study area described in **Section 3.2.1**, Water Resources. Brief summaries of the regional geological setting and local surface and subsurface geology are included below. Additional information on the resources in the study area, including existing surface geophysical survey results, are described in detail in the Hydrologic Evaluation (Stantec 2022a).

The study area is located in the Basin and Range physiographic province, which is characterized by north- or northwest-trending mountain ranges, which are fault-bounded against adjacent basins. Valley-bounding faults that generally trend north to south have been mapped in the region (see Figure 6 in Stantec 2022a).

Surface geology in the AOI is dominated by granitic, volcanogenic-sedimentary, and sedimentary rocks in the Granite Range and Quaternary alluvial, eolian, and lacustrine deposits in topographically low areas (see Figure 6 in Stantec 2022a). Granitic formations are Cretaceous in age and include biotite-hornblende granite, brecciated granite, and highly weathered granite along the Granite Range front. The volcanogenic-sedimentary unit is Tertiary (late to middle Miocene) in age and includes tuffaceous sediments, volcaniclastic sandstone, tephras, and granitic conglomerates and sandstones. Quaternary sediments include Lake Lahontan lacustrine deposits, Holocene alluvial fans deposits, playa deposits, and playa margin deposits.

North–northeast-trending Basin and Range faults bound the Granite Range on the eastern margin. A series of northwest-trending faults have also been identified or inferred near the southern terminus of the Granite Range (see Figure 6 in Stantec 2022a).

Hydrothermal deposits have been mapped in the AOI; siliceous sinter is present near Great Boiling Springs and Mud Springs. Altered granodiorite, containing silica fill along fault zones, is present between Great Boiling Spring and the Granite Range.

Subsurface geology is available from several exploratory boreholes drilled near and within the AOI, several well logs from across the study area, and data from Ormat's exploration drilling database. In general, encountered lithologies include playa deposits, alluvium, granodiorite, and minor breccia. Exploration boreholes drilled into valley fill encountered up to 3,270 feet of alluvium before encountering the granodiorite basement.

Seismicity

The University of Nevada, Reno (UNR) Seismological Laboratory maintains a record of recent regional seismological events (Nevada Seismological Laboratory 2022). Also, historical data are cataloged in a searchable database by the USGS (USGS 2022).

In 2016, the UNR Seismological Laboratory reported a magnitude 3.9 earthquake located near the communities of Gerlach and Empire. This was the largest of just over 300 earthquakes detected in the area between April and May of that year, including four events between magnitude 3.0 and 3.9, and 28 events between magnitude 2.0 to 2.9 (*Nevada Today* 2016). Since 2016, there have been 38 earthquakes between magnitude 2.0 to 2.9 detected in the vicinity of the AOI; none have measured larger than magnitude 2.9 (USGS 2022).

Minerals

The BLM manages the surface and subsurface of federal lands under its jurisdiction. In some cases, it has administrative duties for mineral activities on lands managed by other federal agencies or on private split-estate lands. Split-estate lands are those where surface land rights and subsurface mineral rights have been severed from each other and are held by different owners (BLM 2015a). All federal lands in the Winnemucca District, including those in the AOI, are open to geothermal leasing and development, with the exception of administratively closed areas, such as the Black Rock-High Rock Canyon Emigrant Trails NCA, designated wilderness areas, and WSAs (BLM 2015c, p. 3-128). The open-to-leasing designation includes split-estate lands (BLM and Forest Service 2008), which include the lands in the AOI under private surface ownership.

3.2.3 Vegetation

General Vegetation Communities

As described in the Biological Resources Baseline Report (Ormat 2021), there are 11 SWReGAP land cover types in the AOI. **Table 3-7** summarizes the acres and provides a brief description of each type. A map of land cover types and representative photographs of the land cover types are in the Biological Resources Baseline Report (Ormat 2021).

Table 3-7
Vegetation

Cover Type	Description	Acres[1]
Intermountain Basins Mixed Salt Desert Scrub	Open-canopied shrublands of typically saline basins, alluvial slopes, and plains. Vegetation composed of one or more *Atriplex* species, such as shadscale or fourwing saltbush. Other shrubs present to co-dominate may include Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush (*Ericameria nauseosa*), and others.	1,005

Cover Type	Description	Acres[1]
Intermountain Basins Greasewood Flat	Occurs near drainages on stream terraces and flats and around sparsely vegetated playas. Soils are saline, with a shallow water table, and flood intermittently. This land cover type is open to moderately dense shrublands dominated or co-dominated by black greasewood (*Sarcobatus vermiculatus*), fourwing saltbush (*Atriplex canescens*), or shadscale (*Atriplex confertifolia*).	679
Intermountain Basins Big Sagebrush Shrubland	Occurs in broad basins between mountain ranges, plains, and foothills. Soils are typically deep, well drained, and non-saline. These shrublands are dominated by big sagebrush.	390
Western Great Plains Saline Depression Wetland	Salt-tolerant species typify this system, including saltgrass (*Distichlis spicata*) and foxtail barley (*Hordeum jubatum*). During very wet years, an increase in precipitation can dilute the salt concentration in the soils of some examples of this system; this may allow for less salt-tolerant species to occur.	322
Intermountain Basins Playa	Barren and sparsely vegetated playas with generally less than 10 percent plant cover. Salt crusts are common, with small saltgrass beds in depressions and sparse shrubs around the margins. These systems are intermittently flooded.	208
Intermountain Basins Cliff and Canyon	Includes barren and sparsely vegetated landscapes, with generally less than 10 percent cover. It comprises steep cliff faces, narrow canyons, and smaller rock outcrops of various rock types, as well as sparse vegetation of unstable scree and talus slopes that typically occur below cliff faces.	44
Recently Mined or Quarried	Areas where mining or quarries are visible in the imagery and are 5 acres or greater in size.	41
Intermountain Basins Semi-Desert Shrub Steppe	Occurs at lower elevations on alluvial fans and flats with moderate to deep soils, where ground cover is dominated by grasses and an open shrub canopy exists. Characteristic grasses are Indian ricegrass (*Achnatherum hymenoides*), blue grama (*Bouteloua gracilis*), and needle-and-thread grass (*Hesperostipa comata*), among others. Characteristic species of the woody canopy are saltbushes (*Atriplex* spp.), rabbitbrushes, and ephedra (*Ephedra* spp.). Big sagebrush (*Artemisia tridentata*) may be present but does not dominate.	26
Great Basin Pinyon-Juniper Woodland	Occurs on dry mountain ranges of the Great Basin region. Woodlands are dominated by a mix of single-leaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*), or pure or nearly pure stands of either species. In the AOI, stands are of Utah juniper. Understory layers are variable.	4
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	Often occurs as a mosaic of multiple communities that are tree dominated with a diverse shrub component. The variety of plant associations connected to this system reflects the elevation, stream gradient, floodplain width, and flooding events. In the AOI, this community is made mostly of invasive shrubs, including Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix ramosissima*). Fremont cottonwood (*Populus fremontii*) is also present in limited locations.	3
North American Arid West Emergent Marsh	Occurs throughout much of the arid and semiarid regions of western North America, typically surrounded by savanna, shrub steppe, steppe, or desert vegetation. Natural marshes may occur in depressions in the landscape, as fringes around lakes, and along slow-flowing streams and spring outflows. The vegetation is characterized by herbaceous plants that are adapted to saturated soil conditions, including cattail (*Typha* spp.), rushes (*Juncus* spp.), and bulrushes (*Schoenoplectus* spp.).	1
Total	**—**	**2,724**

Sources: Ormat 2021; USGS 2005

[1] Rounded to the nearest whole acre

Noxious Weeds and Nonnative, Invasive Plant Species

The Nevada noxious weed (NDA 2020) saltcedar was mapped in the AOI, in association with low-lying, intermittently wet areas (Ormat 2021). Additionally, Russian knapweed (*Acroptilon repens*) and musk thistle (*Carduus nutans*) have been documented nearby, along CR-34 north of Gerlach (BLM 2009; EDDMapS 2022). Perennial pepperweed (*Lepidium latifolium*) has been documented nearby along Nevada SR-447 (BLM 2009).

Other nonnative, invasive plants observed in the AOI are Russian olive, bur buttercup (*Ceratocephala testiculata*), redstem stork's bill (*Erodium cicutarium*), saltlover (*Halogeton glomeratus*), Russian thistle (*Salsola tragus*), and cheatgrass (*Bromus tectorum*) (Ormat 2021).

Special Status Plants

No special status plant species were observed during surveys in the AOI (Ormat 2021). Based on ground-truthed vegetation (Ormat 2021, Section 3.2.1) and soil map units (Ormat 2021, Section 2.3) in the AOI, there are approximately 2,356 acres of potentially suitable habitat for upland-associated special status plant species. These species are Tonopah milkvetch (*Astragalus pseudoiodanthus*), Schoolcraft buckwheat (*Eriogonum microthecum* var. *schoolcraftii*), oryctes (*Oryctes nevadensis*), Nevada dune beardtongue (*Penstemon arenarius*), and Susanville beardtongue (*Penstemon sudans*). There are 326 acres of potentially suitable habitat for wetland- and riparian-associated species, including Soldier Meadows cinquefoil (*Potentilla basaltica*).

3.2.4 Wildlife

Eagles and Other Raptors

As detailed in the Biological Resources Baseline Report (Ormat 2021, Map A-6, Golden Eagles and Other Raptors), surveys carried out in 2020 documented nests of golden eagle (*Aquila chrysaetos*), large raptors, and small raptors within a 2-mile survey area buffer around the AOI. Six nests (Nests 10, 11A, 11B, 20A, 20B, and 20C) belonged to golden eagles, two nests (Nests 13 and 24) to large raptors, and one nest (Nest 12) to small raptors. None of the nests were occupied at the time of the surveys, and no nesting attempts were observed. Based on the presence of the golden eagle nests, portions of two golden eagle territories were determined to overlap with the AOI.

Burrowing owl call-broadcast surveys did not observe burrow complexes or detect burrowing owls in the AOI (Ormat 2021). Based on the ground-truthed vegetation (Ormat 2021, Section 3.2.1) and slope (Ormat 2021, Section 2.3) in the AOI, there are approximately 2,341 acres of suitable habitat for the burrowing owl.

As detailed in the Biological Resources Baseline Report (Ormat 2021, Table 4), eagles and other raptors with suitable habitat in the AOI, but that were not observed during surveys, are bald eagle (*Haliaeetus leucocephalus*), western burrowing owl (*Athene cunicularia hypugaea*), ferruginous hawk (*Buteo regalis*), northern goshawk (*Accipiter gentilis*), prairie falcon (*Falco mexicanus*), short-eared owl (*Asio flammeus*), Swainson's hawk (*Buteo swainsoni*), and peregrine falcon (*Falco peregrinus*).

Migratory Birds

Since migratory birds may use the entire AOI, regardless of the vegetation community, the entire 2,724-acre AOI contains potential habitat for migratory birds (Ormat 2021, Section 3.3.2).

Migratory bird point-count surveys in the AOI documented the following species: red-winged blackbird (*Agelaius phoeniceus*), black-throated sparrow (*Amphispiza bilineata*), sagebrush sparrow (*Artemisiospiza nevadensis*), killdeer (*Charadrius vociferus*), common raven (*Corvus corax*), Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Haemorhous mexicanus*), barn swallow (*Hirundo rustica*), northern mockingbird (*Mimus polyglottos*), house sparrow (*Passer domesticus*), blue-gray gnatcatcher (*Polioptila caerulea*), Virginia rail (*Rallus limicola*), rock wren (*Salpinctes obsoletus*), Say's phoebe (*Sayornis saya*), Brewer's sparrow (*Spizella breweri*), western meadowlark (*Sturnella neglecta*), western kingbird (*Tyrannus verticalis*), and mourning dove

(*Zenaida macroura*). Nests of black-throated sparrow, western meadowlark, red-winged blackbird, and sagebrush sparrow were observed in the AOI during surveys (Ormat 2021, Map A-8).

Migratory birds observed incidentally (those that were observed but not during point counts) were common nighthawk (*Chordeiles minor*), horned lark (*Eremophila alpestris*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), and glossy ibis (*Plegadis falcinellus*).

Brewer's sparrow, long-billed curlew, and loggerhead shrike are sensitive species, per BLM Instruction Memorandum No. NV IM-2018-003.

Additional migratory bird species have the potential to occur in the AOI based on habitat conditions, such as wetlands and riparian areas, sagebrush steppe and salt desert scrub, playas, and cliffs and canyons. These species are listed in the Wildlife Clearance Form, which is included as Appendix C of the Biological Resources Baseline Report (Ormat 2021).

Shorebirds

Suitable habitat in the AOI for shorebirds is approximately 531 acres (Ormat 2021, Section 3.3.3). This is where the SWReGAP land cover types Western Great Plains Saline Depression Wetland, North American Arid West Emergent Marsh, and Intermountain Basins Playa are present.

One shorebird species, the long-billed curlew (*Numenius americanus*), was observed during the shorebird surveys described in the Biological Resources Baseline Report (Ormat 2021). Killdeer (*Charadrius vociferus*) and glossy ibis (*Plegadis falcinellus*) were incidentally observed during other surveys in the AOI. It is likely that the killdeer nested in the AOI in 2020, though breeding was not directly observed or detected. The glossy ibis was observed once flying over the AOI. It is unlikely that the ibis would breed there.

During surveys, the Black Rock Desert playa was dry in the vicinity of the AOI, which likely limited shorebird observations; however, water sources were present in some locations in the AOI, including in areas of emergent marsh and spring outflows and ponds.

Mammals

Kangaroo Mouse Habitat Delineation

The kangaroo mouse habitat delineation method was originally developed in coordination with the BLM Winnemucca District Office, NDOW, and Environmental Management and Planning Solutions Inc. (EMPSi), a private consultant for Ormat, during preparation of the Biological Baseline Report for the North Valley Geothermal Project at the San Emidio Geothermal Field Environmental Assessment (BLM 2021b). That project is in the San Emidio Desert in Washoe County, approximately 20 miles south of the AOI. Given the proximity of these areas, the same method was used to delineate potential habitat for the areas considered in this EA.

Acres of non-habitat and low-, moderate-, and high-potential habitat for the dark kangaroo mouse (*Microdipodops megacephalus*) were delineated in the AOI, as described in detail in the Biological Resources Baseline Report (Ormat 2021, Section 3.3.4); they are summarized in **Table 3-8**. The habitat delineation area included the AOI and a 0.25-mile buffer around it. Based on this delineation, there is no habitat for pale kangaroo mouse (*Microdipodops pallidus*) in the AOI or the 0.25-mile buffer around it.

Small Mammal Trapping

As described in the Biological Resources Baseline Report (Ormat 2021), small mammal trapping surveys were done in a potential transmission line route south of the AOI that is no longer included in the proposed project. Trapping was not done in the AOI. However, trapping results are included to describe the survey results and to give an indication of the small mammal species that may also exist in the AOI.

Table 3-8
Kangaroo Mouse Habitat

Common Name *Scientific Name*	Non-Habitat	Low-Potential Habitat	Medium-Potential Habitat	High-Potential Habitat	Total[1]
Dark kangaroo mouse *Microdipodops megacephalus*	543 acres	0 acres	0 acres	2,181 acres	**2,724 acres**

Source: Ormat 2021
[1] Rounded to the nearest whole acre

Small mammal trapping did not detect the dark kangaroo mouse or the pale kangaroo mouse. Though these species were not detected during trapping, they may still be present in the surveyed area. Other small mammal species that were observed during trapping were the Merriam's kangaroo rat (*Dipodomys merriami*), northern grasshopper mouse (*Onychomys leucogaster*), Great Basin pocket mouse (*Perognathus parvus*), and deer mouse (*Peromyscus maniculatus*).

Bats

Acoustic bat detection surveys documented bat presence in the AOI. Detectors were placed near areas of potential bat use, including near old buildings that may be used for roosting and near springs and ponds that may be used for foraging. The most common bat species (as indicated by the total number of acoustic recordings made on each detector) were the canyon bat (*Parastrellus hesperus*) and the Mexican free-tailed bat (*Tadarida brasiliensis*). Other species detected were Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), California myotis (*Myotis californicus*), western small-footed bat (*M. ciliolabrum*), long-legged myotis (*M. volans*), and Yuma myotis (*M. yumanensis*). The Biological Resources Baseline Report contains a map showing acoustic detector locations (Ormat 2021, Map A-11) and a table summarizing detections by survey date and detector location (Ormat 2021, Table 16).

Large Mammals

Portions of the AOI are considered to be year-round habitat for bighorn sheep (*Ovis canadensis* ssp.; in the Granite Range), year-round and crucial winter habitat for pronghorn antelope (*Antilocapra americana*), and limited habitat for mule deer (*Odocoileus hemionus*) (Ormat 2021, Appendix B and Appendix C). Targeted surveys for these species were not conducted, nor were these species incidentally observed or detected during other field surveys conducted in preparation of the Biological Resources Baseline Report (Ormat 2021, Section 3.3.4).

Livestock (cattle and domestic sheep) trailing occurs across most of the AOI in the spring (March through May) and fall (October through December).[11] Trailing usually includes four to seven bands of domestic sheep that are moved to and from the Blue Wing Seven Troughs Allotment in the Winnemucca District to the adjacent California BLM districts. Trailing through the AOI would normally be expected to take 1 to 2 days per band; temporary (overnight) sheep camps are sometimes set up in the AOI as needed. Trailing is normally centered on roadways, such as SR-447 and CR-34. During trailing, however, livestock may forage some distance from roadways, potentially into year-round habitat for bighorn sheep.

Insects

Of the 2,724-acre AOI, approximately 2,325 acres (85 percent) contain buckwheat (*Eriogonum* spp.) populations (Ormat 2021). Certain species in the *Eriogonum* genera provide larval development habitat for

[11] Email from Angela Arbonies, BLM, to Morgan Trieger, EMPSi. Subject: RE: [EXTERNAL] Gerlach Geothermal Exploration Project - domestic sheep trailing. February 8, 2022.

Rice's blue (*Euphilotes pallescens ricei*) and Great Basin small blue (*Philotiella speciosa septentrionalis*) butterflies. There were no observations of known host plants for these sensitive insect species in the AOI; however, observations of other species in the *Eriogonum* genera indicate there is potentially suitable habitat for sensitive insect species. There were no direct observations of special status insect species.

In December 2020, the USFWS determined that listing the monarch butterfly under the ESA was warranted but precluded by higher-priority listing actions (85 *Federal Register* 81813). With this finding, the monarch butterfly became a candidate for listing; it is not yet listed or proposed for listing under the ESA.

Milkweeds (*Asclepias* spp.) are larval host plants for the monarch butterfly. Suitable habitat for the monarch butterfly is likely present where milkweed plants grow. No milkweed plants were observed during special status plant surveys in the AOI (Ormat 2021, p. 33); however, several citizen-science-based observation records for several milkweed species exist in the region (Western Monarch Milkweed Mapper 2022), including narrowleaf milkweed (*A. fascicularis*), showy milkweed (*A. speciosa*), and pallid milkweed (*A. cryptoceras*). Further, several historical monarch butterfly observations have been recorded in the region (Western Monarch Milkweed Mapper 2022). This information suggests that suitable habitat for the monarch butterfly is likely present in the AOI and the vicinity.

Amphibians

Several ponds in the AOI have either a mixture of thermal (hot) and cold water or are far enough from the thermal spring to allow cooling of the water. These aquatic features may support several amphibian species, including northern leopard frog (*Lithobates pipiens*), western toad (*Anaxyrus boreas*), and Great Basin spadefoot toad (*Spea intermontana*). There is approximately 1 acre of the SWReGAP land cover type North American Arid West Emergent Marsh in the AOI (Ormat 2021), indicating suitable aquatic breeding habitat for these species.

Water temperatures in most ponds and springs in the AOI are too high to support western toad breeding and occupancy. However, western toad surveys were carried out in the AOI in ponds with potentially suitable habitat conditions, including those where water temperatures were observed to be below critical thresholds. Surveys were done at Ponds 1, 3, 4, 7, and 8, and at Springs 6, 8, 12, and 17 (Ormat 2021, Map A-12). No adult toads, tadpoles, or egg masses were observed during surveys.

Western toad and Great Basin spadefoot toad breeding habitat is limited to aquatic features; however, these species will also use adjacent upland habitats for dispersal, brumation, and aestivation.[12] Studies examining the nonbreeding movements of western toads have shown that toads can use habitats up to 1.4 miles (Muths 2003) to 1.5 miles (Bartelt et al. 2004) from breeding ponds; however, these studies were conducted in higher-elevation, cooler, moister forested landscapes in the western US. Nonetheless, suitable western toad habitat includes uplands surrounding suitable wetland, pond, and spring habitat. However, upland habitat use in the AOI may be limited to a shorter distance from aquatic areas, compared with western toads in moister forested habitats.

Similarly, the spadefoot toad digs its own burrow in loose soil, or it uses existing small mammal burrows in upland areas adjacent to aquatic breeding habitat (Wildlife Action Plan Team 2012, p. S-66). The distance adult spadefoot toads may travel from burrows to breeding sites is unknown, but the Wyoming Game and Fish Department states they can at least travel several hundred meters (WGFD 2017, p. IV-1-3).

[12] Brumation is the state or condition of inactivity or torpor induced by cold winter temperatures, while aestivation is the state or condition of torpidity or dormancy induced by heat and the dryness of summer.

Reptiles

Reptiles may be found in all areas of the AOI, regardless of the vegetation community; therefore, the entire 2,724-acre AOI contains suitable habitat for reptile species (Ormat 2021, Section 3.3.7). Reptile-specific surveys were not done in the AOI. Incidental reptile observations are discussed below.

The Great Basin collared lizard (*Crotaphytus bicinctores*), desert horned lizard (*Phrynosoma platyrhinos*), and long-nosed leopard lizard (*Gambelia wislizenii*) are sensitive reptile species that were incidentally observed in the AOI during the course of the other surveys (Ormat 2021). Great Basin collared lizards were observed in rocky areas, while long-nosed leopard lizards were observed in areas with sandy soils. Desert horned lizards were observed in the Intermountain Basins Mixed Salt Desert Shrub vegetation type.

The AOI is within the mapped range of an additional sensitive reptile species, the northern rubber boa (*Charina bottae*). While suitable sagebrush shrubland habitat for this species is present, this species was not directly observed; this is likely due to the burrowing habits of this mostly nocturnal species.

Common reptile species incidentally observed during other surveys in the AOI are the zebra-tailed lizard (*Callisaurus draconoides*), western whiptail (*Cnemidophorus tigris*), Great Basin rattlesnake (*Crotalus oreganus lutosus*), bull snake (*Pituophis catenifer sayi*), and western fence lizard (*Sceloporus occidentalis*) (Ormat 2021).

Springsnails

A complex of thermal springs and pools is present in and around the AOI. Most of the springs have water temperatures above the upper temperature threshold for most springsnail species; however, suitable springsnail habitat was observed in several thermal springs, outlet streams, and ponds fed by thermal springs (Ormat 2021). Water temperatures in these areas range from approximately 75°F to 205°F. Springsnail surveys in suitable habitats did not document springsnails or snail shells. The substrate in most springs was either silty mud or solid limestone and not the preferred gravel substrate. Surveyed areas are depicted in the Biological Resources Baseline Report (Ormat 2021, Map A-12).

Greater Sage-Grouse

As described in the Biological Resources Baseline Report (Ormat 2021, Section 3.3.9), habitat for greater sage-grouse (*Centrocercus urophasianus*) was delineated by both the 2015 Nevada and Northeastern California Approved RMP Amendment (BLM 2015b) and the 2019 Nevada and Northeastern California Greater Sage-Grouse RMP Amendment (BLM 2019a). This EA uses habitat data from the 2015 BLM approved RMP amendment (updated 2021) to identify, by way of a desktop analysis, greater sage-grouse habitat in and near the AOI. The 2015 habitat management area data (updated 2021) identify greater sage-grouse habitat types as priority habitat management areas (PHMAs), general habitat management areas (GHMAs), and other habitat management areas (OHMAs).

According to the 2015 greater sage-grouse habitat data (updated 2021), there are approximately 158 acres of OHMAs in the AOI, along the eastern slopes of the Granite Range (**Figure A-6**, Greater Sage-Grouse [2021 Plan Maintenance Action for the Approved Resource Plan Amendment (2015)] in **Appendix A**). There are no GHMAs or PHMAs in the AOI. The nearest GHMA is approximately 0.5 miles north of the AOI, in the Granite Range.

Available data from the NDOW (Ormat 2021, Appendix B) indicate there are no known greater sage-grouse lek sites or radio-marked tracking locations within 4 miles of the AOI.

Threatened and Endangered Species

As described in the Biological Resources Baseline Report (Ormat 2021, Section 2.5.2.10), the BLM queried the USFWS Information for Planning and Consultation (IPaC) system on February 24, 2020. The IPaC identified two federally listed threatened wildlife species, the Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) and desert dace (*Eremichthys acros*). Critical habitat for desert dace has been designated.

There are four Lahontan cutthroat trout recovery streams north of the AOI in the Granite Basin; these recovery streams represent potential habitat for the Lahontan cutthroat trout. Granite Creek is about 7 miles, Cottonwood Creek is about 13 miles, Wagontire Creek is about 14 miles, and Red Mountain Creek is about 16 miles from the AOI. There is also Lahontan cutthroat trout occupied habitat in Pyramid Lake, approximately 32 miles south of the AOI; there is no hydrological connection between the AOI and recovery streams in the Granite Basin or Pyramid Lake.

The desert dace is endemic to spring systems in the Soldier Meadows area in the Black Rock Desert-High Rock Canyon Emigrant Trails NCA. In these areas, the desert dace inhabits warm springs and their outflow creeks; designated critical habitat is also at this location. Soldier Meadows is approximately 47 miles north of the AOI, and there is no hydrological connection between these areas.

The monarch butterfly, a candidate for listing under the ESA, is discussed in *Insects*, above.

3.2.5 Soil Resources

The AOI overlaps eight soil map units (Ormat 2021, Section 2.3). **Table 3-9** summarizes selected characteristics of these map units, including the Natural Resources Conservation Service ratings for soil erosion susceptibility by wind and water.

Table 3-9
Soils

Soil Map Unit	Landscape Position	Surface Texture	Drainage	Wind Erosion Rating[1]	Water Erosion Rating[2]	Acres[3]
210—Veta-Langston Association	Lake plains	Gravelly sandy loam	Well drained	5	0.15	669
1146—Umberland Association	Lake plains	Silty clay loam	Somewhat poorly drained	8	0.37	674
1191—Ragtown Association	Lake plains	Clay loam	Moderately well drained	4	0.32	420
1520—Kaffur-Slocave-Rock Outcrop Association	Mountains	Very gravelly sandy loam	Well drained	6	0.10	382
1580—Trocken-Ganaflan-Bluewing Association	Lake plains	Very gravelly sandy loam	Well drained	6	0.10	211
1064—Trocken, Stony-Mazuma Association	Fan collars	Stony sandy loam	Well drained	5	0.15	190
900—Playas	Playas	Silty clay	Very poorly drained	4	0.32	130
543—Mazuma-Swingler Association	Lake plains	Fine sandy loam	Well drained	3	0.32	46
Total	—	—	—	—	—	**2,724**

Sources: Ormat 2021; Web Soil Survey 2020

[1] The wind erosion potential is classified on a scale between 1 and 8. A rating of 1 means soils are highly susceptible to wind erosion, and a rating of 8 means soils are the least susceptible to wind erosion.

[2] K-Factor (whole soil) is a water erosion rating that indicates susceptibility of a soil to sheet and rill erosion by water. K values range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to erosion by water.

[3] Rounded to the nearest whole acre

3.2.6 Cultural Resources

As described in **Appendix C**, Cultural Resources, the BLM has determined a direct area of potential effect[13] (APE) for physical effects on cultural resources, and an indirect APE for possible visual and auditory effects. Visual, auditory, and atmospheric effects are considered direct effects when assessing potential adverse effects to site integrity. The direct APE includes the 2,724 acres encompassing the AOI, as well as a 2,854-acre linear corridor (approximately 23 miles long and 960 feet wide). A Class III cultural resources inventory of the direct APE was performed. Using the methods in Instruction Memorandum No. NV-2021-006, Bureau of Land Management (BLM) Nevada Template Visual Area of Potential Effect (APE) Policy,[14] the BLM determined that the ~~indirect,~~ visual APE was a 0.44-mile buffer around the proposed well pads. Any site that could be disturbed by the visual impacts of the project was considered and several were monitored in a key observation point (KOP) study. The visual/indirect effects area for cultural resources effects was limited and became solely the area of direct effects as no sites outside the area of interest or direct area of potential effect would be significantly affected. A summary of resources is included below, and more detail is provided in **Appendix C**, Cultural Resources.

The BLM is carrying out NHPA Section 106 consultation in accordance with the process described in 36 CFR 800.8(c). The BLM has consulted with the Nevada State Historic Preservation Office (SHPO) as part of the Section 106 process through letters dated March 8, 2022 and May16, 2022, to which SHPO responded on April 8, 2022, and June 15, 2022. In these letters SHPO acknowledges the adequacy of the KOP study as well as the plan for unanticipated discoveries and plan for inadvertent discovery of human remains. The SHPO gave concurrence to site eligibility of sites in the area in a letter date September 13, 2021, in relation to report CR2-3489, "Cultural Resources Inventory for the Ormat Nevada, Inc. Gerlach Geothermal Development Project, Washoe County, Nevada" which covers the entirety of the APE.

Cultural resources that are eligible for listing on the NRHP include 20 evaluated cultural resources that are eligible for listing on the NRHP under criterion D. These include prehistoric, historic, and multicomponent sites, including lithic, flake, refuse, or ground stone scatters; a probable hearth; a prospecting site; a quarry; a rock shelter; a temporary camp; and a historic habitation.

There are also four resources eligible for listing on the NRHP under criterion A. These are the Guru Road segment/Nobles Trail segment of the California National Historic Trail[15] (NHT; CrNV-22-5656/02-4665; 26WA5549/26PE2301) which is eligible due to its California Trail association, a prehistorically important spring (Great Boiling Spring; CrNV-22-6149/26WA12721) which is located on private property, historic railroad tracks (CrNV-02-6736/12903/26WA6358), and a transmission line (CrNV-02-14397/26WA2706). The Guru Road itself is not considered a site eligible for listing on the NRHP due to its age. It is likely not 50 years old and even so, no reports date Guru Road to before 1970. Under the State Protocol Agreement between the SHPO and the Nevada BLM, "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). There is also a historic cemetery (Gerlach Cemetery; CrNV-22-6150/26WA12722) eligible for listing on the NRHP under criteria A and D.

[13] The area of potential effect is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)).

[14] https://www.blm.gov/policy/nv-im-2021-006

[15] The California NHT was designated by Congress in 1992. The NHT is administered by the National Park Service through its National trails Office in Santa Fe, NM.

There are also four unevaluated cultural resources. For the purpose of this inventory, unevaluated cultural resources are treated as though they are eligible for listing on the NRHP. These are three prehistoric lithic scatters and the historic Gerlach Airport.

There are two architectural resources that are eligible for listing on the NRHP under criterion A; these are the Western Pacific Telegraph Line and Railroad.

There is one resource—the Gerlach Water Tower (NRIS #81000385)—that is listed on the NRHP outside the direct APE; however, it is within a mile of it.

3.2.7 Recreation

Recreation in the region mostly occurs in the Black Rock Desert-High Rock Canyon Emigrant Trails NCA. The NCA's southern boundary is about 4 miles north of the AOI. The NCA and surrounding public lands host a multitude of recreation opportunities, which are described in the 2019 Burning Man Event Special Recreation Permit Final Environmental Impact Assessment (BLM 2019b, p. 3-92); these opportunities typically include motorized and nonmotorized activities, such as nature viewing, driving for pleasure, dispersed camping, hiking, and off-highway vehicle use. Many game species provide opportunities for both wildlife observation and hunting; the AOI is in portions of two Nevada game units (Units 014 and 034; NDOW 2018). There are also opportunities to view wild horses and burros.

The Burning Man Event occurs annually in late August to September on the Black Rock Desert playa in the Black Rock Desert-High Rock Canyon Emigrant Trails NCA. The event is permitted under a special recreation permit (SRP) (BLM 2019b, p. 3-94). The event is the largest SRP issued by the BLM nationwide. During the event, high traffic volumes use SR-447 and CR-34 in the AOI and access the playa using an access road (8-Mile Road) north of the AOI.

Other SRP events not associated with the Burning Man Event occur on the Black Rock Desert playa in the AOI vicinity. These include amateur and experimental rocket launching events, four-wheel drive tours, land speed trials, land sailing, weddings, guided and outfitted camping and horseback trips, and commercial filming and photography (BLM 2019b, p. 3-95).

Recreation also occurs within the Granite Range Special Recreation Management Area (SRMA), which overlaps the AOI (**Figure A-8**, Granite Range Special Recreation Management Area, in **Appendix A**). The SRMA Recreational Management Zone 1, Granite Foothills, is managed for visitor, staff, and maintenance facilities and access to surrounding public lands. It also includes the Guru Road site (BLM 2015a, p. 2-69).

Compared with surrounding public lands, there is relatively little recreational activity in the AOI. This is because of the proximity to the community of Gerlach, private property, commercial operations, developed gravel pits, and abundant high-quality recreation in nearby public lands. However, SR-447 and CR-34 in the AOI provide direct access to recreation opportunities on nearby public lands. The Washoe ArTrail includes existing roadways in the AOI. Washoe County developed the trail in partnership with Burning Man and other community partners; the trail highlights cultural, historic, and artistic regional landmarks (Washoe ArTrail 2022). The trail passes through Gerlach and into the AOI; it includes the Gerlach Water Tower, the western mural on Gerlach's Main Street, and the BLM Black Rock Station on Transfer Station Road in the AOI.

Astrotourism, which is traveling to a destination that has very low light pollution for the purpose of seeing the stars and visiting observatories (Altschuler 2019), is a common recreational activity in the AOI vicinity. Gerlach is known as America's darkest town (Roeder 2017). The Massacre Rim WSA, approximately 60 miles north of Gerlach, is one of 15 locations worldwide to be certified as an International Dark Sky Sanctuary (International Dark-Sky Association 2021). While there are no data available to quantify the number of people who visit the area specifically to engage in astrotourism, according to the Nevada Division

of Tourism, the percentage of visitors who traveled to northern Nevada for the primary purpose of outdoor recreation grew from 3.8 percent in 2015 to 8.0 percent in 2019 (Travel Trak America 2019). This growth in outdoor recreation demand highlights the importance of astrotourism and other nature-related tourism for local economies in northern Nevada.

3.2.8 Special Designations and Visual Resources, Including Night Skies

Special Designations

Lands with Wilderness Characteristics

The 42,700-acre Granite Peak lands with wilderness characteristics (LWC) area is in the Granite Range; most of the area lies north of the AOI. This LWC area possesses sufficient size, naturalness, and outstanding opportunities for either solitude or primitive and unconfined recreation. Approximately 275 acres of the LWC area's southern portion overlap with the AOI (**Figure A-9**, Special Designations, in **Appendix A**). This represents less than 0.01 percent of the entire LWC area. The Winnemucca District RMP Record of Decision allows for multiple-use and sustained-yield objectives in areas identified as having LWC (see Action LWC 1.1 in BLM 2015a, p. 2-45) with appropriate mitigations applied, if needed, to protect LWC criteria.

Visual Resources

Visual Resource Management

BLM-administered lands in the AOI are visual resource management (VRM) Class II[16] and Class III[17] (see **Figure A-10**, Visual Resource Management and Key Observation Points, in **Appendix A**). The AOI is in the northern Basin and Range physiographic province. Basin and Range landscapes in northern Nevada are characterized by elongated, generally north–south-trending mountain ranges separated by broad open basins. This type of landscape allows for long viewing distances. The dominant natural features in and around the AOI are steep, rugged mountains and expansive valleys (the Black Rock Desert playa). Human-made features are structures in Gerlach, paved and dirt roadways and trails, fence lines, utility poles and transmission lines, gravel pits, cleared lots, and communication towers.

The visual contrast rating system provides a systematic way to evaluate proposed projects and to determine whether projects conform to the approved VRM objectives along with identifying mitigation measures to minimize impacts. A visual contrast inventory was done in the AOI using key observation points ~~(KOPs)~~, in accordance with the BLM's VRM system (BLM Manual 8400, Manual H-8410-1, and Manual H-8431).[18] **Appendix D** provides completed visual contrast rating worksheets and photographs from the KOPs.

Night Skies

The night sky refers to the darkness of space and the visibility of stars, planets, and other objects in space. The BLM does not have any policies related to managing the night sky resource (BLM 2022b). Light pollution from ALAN can diminish the night sky resource and disrupt amateur and professional astronomy, lead to human health impacts, disturb wildlife, and affect the characteristics of places being managed for specific natural and cultural resource values.

[16] The objective of VRM Class II is to retain the landscape's existing character. The level of change to the characteristic landscape should be low. Management activities may be seen, but they should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the characteristic landscape's predominant natural features.

[17] The objective of VRM Class III is to partially retain the landscape's existing character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the characteristic landscape's predominant natural features.

[18] Internet website: https://www.blm.gov/programs/recreation/recreation-programs/visual-resource-management.

The broader AOI region that includes Nevada's northwest corner is one of the least populated areas in the US. It has few ALAN sources and is known for its night sky, as described in **Section 3.2.7**, Recreation. The AOI is approximately 75 miles north of the Reno-Sparks metropolitan area, which is the nearest major light source. Winnemucca is approximately 85 miles east of the AOI. Other notable sources of year-round ALAN in the vicinity are the communities of Gerlach and Empire, which are 1 mile and 5 miles from the AOI, respectively; the Hycroft Mine, which is 20 miles northeast of the AOI; and the San Emidio Geothermal Power Plant, which is 20 miles southwest of the AOI. The Burning Man Event, which occurs on the Black Rock Desert playa in late August and early September, is a major contributor of ALAN while the event is active (BLM 2022b).

Sky brightness, typically expressed in the form of luminosity of a celestial object (magnitude [mag]) relative to its distance (arcsec^2), is a commonly used method to quantify the relative darkness of the night sky. The higher the mag arcsec^2 value, the darker the sky and more readily visible the celestial objects are in the sky. As a reference point, during the new moon and with an air quality index near zero, the Massacre Rim WSA has a darkness value of 22.0 mag arcsec^2, which is near complete darkness[19] (see BLM 2022b, Appendix A, Section 4.5).

Sky brightness values in the AOI are slightly lower than in the Massacre Rim WSA. This means the night sky when viewed from the AOI is less dark than it is when viewed from the WSA. During a new moon and outside of the Burning Man Event, the sky brightness at Gerlach is 21.69 mag arcsec^2. During the Burning Man Event, it is 21.36 (see BLM 2022b, Appendix A, Section 4.5). These values for Gerlach are representative of the sky brightness in the AOI due to the proximity of Gerlach to the AOI.

Additional information, including day- and nighttime photographs from KOPs in the AOI vicinity, can be found in the Night Sky Baseline Report (BLM 2022b).

3.2.9 Noise

Ambient sound is the result of combined noise sources in a given area. It is usually measured in A-weighted decibels (dBA), which most closely relates to the way humans perceive sound. The decibel scale is logarithmic, not linear. In other words, two sound levels 10 decibels apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60-dBA sound. Noise from stationary sources lessens at a rate of approximately 6 decibels per doubling of distance, depending on such environmental conditions as topography, vegetation, and weather. **Table 3-10** indicates typical noise levels for common indoor and outdoor situations.

Ambient sound levels have been measured at Transfer Station Road in the AOI, as part of the Burning Man Event Special Recreation Permit Final Environmental Impact Statement (BLM 2019b). Ambient sound was measured between August 23 and 26, 2017, outside of the event. The measured day-night average sound level (DNL)[20] was 63 dBA; the maximum 15-minute L_{eq}[21] was 66 dBA (Salter 2018). The primary sources of

[19] In the Massacre Rim WSA, the lack of ALAN and sky glow makes it possible to view distinct features of the Milky Way and other celestial objects that are otherwise occluded by sky glow and localized ALAN. The sky must be approximately 20.2 mag arcsec^2 or darker for the Milky Way to be seen (Williams 2015). Typical sky brightness for the central portion of a large city can be 15 mag arcsec^2, which allows viewers to see only the brightest objects in the night sky.

[20] The DNL is a descriptor for a 24-hour A-weighted average noise level. The DNL accounts for the increased acoustical sensitivity of people to noise during the nighttime hours. DNL penalizes sound levels by 10 decibels during the hours from 10:00 p.m. to 7:00 a.m. (Salter 2018).

[21] L_{eq} is the equivalent continuous sound level that would contain the same acoustic energy as a varying sound level during the same period.

noise are local ambient noise from traffic on SR-447, CR-34, and Transfer Station Road; overflying aircraft; wind; and wildlife (such as horses neighing in the distance) (Salter 2018).

Sensitive noise receptors are individuals or groups that could be aware of or be affected by changes in ambient noise levels. For example, sensitive noise receptors in and around the AOI include individuals partaking in outdoor recreation, such as camping, visiting cultural sites and hot springs, retracing historic trails, and stargazing, where serenity and quiet are often desired. Sensitive noise receptors also include the community of Gerlach. Additional sensitive noise receptors are wildlife (see **Section 3.2.4**) and areas with special designations, such as NCAs, designated wilderness areas, and WSAs (see **Section 3.2.8**, Special Designations and Visual Resources, Including Night Skies).

Table 3-10
Typical Noise Levels

Common Outdoor Activity	Noise Level (dBA)	Common Indoor Situation
Typical construction site at 50 feet	70–105	—
Jet flyover at 1,000 feet	100	—
Gas lawn mower at 3 feet	90	—
Diesel truck at 50 feet traveling 50 miles per hour	80–85	Food blender at 3 feet; garbage disposal at 3 feet
Congested urban area, daytime	70	Vacuum cleaner at 10 feet
Commercial area with heavy traffic	60	Normal speech at 3 feet
Quiet urban daytime	50	Large business office; dishwasher in next room
Quiet urban nighttime	40	Theater or large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Sources: Caltrans 2013; US EPA 1971

3.2.10 Greenhouse Gas Emissions and Climate Change

Climate change is defined by the Intergovernmental Panel on Climate Change as a change in the state of the climate. This can be identified (for example using statistical tests) by changes in the mean temperature or the variability of its properties that persist for an extended period, typically decades or longer. It refers to any change in climate over time, due to natural variability or as a result of human activity (IPCC 2013).

Nevada's climate is changing. Observed conditions and projected trends include increased average temperatures, punctuated by more severe heat waves, increased drought, reduced winter snowpack and earlier snow melt, more frequent flooding, and increased wildfire driven by more invasive annual grasses and dryer fuels. More detail is provided in Table 1 of Nevada Climate Initiative (2022).

GHGs are compounds in the atmosphere that absorb infrared radiation given off by the earth after it is warmed by the sun. This process traps heat and warms the earth's atmosphere. GHGs are released naturally and by human processes. GHGs influence climate over long time frames and at a global scale.

The NDEP estimated Nevada's statewide GHG emissions in 2019 (the most recent year for which state data have been tabulated) at 40.6 million metric tons of carbon dioxide equivalents (NDEP 2021). The major sectors contributing to Nevada's GHG emissions in 2019 were as follows: transportation (34 percent), electricity generation (29 percent), industry (17 percent), residential and commercial (12 percent), waste

management (4 percent), and agriculture (4 percent). The EPA estimated that national GHG emissions were 6,558 million metric tons of carbon dioxide equivalents in 2019 (US EPA 2021).

GHG emissions near the project area would come from nearby mining and geothermal operations, including the Hycroft Mine and San Emidio Geothermal Plant. Emissions would also come from nearby traffic on roads. Emissions resulting from range and recreational uses are generally minimal. Additional information can be found in **Appendix E**, Greenhouse Gas Emissions.

3.3 ENVIRONMENTAL CONSEQUENCES

3.3.1 Analysis Methods and Assumptions

This section describes the potential effects on resources and resource uses by issue (see **Table 3-1**). It describes effects in terms of their duration (temporary or permanent) and context (local or regional). A temporary effect is one that occurs only during implementation of the alternative, while a permanent effect could occur for an extended period after the alternative's implementation. Where appropriate, the analysis provides recommended avoidance, minimization, or mitigation measures to avoid, reduce, or otherwise offset effects on the specified resource or resource use. Any specific assumptions are identified for each issue.

Ormat would conduct all proposed activities in compliance with all relevant federal, state, and local regulations and permits; applicable geothermal lease stipulations (ORNI 26 LLC ~~2020~~2022, Appendix A); the Winnemucca District's BMPs and standard operating procedures (BLM 2015a, Appendix B); the BMPs in Appendix D of the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western US (BLM and Forest Service 2008); and the requirements and conditions specified in the NEPA decision record. Implementing applicant-committed environmental protection measures (**Section 2.1.7**), and additional BLM-required stipulations (see **Table 3-11**), would further avoid, minimize, or mitigate potential adverse environmental impacts.

The analysis of the environmental consequences of implementing applicable geothermal lease stipulations, applicant-committed environmental protection measures, BMPs, and BLM-required stipulations follows the analysis of direct and indirect effects under each issue. The direct and indirect effects are those that may occur after implementing the measures, as applicable.

Table 3-11
BLM-Required Stipulations

Resource or Resource Use	Required Stipulation	Applicable Issue(s)
Air Quality	To control fugitive dust, vehicle speeds would be limited to 25 miles per hour on gravel roads and 15 miles per hour on dirt roads.	5
Special Designations and Visual Resources	Lights used during night drilling would be limited to those required to safely conduct operations, and would be shielded or directed to focus light on the immediate work area. Lights on drill rig derricks would pulse at the minimum intensity and minimum number of flashes per minute allowable by the Federal Aviation Administration or other applicable regulations.	2

Resource or Resource Use	Required Stipulation	Applicable Issue(s)
Vegetation	Portion of access road not previously surveyed (would apply only to Alternative B: 3-Mile Access Point) • The BLM analyzes specific environmental protection measures as part of the proposed project NEPA documentation process. To ensure that potential impacts on vegetation and special status plants from the proposed project are avoided, minimized, or mitigated, as applicable, pre-construction surveys be conducted in the area before the surface is disturbed. If pre-construction surveys indicate suitable habitat or presence of special status plant species as documented elsewhere in the Biological Resources Baseline Report (Ormat 2021) and EA, then the same recommended measures to avoid, minimize, or mitigate impacts would be applied. • If pre-construction surveys indicate suitable habitat or presence of a special status plant species not already documented elsewhere in the Biological Resources Baseline Report (Ormat 2021) and EA, then additional NEPA documentation would occur. Measures to avoid, minimize, or mitigate impacts would be developed during that additional NEPA process. • Following construction activities, disturbed areas would be seeded by the applicant as directed by the BLM using a BLM-approved native seed mixture and application rate. Any variance in the mix would be coordinated first with the BLM. • Following construction activities, disturbed areas no longer required for operations would be reclaimed to promote the reestablishment of native plant and wildlife habitat. • Prior to any surface-disturbing activities, a special status plant survey is required for the area. Timing of the survey would be dependent on the habitat type and the detectability of the target species. If a special status plant is located, a protective buffer would be delineated in consultation with the BLM Authorized Officer.	5
Water Resources	Spring discharges and monitoring wells would be monitored to allow early detection of potential changes. The monitoring plan (Broadbent and Associates Inc. 2022) outlining monitoring locations, parameters, frequency, and duration would be supplemented with additional monitoring requirements outlined below; additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. I. Water Monitoring Plan A. Ormat will develop a water resource monitoring plan in accordance with BLM and Nevada State regulations. This plan will be submitted to the BLM and applicable agencies (NDWR, NDEP, NDOM, etc.) for approval and implementation prior to drilling any geothermal exploration wells. The BLM Authorized Officer will have final say for all wells on public land. At a minimum, the plan will include the following: Springs: The same surface water sampling locations and monitoring parameters collected for the Hydrologic Evaluation (Stantec 2022a) will continue to be monitored. Private spring locations will be sampled after obtaining permission to enter the sites. Ormat will meet with the landowners to obtain site access for sampling, or written denial. The approved BLM	4

Resource or Resource Use	Required Stipulation	Applicable Issue(s)
	monitoring plan will serve as written documentation to the purpose and need for sampling. The monitoring frequency will be as follows: • Continuous monitoring: Springs will include a continuous (logging interval: 60 minutes) water data logger that includes the following measurements: flow, temperature, pH, conductivity, total dissolved solids, dissolved oxygen, salinity, and oxygen reduction potential. This should be operated using telemetry for ease of collecting data and comparing to potential real time impacts due to drilling and/or testing of geothermal resource confirmation wells. • Monthly monitoring: Parameters included in baseline data collection (NDEP Profile III) with the exception of radionuclides. • Quarterly monitoring: Radionuclides (NDEP Profile R) and isotopic analysis including gross beta, deuterium, carbon 13/14, oxygen 16/18, and lead isotopes. Wells: Up to four monitoring wells will be installed downgradient of the geothermal exploration wells. The locations and monitoring depths of the monitoring wells will be determined based on potential impacts to the upper aquifers and geothermal resource from drilling and testing of the geothermal exploration wells. Monitoring wells may also be installed on the authorized drill pads. At least two monitoring wells will be installed and at least one groundwater sample from each monitoring well will be collected prior to drilling geothermal exploration wells. In addition, any potable water supply wells in the AOI and the Gerlach potable water supply will also be sampled and monitored. The monitoring frequency will be as follows: • Quarterly monitoring: depth to groundwater, parameters included in baseline data collection (NDEP Profile III) with the exception of radionuclides, and radionuclides (NDEP Profile R), isotopic analysis including gross beta, deuterium, carbon 13/14, oxygen 16/18, and lead isotopes. B. After approval of the monitoring plan, begin collection of monitoring data. Upon collection of one month's data (both springs and wells), the data will be submitted to the BLM and applicable agencies for review. After BLM review of this data, exploration drilling can commence. C. During pump testing or flow testing, the continuous spring monitoring data collected by telemetry will be reviewed and evaluated every six hours. The telemetry data should also include an alert or alarm to identify any sudden or unusual changes in the monitoring data. D. Daily review and evaluation of data from springs with continuous monitoring will be required when an exploration well is drilled within one mile of a spring. E. On a monthly basis, Ormat will analyze and identify if the data collected shows any trends (such as flow changes, temperature changes, water quality changes, or similar). This will be reported to the BLM each month and must include well drilling logs and all lithologic logs for the monitoring wells. All raw data must be presented to the BLM, if requested. Ormat will also propose thresholds for potential changes for which mitigations will be required. The following mitigation measures should be included at a minimum with proposed thresholds: 1. Increase monitoring frequency and parameters 2. Add additional monitoring locations	

Resource or Resource Use	Required Stipulation	Applicable Issue(s)
	3. Change drilling operations (i.e., drill wells further away from the affected monitoring points prior to drilling wells closer, add additional casing to separate the aquifers) 4. Cease installation of geothermal exploration well 5. Cease pump testing of geothermal exploration well 6. Provide alternative water supply to affected water users Ormat will also identify which thresholds would require notification within 24 hours to the BLM and applicable agencies. F. The BLM recommends continued evaluation and development of the monitoring plan (adaptive management) based on change points (thresholds). Every monthly report will analyze and identify if the previous data collected shows any trends or change points (i.e., flow changes, temperature changes, water quality changes). Ormat will review thresholds and recommend any amendments, as necessary. G. Monitoring duration will be for the life of the project. II. Water Monitoring on Private Land If the private landowners do not allow monitoring of their springs or wells, Ormat would drill the geothermal exploration wells that are estimated to have the least potential impact to these resources first. This would allow collection of as much water resource information as possible prior to drilling the exploration wells closest to the private springs or wells, potentially preventing or reducing impacts. III. Buffer from Springs In conformance with the BLM Winnemucca District RMP (BLM 2015a), as amended, and the BLM Black Rock Desert-High Rock Canyon Emigrant Trails NCA and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), Ormat will not install any disturbance within 500 feet of a spring or associated wetlands.	
Water Resources	If deemed necessary by the USACE, Ormat would obtain a CWA Section 404 permit and comply with all permit requirements.	5
Wildlife (General, including Special Status Species)	If a special status wildlife species is identified in or near the work area during construction, work near the species would be halted. A qualified biologist would be consulted to determine an appropriate buffer and other protective measures, as applicable. The appropriate resource agencies, including the BLM, USFWS, and/or NDOW, would be notified of the discovery within 24 hours. If avoidance is infeasible, consultation with the appropriate resource agency would be conducted prior to continuing work in the immediate area.	5
Wildlife (General, including Special Status Species)	Ormat would implement the applicable measures described in the NDOW's Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps (NDOW, n.d.). Applicable measures would be determined in coordination with the BLM Authorized Officer.	2, 4
Wildlife (General, including Special Status Species)	Ormat would prevent wildlife access to pits and tanks containing liquids contaminated by substances that may be harmful due to toxicity or with the potential to foul fur or feathers, and liquids at excessive temperatures. Wildlife exclusion could be done by fencing, netting, or otherwise covering liquids when not in active use. If exclusion is not feasible, a hazing program, in conjunction with monitoring, would be implemented (BLM and Forest Service 2008, p. B-17).	4
Wildlife (General, including Special Status Species)	To minimize wildlife trapping hazards in steep-sided or smooth-lined clean-water impoundments, all such impounds would have functional escape ramps (BLM and Forest Service 2008, p. B-17).	2

Resource or Resource Use	Required Stipulation	Applicable Issue(s)
Wildlife (General, including Special Status Species)	Portion of access road not previously surveyed (would apply only to Alternative B: 3-Mile Access Point) • The BLM analyzes specific environmental protection measures as part of the proposed project NEPA documentation process. To ensure that potential impacts on wildlife species and habitat from the proposed project are avoided, minimized, or mitigated, as applicable, pre-construction surveys be conducted in the area before the surface is disturbed. If pre-construction surveys indicate suitable habitat or presence of special status wildlife species as documented elsewhere in the Biological Resources Baseline Report (Ormat 2021) and EA, then the same recommended measures to avoid, minimize, or mitigate impacts would be applied. • If pre-construction surveys indicate suitable habitat or presence of a special status wildlife species not already documented elsewhere in the Biological Resources Baseline Report (Ormat 2021) and EA, then additional NEPA documentation would occur. Measures to avoid, minimize, or mitigate impacts would be developed during that additional NEPA process.	2, 3, 5
Wildlife (Eagles and Other Raptors)	Bald or golden eagles, or both, may now or hereafter use the project area. The BLM would not issue a notice to proceed for any project that is likely to result in take of bald eagles or golden eagles until the applicant completes its obligation and demonstrates compliance with the Bald and Golden Eagle Protection Act (Eagle Act). This includes coordination with the USFWS on agreed-upon measures to avoid take, or obtaining an eagle take permit, should take be unavoidable. The BLM hereby notifies the applicant that compliance with the Eagle Act is a dynamic and adaptable process that may require the applicant to conduct further analyses and mitigation following assessment of operational impacts. Any additional analysis or mitigation required to comply with the Eagle Act would be developed with the USFWS and coordinated with the BLM (WO-IM-2010-156; https://www.blm.gov/policy/im-2010-156).	2, 3, 5
Wildlife (Eagles and Other Raptors)	Each year, western burrowing owl clearance surveys would be conducted prior to surface disturbance in suitable habitat during the nesting season (March 1 through August 31). A qualified biologist would conduct the surveys and follow the BLM Winnemucca District Office protocol. If active burrow(s) are detected, an avoidance buffer of no less than 250 feet would be established and avoided to prevent destruction or disturbance to burrows. The buffer would remain in place until young have fledged or the burrow is no longer active, as confirmed by burrow monitoring. If no active burrows are present, surface disturbance could commence within 10 days of the survey.	2, 3, 5
Wildlife (Greater Sage-Grouse)	The project would comply with Nevada State Executive Order 2018-32, which could include coordination with the Sagebrush Ecosystem Technical Team on the application of a compensatory mitigation program, such as the Nevada Conservation Credit System for mitigating activities that result in greater sage-grouse habitat loss and degradation in Nevada. Under this system, the application of compensatory mitigation would occur on, or the credit would be applied to, disturbance on BLM-administered lands.	2, 3, 5

Resource or Resource Use	Required Stipulation	Applicable Issue(s)
Cultural Resources	All cultural resources that are eligible or unevaluated for listing on the NRHP would be avoided. When ground-disturbing project activities would occur within 30 meters (98 feet) of a NRHP-eligible or unevaluated cultural resource, an archaeological monitor would be present to ensure resources are not disturbed. Temporary or permanent fencing around NRHP-eligible or unevaluated cultural resources could be installed to prevent disturbance, if the BLM Authorized Officer determines it is necessary. Employees, contractors, and suppliers would be instructed that all cultural resources are protected, and that if previously undiscovered resources are encountered, the resources will be left in place and reported to the BLM by the responsible Ormat representative.	5

Sources: cited in the table

3.3.2 Issue 1: How would geothermal exploration affect GHG emissions?

Analysis Area and Assumptions

It is not currently possible to correlate local GHG emissions with specific, local climate effects. The magnitude of the potential effects of GHGs emitted by a specific source can be roughly assessed by comparing the amount of GHGs emitted to state and national emission inventories. Climate effects related to the proposed action would consist of an increase in currently observed climate effects proportional to the increase in total state and national emissions related to the proposed action. See **Section 3.2.10** for a description of currently observed climate change impacts in Nevada.

Alternative A: Proposed Action

The use of drilling rigs and vehicles powered by internal combustion engines would generate approximately 5,519 tons (5,007 metric tons) per year of GHG emissions during the proposed action (see **Appendix E**). This would represent approximately 0.012 percent of the 2021 statewide GHG emissions (40.6 million metric tons) reported by the NDEP. It would represent approximately 7.63×10^{-5} percent of the 2021 national GHG emissions (6,558 million metric tons) reported by the US EPA. This would be a relatively small contribution to state and national GHG emissions, and would have a correspondingly small contribution to climate change.

Alternative B: 3-Mile Access Point

GHG emissions and associated effects would be the same as those described for Alternative A.

Alternative C: Existing Well 68-3 Access Point

GHG emissions and associated effects would be the same as those described for Alternative A.

Alternative D: No-Action Alternative

There would be no GHG emissions because Ormat would not construct the project. GHG emissions from regional sources would continue to occur.

3.3.3 Issue 2: How would the presence of equipment, fencing, traffic, and personnel affect resources in the AOI?

Analysis Area and Assumptions

The analysis area for both direct and indirect effects is the project area. The analysis area for indirect effects on cultural resources is defined as the indirect APE for cultural resources; the indirect effects analysis area for special designations and visual resources is the viewsheds from which proposed project elements ~~would~~ could be visible. Once a visual effect on a resource is determined, that is considered a direct effect.

Alternative A: Proposed Action

Recreation

Alternative A would temporarily increase the amount of equipment, project traffic, and ground disturbance visible from the Granite Range SRMA. Alternative A also would permanently increase the amount of development visible from this area in the form of well pads and access roads. However, numerous developed areas in the AOI are already visible from the SRMA, such as traffic on CR-34 and SR-447, gravel pits, and other municipal and commercial developments around Gerlach. As such, effects on the recreation setting would be minor.

Access to recreation opportunities may be temporarily restricted in the immediate work area during construction, displacing visitors from localized areas. However, numerous other access points to the same opportunities would remain open during construction. Visitors would be permanently displaced from fenced well pads, but this would not restrict access to recreation opportunities in the vicinity. As such, effects from restricting or displacing recreation opportunities would be minor.

Proposed Mitigations

There would be no specific mitigation measures for recreation. However, implementing measures to avoid, reduce, or mitigate visual-related impacts on other resources would directly and indirectly reduce the potential for Alternative A to change the recreation setting.

Wildlife (General and Sensitive Species) and Migratory Birds

Proponents of projects that would involve human disturbances in or within 3.7 miles (6 kilometers) of PHMAs, GHMAs, or OHMAs are required to consult with the Nevada Sagebrush Ecosystem Technical Team to determine whether mitigation is necessary. Ormat has ~~initiated coordination~~coordinated with the team. To date, the team has not recommended any additional habitat quantification or mitigation measures beyond the applicant-committed environmental protection measures (**Section 2.1.7**) already included in this EA.

A comprehensive review of the effects of ALAN on wildlife species is included in the Night Sky Baseline Report (BLM 2022b, Section 3.3). In summary, ALAN has been shown or is inferred to have a number of effects on wildlife, as described below. Minimizing lighting during drilling operations would minimize, but not eliminate, the potential for these effects. The following effects would be temporary, lasting the duration of drilling:

- There could be disruption of small mammal movement and foraging patterns and increased predation risk from increased visibility.
- Amphibians, including frogs and toads, could experience increased risk of predation and vehicle strike on roads, changes in reproductive activity, and movement disruptions. Frogs and toads have been observed to congregate at lights to forage on insects attracted to such lighting, but this could make them more susceptible to vehicle collisions on nearby roads.
- ALAN could attract nocturnal insects, including insect pollinators, in the immediate vicinity. Insects attracted to the lighting could then attract insect-eating birds or bats, leading to increased mortality of insects and successful predation for birds and bats.
- ALAN could disorient migrating birds or attract birds away from suitable stopover habitat, causing unanticipated energy expenditure. The potential for bird/structure collisions could increase for night-migrating species, which could become disoriented by nighttime lights on tall structures, particularly during inclement weather.

Using wildlife-friendly fencing, netting, or other coverings to exclude wildlife from sumps, tanks, and impoundments, including drill reserve pits, containing hot or contaminated liquids and other constituent chemicals would minimize the potential for hazards to migratory birds, bats, and other wildlife from exposure to detrimental substances or entrapment.

Vehicles can collide with wildlife, causing injury or mortality. There could be an additional risk for scavenger species, such as turkey vultures (*Cathartes aura*), ravens, and raptors, foraging along roads. Also, risks could increase for perching bird species, such as horned larks, whose concentrations have been observed to increase along newly constructed roads in sagebrush habitats (Inglefinger and Anderson 2004).

Domestic sheep trailing would likely overlap temporally with the project. The BLM would not anticipate that the presence of project equipment and personnel would cause a higher probability of interaction between domestic sheep and bighorn sheep, which in turn would increase the potential for pathogen transmission between domestic and non-domestic animals. This is because trailing is typically centered on SR-447 and CR-34, which would not be obstructed by project equipment, and because only one well would be drilled at a time. This would limit the area over which equipment and personnel are distributed at a given time. Further, bighorn sheep could be more likely to temporarily avoid the project area due to increased noise and activity, lowering the potential for interaction with domestic animals.

Proposed Mitigations

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**), including restricting cross-country travel to designated construction areas and imposing speed limits of 35 miles per hour on unpaved roads, would minimize the potential for vehicle collisions with wildlife.

BLM-required stipulations (**Table 3-11**) would minimize the potential for effects on wildlife from project elements, equipment, and personnel. These stipulations include:

- Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in **Table 3-11**, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
- Lights on drill rig derricks would pulse at the minimum intensity and minimum number of flashes per minute allowable by the Federal Aviation Administration or other applicable regulations. Also, lights used during night drilling would be limited to those required to safely conduct operations; these lights would be shielded or directed to focus light on the immediate work area.
- Adhering to applicable measures, as determined by the BLM and the NDOW (described in the NDOW's Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps), would minimize the potential for wildlife impacts from exposure to detrimental substances associated with geothermal reserve pits.
- To minimize wildlife hazards from pits and tanks containing harmful liquids, Ormat would prevent wildlife access to liquids contaminated by substances that could be harmful due to toxicity or with the potential to foul fur or feathers, and liquids at excessive temperatures. Wildlife exclusion could be done by fencing, netting, or otherwise covering liquids when not in active use. If exclusion is not feasible, a hazing program, in conjunction with monitoring, would be implemented (BLM and Forest Service 2008, p. B-17).
- To minimize wildlife trapping hazards in steep-sided or smooth-lined clean-water impoundments, all such impounds would have functional escape ramps (BLM and Forest Service 2008, p. B-17).

Special Designations and Visual Resources, Including Night Skies

Special Designations

Alternative A would not have direct effects on the Granite Peak LWC area because proposed project elements would be outside the area. Minor, ~~indirect~~ mainly temporary effects would occur because proposed project elements would be visible from portions of the LWC area. This would be on the steeply sloping southeast-facing flank of the Granite Range above the AOI, where proposed project elements would be located within approximately 0.1 mile of the LWC area. The proximity and visibility of proposed project elements would reduce opportunities and feelings of solitude or primitive and unconfined recreation for visitors in the LWC area.

This effect would be minor because numerous nearby developed areas are already visible from this portion of the LWC area, including traffic on CR-34 and SR-447, gravel pits, and other municipal and commercial developments around Gerlach. As a result, opportunities and feelings of solitude or primitive and unconfined recreation are already low.

According to BLM Manual 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process, the BLM is not required to protect wilderness characteristics as a priority over other resource values and multiple uses.

Visual Resource Management

Proposed project elements and equipment would be noticeable from project KOPs; however, they would not dominate the view of the casual observer (see a map of KOPs in **Figure A-10** and visual contrast rating worksheets and photographs from KOPs in **Appendix D**). The proposed project elements would repeat the basic elements present in the landscape character; this is because there are already nonnatural lines and forms, namely CR-34 and SR-447, dirt roads, fences, power lines, and other municipal and commercial developments in and around Gerlach. Access roads, wellheads, and well pad fences would be visible to the casual observer, but they would be below the horizon line and would not attract attention. Further, wellheads would be painted a color consistent with BLM visual color guidelines; the color would blend with the surrounding landscape to minimize visibility. To provide an example of the visual appearance of proposed well pads and sumps, **Figure A-12** in **Appendix A** provides representative photographs of existing geothermal development in the AOI.

Following construction, areas of disturbed land no longer required for operations would be reclaimed, and fences would be removed. Taking these measures into account, the degree of contrast and modification imposed on the landscape by the project would be minor. This is within the parameters of the VRM Class II objective to retain the landscape's existing character, and Class III objective to partially retain the landscape's existing character. Accordingly, the project would be in conformance with VRM guidelines and policy (BLM Manual 8400, Manual H-8410-1, and Manual H-8431).

Night Sky Conditions

Anticipated changes in ALAN, radiance, and sky glow would have temporary effects on the Granite Peak LWC area. This is because light generated by drilling would be discernible from portions of the LWC area. This would be particularly true on the steeply sloping southeast-facing flank of the Granite Range above the AOI, where proposed project elements would be located within approximately 0.1 mile of the LWC area. Viewers in this area would experience reduced opportunities and feelings of solitude or primitive and unconfined recreation.

This effect would be minor for several reasons. First, under a worst-case scenario, which assumes 1.5 times the amount of expected lighting would be produced, the radiance of the drill rig would increase to a level equivalent to the observed radiance of Gerlach (BLM 2022b, p. 3-4); actual lighting produced would be lower, and measures to reduce the amount of light produced would be in effect. Numerous sources of nearby

ALAN are present in this area, primarily from Gerlach and Empire. As a result, night sky conditions and associated opportunities and feelings of solitude or primitive and unconfined recreation are already low in this area. Finally, effects would be temporary, lasting the duration of construction.

In other portions of the LWC area farther from drilling, effects would be negligible. This is because from the perspective of viewers in other portions of the LWC area, the topography would directly obscure drilling in the AOI. Further, since existing ALAN in the region already affects night sky conditions, anticipated changes in conditions would be indistinguishable (BLM 2022b, p. 3-4).

Proposed Mitigations

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**), including reclaiming temporarily disturbed areas and painting wellheads a color that blends with the surrounding landscape, would reduce the intensity of effects on visual resources from project elements and equipment. Paint used on wellheads would be consistent with BLM visual guidelines to blend with the area and minimize visibility.

Per BLM-required stipulations (**Table 3-11**), lights used during night drilling would be limited to those required to safely conduct operations, and they would be shielded or directed to focus light on the immediate work area.

There would be no specific mitigation measures for special designations. However, implementing the measures above to avoid, reduce, or mitigate visual-related impacts would reduce the potential for Alternative A to affect wilderness characteristics in the Granite Peak LWC area.

Cultural Resources (National Historic Trails)

Two of the geothermal leases in the AOI (NVN-98641 and NVN-100029) were leased in 2019 and 2020, respectively. Both leases contain no surface occupancy (NSO) stipulations for trails, including NHTs, as required under the BLM Winnemucca District RMP (BLM 2015a), as amended. Six proposed wells (86-16, 67-16, 45-16, 37-16, 62-20, and 11-21) are within trail NSO areas and would require a stipulation waiver to be drilled. A waiver would require the BLM to consult with the NPS, Nevada State Historic Preservation Office, and other interested public entities under the NHPA. Similarly, proposed wells 37-16 and 62-20 are also within NRHP-eligible sites with a NSO stipulation; they also would require waivers to be drilled. The required analysis and consultations to procure waivers are not included in Alternative A. As a result, these six wells would not be permitted, and direct effects on NHTs would not occur.

Geothermal leases NVN-75228 and NVN-55718 were leased in 2001 and 1992, respectively. At the time these leases were sold, the Sonoma-Gerlach Management Framework Plan was the planning document in effect. Unlike the BLM Winnemucca District RMP mentioned above, this plan did not include similar trails stipulations. The remaining proposed wells are within these lease areas; as a result, they would not be subject to the trail NSO stipulation. However, the plan does provide the BLM discretion to stipulate restrictions for surface use in direct conflict with cultural resources eligible for listing on the NRHP. ~~Proposed~~ Previously proposed well 83-16 would be located directly on such a resource. For this reason, the well would not be permitted without a similar additional analysis and consultations, as described above. As a result, this well would not be permitted, and the direct effects on the eligible resource would not occur. As a result of this finding, Ormat moved previously proposed well pad 83-16 so it is no longer located on an eligible resource and assigned it a new identifying number, 84-16. As a result, direct effects on the eligible resource from this well pad would not occur.

The anticipated effects on cultural resources from the ~~13~~ 12 remaining wells and other project components are discussed below.

A visual effects analysis was done at KOPs in and around the indirect APE, including at the Nobles Trail section of the California NHT, the Gerlach Cemetery, and the Gerlach Water Tower. There is the potential for temporary, ~~indirect~~visual, adverse effects on the setting, feeling, and association of eligible or unevaluated sites, including the NHT and Gerlach Cemetery. Temporary adverse effects would occur from the visual and noise intrusion of construction activity during well drilling, which typically would last up to 45 days per well. While temporary changes in the visual and noise baseline conditions of the area would occur, these would be resolved upon completion of the ~~exploration project~~drilling and reclamation of the well pad. The KOP assessment also found that effects on the Gerlach Water Tower would be similarly limited since the view of the project from the water tower is already obstructed by Gerlach's existing built environment.

There is also the potential for similar temporary, ~~indirect~~visual, adverse effects on Great Boiling Spring. The KOP analysis was not completed for this site because it is on private surface. The site is similar in location to the Nobles Trail section of the California NHT and would be similarly affected. The 2006 Final Ethnographic Assessment (Bengston 2006) identified Great Boiling Spring as a potential ritual site for Northern Paiutes, but no tribes have offered any further information on Great Boiling Spring as part of the consultation process.

There is also the potential for temporary, ~~indirect,~~ adverse effects ~~on the setting, feeling, and association~~ from anticipated changes in the ALAN, radiance, and sky glow due to nighttime drilling. This is because light generated by drilling would be discernible from eligible and unevaluated sites. This effect would be minor for several reasons. First, under a worst-case scenario, which assumes 1.5 times the amount of expected lighting would be produced, the radiance of the drill rig would increase to a level equivalent to the observed radiance of Gerlach (BLM 2022b, p. 3-4). Actual lighting produced would be lower, and measures to reduce the amount of light produced would be in effect. Numerous sources of nearby ALAN are present in this area, primarily from Gerlach and Empire. As a result, night sky conditions and the associated setting, feeling, and association are already compromised in this area. Finally, effects would be temporary, lasting the duration of construction.

Permanent impacts on the integrity of the setting, feeling, and association of eligible or unevaluated sites are not expected. This is because—with the exception of proposed well 83-16 discussed above—proposed project components would not be sited on these resources themselves. No significant indirect effects on other cultural resources ~~would be~~are expected to occur.

Proposed Mitigations

Since well pads 86-16, 67-16, 45-16, 37-16, 62-20, 11-21, and the previously proposed well pad 83-16 are dropped from the analysis and will not be permitted due to NSO lease stipulations, there~~There~~ would be no specific mitigation measures for cultural resources because there would be no significant visual or noise impacts. However, implementing measures to avoid, reduce, or mitigate visual and noise impacts on other resources would directly and indirectly reduce the potential for Alternative A to affect the integrity of the setting, feeling, and association of cultural resources.

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**), including reclaiming temporarily disturbed areas and painting wellheads a color that blends with the surrounding landscape, would reduce the intensity of effects on visual resources from project elements and equipment. Paint used on wellheads would be consistent with BLM visual guidelines to blend with the area and minimize visibility. These measures also include using mufflers on all drilling rig engines and using a rock muffler to attenuate steam venting noise during well testing.

Per BLM-required stipulations (**Table 3-11**), lights used during night drilling would be limited to those required to safely conduct operations. They would be shielded or directed to focus light on the immediate work area.

Alternative B: 3-Mile Access Point

Recreation

Potential effects on recreation would be similar to those described for Alternative A. Because access to proposed well pads 71-3, 63-3, 66-3, and 58-3 would be from the 3-Mile Access Point under Alternative B, visitors wishing to access the Black Rock Desert playa at this location could be temporarily delayed by construction traffic accessing these well pads. This effect would be negligible. This is because the delays would be temporary, lasting only minutes, and because other playa access points would remain open and unobstructed by project equipment and traffic.

Proposed Mitigations

There would be no specific mitigation measures for recreation. However, implementing measures to avoid, reduce, or mitigate visual-related impacts on other resources would directly and indirectly reduce the potential for Alternative B to change the recreation setting.

Wildlife (General and Sensitive Species) and Migratory Birds

The effects on wildlife and migratory birds would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Special Designations and Visual Resources, Including Night Skies

The effects on the Granite Peak LWC area, VRM, and night sky conditions would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Cultural Resources (National Historic Trails)

The effects on cultural resources would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Alternative C: Existing Well 68-3 Access Point

Recreation

The effects on recreation and the proposed mitigations under Alternative C would be the same as those described under Alternative A.

Wildlife (General and Sensitive Species) and Migratory Birds

The effects on wildlife and migratory birds would be the same as those described under Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Special Designations and Visual Resources, Including Night Skies

The effects on the Granite Peak LWC area, VRM, and night sky conditions would be the same as those described under Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Cultural Resources (National Historic Trails)

The effects on cultural resources would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Alternative D: No-Action Alternative

There would be no effects from the presence of project elements, equipment, or personnel. This is because Ormat would not construct the project. Existing recreation experiences, opportunities, and access would be unchanged. Existing development and night sky conditions associated with and influenced by development in and around Gerlach would remain unchanged, as would opportunities and feelings of solitude or primitive and unconfined recreation for visitors in the Granite Peak LWC area. Wildlife would also continue to be

affected by existing ALAN from these sources. The potential for pathogen transmission between domestic sheep and bighorn sheep in the Granite Range would continue during periodic trailing activities. There would be no changes to the existing form, color, line, or texture, in accordance with BLM VRM guidelines; this is because project elements would not be built.

3.3.4 Issue 3: How would ambient noise levels change and what would be the effect on sensitive resources?

Analysis Area and Assumptions

Noise-generating sources from the proposed action would come from stationary and mobile equipment. Stationary equipment is a point source, meaning noise from the source propagates outward in all directions (Caltrans 2013). Stationary equipment would be the primary noise source for the proposed action. This includes the drill rig, rig engines (generators), pumps, and light plants. Mobile equipment is a line source, meaning the noise is spread out in a linear direction as the source moves (Caltrans 2013). Mobile equipment includes trucks, dozers, and excavators. **Table 3-12** summarizes the typical noise levels associated with the stationary and mobile equipment proposed for the project. Typical noise levels reported in the table are from a distance of 50 feet from the source; the exception is the large rotary drill rig, which generates a range of noise levels observed at the noise source by Ormat drilling contractors; these noise levels can be considered maximum expected values.[22]

Since noise from stationary sources lessens at a rate of approximately 6 dBA per doubling of distance, noise receptors occurring 1 to 2 miles outside the project area (approximately 5,300–10,500 feet away) would likely experience noise levels that are comparable with current conditions (see **Section 3.2.10**, Noise). As such, the analysis area for noise effects is the project area plus a 2-mile buffer around this area. Effect intensity would depend on the distance from the project area and on the receptor's sensitivity.

Table 3-12
Project Noise Sources

Source Type	Source	Quantity	Daily Use Hours	Typical Noise Level (dBA) at 50 Feet from Source
Stationary	Large rotary drill rig	1	24	91–106[1]
	Rig generators	3	24	82
	Light plant	12	12	85
	Pumps	14	24	77
Mobile	Grader, excavator, water truck	1 each	10	85
	Front-end loader	1	10	80
	Tractor trailer	25 or more	4	84
	Small trucks	8	4	55

Sources: BLM 2022b; Caltrans 2013; ORNI 26 LLC 2022; Ormat 2022b

[1] Approximate noise levels at the noise source, as reported from Ormat drilling contractors and not based on noise models or studies. Values can be interpreted as maximum expected values.

All action alternatives would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)).

Alternative A: Proposed Action

Recreation

Construction noise could temporarily impact the recreation setting. Primarily, noise could affect experiences of isolation and remoteness, reducing the potential for positive recreation outcomes. The greatest potential

[22] Email from Kim Carter, Ormat, to Morgan Trieger, EMPSi, on February 28, 2022, regarding Gerlach Geothermal Exploration Project EA - drilling noise question.

for this effect would be in the Granite Peak LWC area and the Granite Range SRMA. However, effects in these areas would be minor for several reasons. First, noise effects would be mostly limited to the portions of these areas on the steeply sloping southeast-facing flank of the Granite Range above the AOI. Recreation opportunities in this area are limited due to the rugged, steep terrain and lack of access roads, trails, or other facilities. Further, this area is already subject to noise effects from traffic on CR-34, vehicles driving on the Black Rock Desert playa, operations in the existing gravel pits in the AOI, and other noise emanating from day-to-day activities in Gerlach. As a result, the potential for experiences of isolation and remoteness are lower in this area than elsewhere in the LWC area and SRMA. Any noise effects in these areas would also be temporary, lasting the duration of construction.

Construction noise is not anticipated to affect the recreation setting in the Black Rock Desert-High Rock Canyon Emigrant Trails NCA; this is because the NCA's southern border is about 4 miles away from the AOI, and the NCA Act of 2000 does not designate a buffer around the NCA border. At this distance, noise receptors would experience noise levels that are comparable with current conditions.

Proposed Mitigations

There would be no specific mitigation measures for recreation. However, complying with the BLM regulation for noise thresholds for geothermal operations mentioned above, and implementing measures to avoid, reduce, or mitigate noise-related effects on other resources would directly and indirectly reduce the potential for noise from Alternative A to affect the recreation setting or experiences.

Wildlife (General and Sensitive Species) and Migratory Birds

While Ormat would use both stationary and mobile noise sources up to 24 hours a day, stationary sources would have the most potential to displace wildlife. This is because noise levels surrounding the stationary source would remain more or less constant, as would the attendant displacement effects. The project would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)).

Stationary and mobile noise sources could temporarily displace wildlife from suitable habitat in the project area. This could reduce breeding or nesting success, especially if species are displaced during sensitive life cycle periods. Noise could also affect foraging opportunities or effectiveness. Generally, these effects would last only as long as the duration of the project activity, including during well pad and road construction, well drilling, and well testing.

Implementing eagle conservation measures (Ormat 2022a, Table 5) would reduce the potential for noise effects on golden eagles in the Granite Range. Construction would not occur within 1 mile of occupied golden eagle nests between January 15 and April 6, or until an occupied nest is no longer in use (typically by August 30; see CM-1 in Ormat 2022a). Ormat would use rock mufflers during well testing (CM-8 in Ormat 2022a); these devices attenuate steam venting noise. As a result of these measures, construction noise would be unlikely to disrupt golden eagle nesting, reduce nest productivity, or cause nest abandonment.

Construction would not occur near active burrowing owl burrows or migratory bird nests during the burrowing owl and migratory bird breeding season (March 1 through August 31). Thus, construction would be unlikely to cause nest failure or abandonment.

Since it would occur 24 hours a day, noise from well drilling could disrupt bat foraging behavior by acoustic masking, attentional distraction, and avoidance response (Barber et al. 2009). These effects would last through the duration of drilling activities.

Temporary project construction noise could displace big game species from habitat in or near the project area. This includes bighorn sheep and mule deer in the Granite Range and pronghorn antelope, whose distribution is more widespread in and around the AOI (Ormat 2021, Appendix B).

Greater sage-grouse using habitat management areas in and around the AOI could experience temporary noise effects during project activities. The effects would be limited to habitat management areas within 2 miles of the AOI, which includes approximately 1,767 acres of OHMAs and 85 acres of GHMAs (BLM GIS 2022). This is because, due to typical noise attenuation rates as described in the *Analysis Area and Assumptions*, noise receptors occurring 1 to 2 miles outside the project area would likely experience noise levels that are comparable with current conditions. Because there are no known greater sage-grouse lek sites within 4 miles of the AOI, noise effects on leks are not anticipated to occur.

Proposed Mitigations

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**) would reduce the potential for noise effects on wildlife. These measures include using mufflers on all drilling rig engines and using a rock muffler to attenuate steam venting noise during well testing.

Ormat would avoid the effects from construction noise on breeding golden eagles by implementing measures described in the project's USFWS-approved eagle conservation plan (Ormat 2022a).

Implementing BLM-required stipulations (see **Table 3-11**) would avoid construction noise impacts on breeding burrowing owls and migratory birds because construction would occur outside the breeding season. If construction must occur during this period, pre-construction surveys would be conducted. Ormat would avoid active nests near the construction area by using an appropriate buffer, as determined in coordination with the BLM. Buffers would remain in effect until young have fledged or the nest has failed, subject to BLM approval.

Special Designations and Visual Resources, Including Night Skies

Construction noise could temporarily impact the naturalness character in portions of the Granite Peak LWC area. As described above in *Recreation*, this effect would be most pronounced on the steeply sloping southeast-facing flank of the Granite Range above the AOI. The naturalness character in this area is already degraded by noise effects from traffic on CR-34, vehicles driving on the Black Rock Desert playa, operations in the existing gravel pits in the AOI, and other noise emanating from day-to-day activities in Gerlach. As a result of these existing conditions, the addition of temporary construction noise would be a minor effect.

Proposed Mitigations

The Winnemucca District RMP Record of Decision allows for multiple-use and sustained-yield objectives in LWC areas (see Action LWC 1.1 in BLM 2015a, p. 2-45) with appropriate mitigations applied, if needed, to protect wilderness characteristics. Implementing applicant-committed environmental protection measures (see **Section 2.1.7**) would reduce the potential for noise effects on the LWC area. These measures include using mufflers on all drilling rig engines and using a rock muffler to attenuate steam venting noise during well testing.

Cultural Resources (National Historic Trails)

Noise effects on cultural resources are analyzed in **Section 3.3.3**.

Alternative B: 3-Mile Access Point

Recreation

The potential for noise from Alternative B to affect the recreation setting or experiences would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Wildlife (General and Sensitive Species) and Migratory Birds
The potential for noise from Alternative B to affect wildlife and migratory birds would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Special Designations and Visual Resources, Including Night Skies
The potential for noise from Alternative B to affect wilderness characteristics in the Granite Peak LWC area would be the same as described for Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Cultural Resources (National Historic Trails)
Noise effects on cultural resources are analyzed in **Section 3.3.3**.

Alternative C: Existing Well 68-3 Access Point
Recreation
The potential for noise from Alternative C to affect the recreation setting or experiences would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Wildlife (General and Sensitive Species) and Migratory Birds
The potential for noise from Alternative C to affect wildlife and migratory birds would be the same as those described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Special Designations and Visual Resources, Including Night Skies
The potential for noise from Alternative C to affect wilderness characteristics in the Granite Peak LWC area would be the same as described for Alternative A. The proposed mitigations also would be the same as those described under Alternative A.

Cultural Resources (National Historic Trails)
Noise effects on cultural resources are analyzed in **Section 3.3.3**.

Alternative D: No-Action Alternative
There would be no construction-related noise because there would be no construction authorized under Alternative D; thus, the effects on recreation, wildlife, special designations, and cultural resources described for the action alternatives would not occur. Noise from existing activities in the AOI, including traffic on CR-34 and SR-447, gravel pit operations, vehicle use on the Black Rock Desert playa, and day-to-day activities in Gerlach, would continue to affect the recreation setting, wildlife, and the naturalness character in portions of the Granite Peak LWC area in the vicinity of the AOI.

3.3.5 Issue 4: How would geothermal exploration affect the geology, mineral rights, and water resources?

Analysis Area and Assumptions
The analysis area for water resources is the hydrologic evaluation study area described in **Section 3.2.1**, Water Resources, and the project Hydrologic Evaluation (Stantec 2022a). The analysis area for other resources analyzed under this issue is the project area.

Alternative A: Proposed Action
Geology and Minerals
Direct impacts on surface geology would be limited to the areas proposed for well pad and access road construction and gravel pit expansion. Impacts on surface geology would be temporary where reclamation

is proposed, such as well pad shoulders. Where reclamation is not proposed, such as the portion of well pads that would remain cleared for maintenance and monitoring, the effects would be permanent.[23] The effects also would be permanent in the proposed gravel pit expansion.

Under certain circumstances, increased pore pressures resulting from fluid injection can trigger earthquakes (Nicholson and Wesson 1990), including from development of enhanced geothermal systems (EGS; Zang et al. 2014; McGarr et al. 2015). EGS activities are not proposed; however, proposed injectivity tests, in which geothermal fluid produced during well testing would be injected back into the well and the geothermal reservoir (see **Section 2.1.2**), could have the potential to induce earthquakes. This is because fluid injection is a component of both EGS and the proposed injectivity test.

The potential for this effect and its magnitude would vary depending on several factors, such as the injection site's proximity to a fault or fracture and the hydrologic properties of the receiving reservoir. As a general example, as discussed in the Department of Energy's Protocol for Addressing Induced Seismicity Associated with Enhanced Geothermal Systems (Majer et al. 2012) and the Best Practices for Addressing Induced Seismicity Associated with Enhanced Geothermal Systems (Majer et al. 2016), earthquakes induced in EGS fields generally range from magnitude 2 (insignificant) to about 3.5 (locally perceptible to humans).

Valid existing leases would continue to be managed under stipulations in effect when the leases were issued. Any operations on existing leases would continue to be subject to conditions of approval by the BLM Authorized Officer.

Proposed Mitigations

There would be no specific mitigation measures for geology and minerals.

Water Resources (Surface and Ground)

The project could potentially affect water resources in the following ways: (1) direct disturbance in, or increased erosion and sediment transport into, wetlands and riparian areas; (2) alterations to the spring discharge quantity or quality; (3) alterations to the shallow groundwater aquifer or geothermal reservoir quantity or quality; or (4) permittees being unable to fulfill their water rights' intended beneficial use.

Ormat would not anticipate direct disturbance in, or increased erosion and sediment transport into, wetlands and riparian areas. This is because exploration activities would incorporate a riparian habitat buffer of 500 feet, subject to modification or exception, in accordance with geothermal lease stipulations (NV-B,C,W-10-B-CSU; see ORNI 26 LLC 2022, Appendix A for full lease stipulations). The project would also minimize cut and fill activities and follow stormwater BMPs in the stormwater pollution prevention plan, which would prevent stormwater sediment transport from disturbance in uplands into wetlands and riparian areas.

Implementing a water monitoring plan (see BLM-required stipulations in **Table 3-11**) would reduce, but not eliminate, the potential for the water quantity and quality effects described in this section. When monitoring the water quantity and quality and implementing adaptive management and mitigation measures, there is the potential for a time lag between detectable and maximum effects in surface expression. This results in maximum impacts that are larger than those observed even after measures are implemented. Further, the recovery to baseline states could occur slowly (see, for example, Bredehoeft and Durbin 2009). Therefore, monitoring and mitigation measures would minimize, but could not completely avoid, long-term effects on the water quantity and quality.

[23] If Ormat does not move forward with the project, or abandons the lease(s), wells could be abandoned and plugged, and the surface could be reclaimed, as described in **Section 2.1.8**.

During drilling, the potential exists for geothermal fluids to mix with the shallow groundwater aquifer, potentially affecting the water quality, including temperature, of spring discharges and the associated surface water features. The potential for this effect is low, because Ormat would case exploration wells to comply with the DOI's Geothermal Resources Operational Order No. 2 (DOI 1975) and the NDOM requirements to prevent commingling of geothermal fluids and underground aquifers.

Regardless of construction water source, water would be provided by an established utility or under permit or temporary change application or waiver issued by the State Engineer's Office with a manner of use acceptable for the project water needs. If sourcing construction water from shallow water wells in the AOI, there is the potential to temporarily reduce spring discharge rates or lower groundwater well levels and productivity for other groundwater users in the local hydrologic basins. Drilling each proposed exploration well would require approximately 1.845 million gallons, or 6.8 acre-feet.[24] As shown in **Table 3-6**, adopted perennial yields for the local hydrographic basins are between 200 and 30,000 acre-feet per year. If the quantity of surface water discharge or groundwater levels were reduced, vested and other water rights could be indirectly impacted as permittees could be temporarily unable to fulfill their water rights' intended beneficial use. Additionally, wetlands that are hydrologically fed by spring discharge could be adversely affected. Conversely, purchasing water from outside the local hydrographic basins and transporting it to the project site would have no effects on spring discharge rates, wetland conditions, or water rights in the local hydrologic basins.

During short- and long-term well testing at each well, geothermal fluids would be discharged to reserve pits or containers (geothermal fluids would not be discharged to the ground). This could affect the volume of the geothermal reservoir. The precise volume of the geothermal reservoir is not reported in the project hydrologic evaluation; however, the volume of fluid withdrawn during the relatively short-duration well tests would be up to approximately 1.5 million gallons per short-term test and up to 15 million gallons per long-term test. This is expected to be minor, compared with the volume of fluid available in the geothermal resource. Removing geothermal fluid during testing would not be expected to affect the geothermal reservoir's quantity or quality.

Geothermal fluid injection could occur during well testing at each well. If this occurs, it is not anticipated to have impacts on surface or shallow groundwater quality because the NDEP's Bureau of Water Pollution Control underground injection control permit would be required to conduct injection. The permit would require that injection be designed and monitored to prevent degradation of underground drinking water sources from geothermal fluid injection.

Temporary geothermal fluid extraction and injection during well testing is not anticipated to affect the shallow groundwater aquifer's quantity or quality characteristics. This is because water quality sampling in the vicinity indicates little to no mixing of the geothermal reservoir and the shallow groundwater aquifer (Stantec 2022, Section 5.4), and because wells would be cased to prevent mixing of geothermal fluids and the shallow groundwater aquifer, as described above.

Ormat would implement the applicant-committed environmental protection measures (**Section 2.1.7**) to protect surface and groundwater. As such, surface or groundwater contamination from accidental spills or discharges, such as diesel fuel or lubricants, would be unlikely to occur.

[24] As described in **Section 2.1.4**, the project would require up to 35,000 gallons of water per day for well drilling, and up to 6,000 gallons per day for dust control, or approximately 41,000 gallons per day. Over the anticipated 45-day drilling period per well, this is 1,845,000 gallons, or 6.8 acre-feet.

Proposed Mitigations

Implementing applicant-committed environmental protection measures (**Section 2.1.7**) would reduce the potential for effects on water resources. Specifically, geothermal fluids would not be discharged to the ground under normal operating conditions. Should accidental discharges occur, measures in a spill ~~prevention, control, and countermeasure~~or discharge contingency plan (ORNI 26 LLC 2022, p. 13) would be implemented. Ormat would also develop and implement a stormwater pollution prevention plan, per the NDEP Bureau of Water Pollution Control requirements; follow stormwater BMPs; and minimize cut and fill activities; these would minimize the potential for erosion from stormwater runoff. Well casings would prevent commingling of geothermal fluids and underground aquifers.

Implementing BLM-required stipulations (**Table 3-11**) would further minimize the potential for effects on water resources. Spring discharges would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in **Table 3-11**, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects were detected, appropriate measures to mitigate effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

Wildlife (General and Sensitive Species) and Migratory Birds

As described in the analysis for *Water Resources (Surface and Ground)*, above, spring discharge monitoring would allow early detection of potential changes; if effects were detected, appropriate measures, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. Thus, Alternative A is not anticipated to affect water availability or quality for wildlife at area springs, wetlands, or wells in the long term.

Constructing reserve pits in accordance with the NDOW's Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps (NDOW, n. d.) and fencing reserve pits according to rangeland management specifications would minimize the potential for wildlife harm due to ingesting geothermal fluids or becoming entrapped in pits.

Proposed Mitigations

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**) would reduce the potential for effects on wildlife from exposure to geothermal fluids. Specifically, geothermal fluids would not be discharged to the ground under normal operating conditions. Should accidental discharges occur, measures in a spill prevention, control, and countermeasure plan (ORNI 26 LLC 2022) would be implemented. Ormat would also follow stormwater BMPs and minimize cut and fill activities, to minimize the potential for habitat loss and degradation from erosion.

Implementing BLM-required stipulations (**Table 3-11**) would further minimize the potential for effects on wildlife. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes as described above; this would minimize the potential that there would be changes in water quality or quantity at wells or springs used by wildlife. If water quality or quantity effects were detected, appropriate measures to mitigate effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented.

To minimize the potential that wildlife would come into contact with geothermal fluids or become entrapped in reserve pits, Ormat would construct reserve pits in accordance with the NDOW's Design Features and

Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps (NDOW, n. d.) and fence reserve pits according to rangeland management specifications.

Cultural Resources

There is the potential for Alternative A to alter or diminish the quality and quantity of groundwater resources. This ~~would~~ could indirectly affect cultural resources associated with springs and wells in the direct APE, including Great Boiling Spring. Monitoring spring discharges and groundwater monitoring wells as described above (see BLM-required stipulations in **Table 3-11**) would allow early detection of potential changes; if effects were detected, appropriate measures, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. Thus, Alternative A is not anticipated to affect cultural resources associated with area springs or wells in the long term.

Proposed Mitigations

Implementing BLM-required stipulations (**Table 3-11**) would minimize the potential for effects on water resources. Spring discharges would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. If water quality or quantity effects were detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented.

Alternative B: 3-Mile Access Point

Geology and Minerals

The effects on surface geology would be substantially similar to those described under Alternative A. The precise amount and location of surficial effects would vary due to the different configuration and length of access roads proposed under Alternative B. The effects on seismicity and minerals would be the same as those described under Alternative A.

Water Resources (Surface and Ground)

The potential for geothermal exploration from Alternative B to affect water resources would be the same as described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Wildlife (General and Sensitive Species) and Migratory Birds

The potential for geothermal exploration from Alternative B to affect wildlife resources would be the same as described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Cultural Resources

The potential for geothermal exploration from Alternative B to affect cultural resources would be the same as described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Alternative C: Existing Well 68-3 Access Point

Geology and Minerals

The effects on surface geology would be substantially similar to those described under Alternative A. The precise amount and location of surficial effects would vary due to the different configuration and length of access roads proposed under Alternative C. The effects on seismicity and minerals would be the same as those described under Alternative A.

Water Resources (Surface and Ground)
The potential for geothermal exploration from Alternative C to affect water resources would be the same as described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Wildlife (General and Sensitive Species) and Migratory Birds
The potential for geothermal exploration from Alternative C to affect wildlife resources would be the same as described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Cultural Resources
The potential for geothermal exploration from Alternative C to affect cultural resources would be the same as described for Alternative A. The proposed mitigations also would be the same as those described for Alternative A.

Alternative D: No-Action Alternative
There would be no increase in the potential for effects on surface water, groundwater, geothermal fluids, or use of water rights, compared with current conditions. There would be no changes in water availability or quality for wildlife at springs or wells. Because proposed injection tests would not occur, there would be no increase in the potential for induced seismicity.

3.3.6 Issue 5: How would ground disturbance and vegetation removal affect resources in the AOI?

Analysis Area and Assumptions
The analysis area for direct effects is the AOI; the analysis area for indirect effects is the AOI, plus a 650-foot buffer around this area. The buffer is the distance that fugitive dust or surface water runoff would generally travel from areas of ground disturbance. This distance is based on typical Nevada BLM geothermal lease stipulations for ground disturbance buffers.

Alternative A: Proposed Action
Soil Resources
Alternative A would disturb approximately ~~51.5~~49.3 acres of the ground surface, as summarized in **Table 2-1**. After reclamation following the methodology in **Section 2.1.8**, there would be approximately ~~30.5~~29.4 acres of surface disturbance that would not be reclaimed. **Table 3-13** summarizes the acres of proposed surface disturbance in each soil map unit in the AOI.

Table 3-13
Proposed Disturbance by Soil Map Unit

Soil Map Unit	Disturbance Acres[1]
210—Veta-Langston Association	~~17.9~~15.8
1146—Umberland Association	~~14.9~~15.4
1191—Ragtown Association	~~8.5~~8.6
1520—Kaffur-Slocave-Rock Outcrop Association	0.1
1580—Trocken-Ganaflan-Bluewing Association	0
1064—Trocken, Stony-Mazuma Association	~~2.2~~7.3
900—Playas	2.3
543—Mazuma-Swingler Association	0

Sources: Ormat GIS 2022; BLM GIS 2022; Web Soil Survey 2020
[1] ~~Disturbance acres from the proposed aggregate pit expansion are not included, as the pit location is yet to be determined. The pit expansion would add approximately 5 acres of disturbance in either 1520—Kaffur-Slocave-Rock Outcrop Association or 1064—Trocken, Stony-Mazuma Association~~The sum of disturbance acres is slightly different than reported in **Table 2-1**. The 0.2-acre total difference can be attributed to rounding errors.

Where surface disturbance is proposed, implementing applicant-committed environmental protection measures (**Section 2.1.7**) would minimize, but not prevent, the potential for soil erosion by wind or water. These measures include following stormwater BMPs, grading practices described in the Gold Book (BLM and Forest Service 2007), and developing and implementing a stormwater pollution prevention plan. Residual effects could include increasing erosion rates from site grading or by reducing soil productivity and the potential for successful restoration. This would come about by exposing soil surfaces, which would increase the potential for wind- and water-driven erosion. There could also be effects from compacting the soil to a level that prevents or slows successful restoration and eventual reestablishment of vegetation.

The region has the potential for high winds and infrequent strong rains, which could increase erosion rates and soil loss in disturbed areas. The use of vehicles and equipment on disturbed areas could further increase the potential for wind- and water-driven erosion and contribute to soil compaction, thus reducing the restoration potential.

Soil erosion ratings (see **Table 3-9**) of the soil map units with the greatest amount of proposed disturbance in the AOI indicate that the susceptibility of these soils to wind and water erosion is generally low to moderate. Unit 210—Veta-Langston Association is moderately susceptible to wind erosion and not very susceptible to water erosion. Unit 1146—Umberland Association is not susceptible to wind erosion and moderately susceptible to water erosion.

Although measures would reduce the potential for wind- and water-driven erosion and soil compaction and would help maintain the soil restoration potential, some level of localized topsoil loss due to wind- and water-driven erosion and soil compaction is still expected to occur.

Proposed Mitigations

Following applicant-committed environmental protection measures (see **Section 2.1.7**), including following stormwater BMPs, grading practices described in the Gold Book (BLM and Forest Service 2007), and developing and implementing a stormwater pollution prevention plan, would minimize the potential for Alternative A to erode soils. Reclaiming temporarily disturbed areas, using BLM-approved revegetation methods, and stockpiling topsoil to enhance revegetation success would increase the potential for successful reclamation.

Vegetation and Invasive, Nonnative Species

As summarized in **Table 2-1**, Alternative A would disturb approximately ~~51.5~~49.3 acres of the ground surface, thereby removing vegetation from these areas. After reclamation following the methodology in **Section 2.1.8**, there would be approximately ~~30.5~~29.4 acres of surface disturbance and associated vegetation removal that would not be reclaimed. Acres of proposed surface disturbance and the associated vegetation removal in each vegetation type in the AOI are summarized in **Table 3-14**.

Table 3-14
Proposed Disturbance by Vegetation Type

Cover Type	Acres[1]
Intermountain Basins Mixed Salt Desert Scrub	~~21.3~~24.2
Intermountain Basins Greasewood Flat	~~14.2~~14.3
Intermountain Basins Big Sagebrush Shrubland	~~2.7~~2.8
Western Great Plains Saline Depression Wetland	6.1
Intermountain Basins Playa	~~1.5~~1.6
Intermountain Basins Cliff and Canyon	0
Recently Mined or Quarried	0
Intermountain Basins Semi-Desert Shrub Steppe	0
Great Basin Pinyon-Juniper Woodland	0

Cover Type	Acres[1]
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	0
North American Arid West Emergent Marsh	0

Sources: Ormat GIS 2022; BLM GIS 2022; Robison GIS 2020; USGS 2005

[1] ~~Disturbance acres from the proposed aggregate pit expansion are not included, as the pit location is yet to be determined. The pit expansion would add approximately 5 acres of disturbance in either the land cover type Intermountain Basins Mixed Salt Desert Scrub, or Recently Mined or Quarried~~The sum of disturbance acres is slightly different than reported in **Table 2-1**. The 0.2-acre total difference can be attributed to rounding errors.

Direct effects on special status plants are unlikely to occur. This is because surveys did not document special status plants in the AOI (Ormat 2021, p. 22). Indirect effects on special status plants would include potential habitat loss for upland- and wetland-associated special status plant species. As summarized in **Table 3-14**, above, construction disturbance would occur on up to approximately ~~38.2~~41.3 acres[25] of potentially suitable habitat for upland-associated species and 6.1 acres[26] of potentially suitable habitat for wetland-associated species.

It is unlikely that the project would actually disturb up to 6.1 acres of suitable habitat for wetland-associated special status plant species; actual disturbance would likely be much smaller, if any. This is because such habitat is in wetlands, which were delineated in the AOI (see *Surface Water—Wetlands* under **Section 3.2.1**, Water Resources). While wetlands in the AOI are found in association with several of the SWReGAP land cover types discussed above, the spatial extent of delineated wetlands is typically more restricted than the ground-truthed land cover types.[27] Further, project proponents would typically be required to avoid these areas, or if avoidance is not feasible, obtain permits to fill or otherwise disturb wetlands (see BLM-required stipulations in **Table 3-11**).

Though some areas of temporary disturbance in special status plant habitat in the AOI would be reclaimed following construction, as described in **Section 2.1.8**, habitat suitability for special status plants would likely take decades or more to return, if at all. This would effectively make this effect permanent.

Following applicant-committed environmental protection measures (see **Section 2.1.7**) for fugitive dust control, including watering work areas and placing gravel on access roads, would minimize, but not prevent, the potential that vegetation would be indirectly affected by fugitive dust generated during ground disturbance and vehicle and equipment use. Fugitive dust can settle on nearby vegetation, reducing pollinator success and diminishing plant productivity.

Following applicant-committed environmental protection measures (see **Section 2.1.7**) for noxious weeds and invasive, nonnative plant species would minimize, but not prevent, the potential that ground disturbance would increase these plant species' establishment and spread. Measures include washing equipment and vehicles to be used on the project site, and using certified noxious weed-free hay and straw bales for erosion control.

Proposed Mitigations

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**), including using existing roads whenever possible and preventing cross-country travel outside the work area, would minimize vegetation removal under Alternative A. Reclaiming temporarily disturbed areas, using BLM-approved

[25] Potentially suitable habitat corresponds to the land cover types Intermountain Basins Mixed Salt Desert Scrub, Intermountain Basins Greasewood Flat, and Intermountain Basins Big Sagebrush Shrubland (Ormat 2021, p. 22).

[26] Potentially suitable habitat corresponds to the land cover types North American Arid West Emergent Marsh, Western Great Plains Saline Depression Wetland, and Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland. (Ormat 2021, p. 22).

[27] Wetland delineation requires detailed investigation of soil pits and belowground hydrological conditions, which is not conducted during vegetation ground truthing.

revegetation methods, and stockpiling topsoil to enhance revegetation success would increase the potential for successful reclamation. Washing equipment and vehicles to be used on the project site, and using certified noxious weed-free hay and straw bales for erosion control, would help minimize the spread of invasive, nonnative species.

Wildlife (General and Sensitive Species) and Migratory Birds

As summarized in **Table 2-1**, Alternative A would directly disturb approximately ~~51.5~~49.3 acres of the ground surface, thereby removing wildlife habitat from these areas. The acres and percentages of proposed habitat removal for key wildlife species are summarized in **Table 3-15**.

Table 3-15
Proposed Disturbance by Wildlife Habitat Type

Wildlife Habitat Type	Total Habitat in AOI (acres)[1]	Habitat Removal (acres[1, 2] and percent)
Burrowing owl	2,341	~~45.9~~49.1 (2)
Migratory birds	2,724	~~51.5~~49.3 (2)
Shorebirds	531	~~7.6~~7.7 (1)
Dark kangaroo mouse (high-potential habitat)	2,181[3~~2~~]	~~42.4~~45.6 (2)
Insects (larval host plant habitat)	2,325[4~~3~~]	~~3.6~~3.7 (<1)
Amphibians (aquatic breeding habitat)	1	0 (0)
Reptiles	2,724	~~51.5~~49.3 (2)
Greater Sage-Grouse OHMA (2021 Plan Maintenance Action for the Approved Resource Plan Amendment [2015])	158	0 (0)

Sources: Ormat GIS 2022; BLM GIS 2022

[1] Rounded to the nearest whole acre

~~[2] Disturbance acres from the proposed aggregate pit expansion are not included, as the pit's location is yet to be determined. The pit expansion would add approximately 5 acres of disturbance in most general and some sensitive wildlife habitat types.~~

[3~~2~~] The habitat delineation area for dark kangaroo mouse included the AOI and a 0.25-mile buffer around it; see **Section 3.2.4**.

[4~~3~~] Acres of buckwheat populations in the AOI; see **Section 3.2.4.**

Temporarily disturbed areas would be reclaimed following the methods in **Section 2.1.8**. Where wildlife habitat was reclaimed, habitat removal would be a temporary effect. The duration of the temporary effect would vary, depending on the habitat type affected. For example, burrowing owls and some generalist migratory birds, such as common ravens, horned larks, and meadowlarks, can inhabit relatively disturbed habitats lacking intact, native vegetation; thus, these species could reoccupy temporarily disturbed and restored areas relatively quickly.

In contrast, some migratory bird species that could be less tolerant of fragmented or disturbed habitats, such as Brewer's sparrow, black-throated sparrow, and sage sparrow, could not reoccupy temporarily disturbed habitats for longer periods. Similarly, kangaroo mice typically require relatively undisturbed habitats with intact native vegetation. Temporarily disturbed suitable habitat, even if restored, can take a relatively long time to regain suitability. Even if habitat suitability is restored, this does not always allow for species recolonization.

Removing milkweed plants would remove larval host plant habitat for the monarch butterfly, a candidate for listing under the ESA.

As discussed above in *Vegetation and Invasive, Nonnative Species*, adhering to noxious weed and fugitive dust measures would minimize, but not prevent, indirect effects on wildlife habitat from weed establishment and spread and fugitive dust deposition on vegetation.

Proposed Mitigations

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**), including using existing roads whenever possible and preventing cross-country travel outside the work area, would minimize wildlife habitat removal under Alternative A. Reclaiming temporarily disturbed areas, using BLM-approved revegetation methods, and stockpiling topsoil to enhance revegetation success would increase the potential for successful reclamation.

Implementing applicant-committed environmental protection measures (see **Section 2.1.7**), including washing equipment and vehicles used on the project site and using certified noxious weed-free hay and straw bales for erosion control, would help minimize the potential for wildlife habitat degradation from the spread of invasive, nonnative species.

In accordance with applicant-committed environmental protection measures (see **Section 2.1.7**), a qualified biologist would conduct a migratory bird nesting survey prior to any surface disturbance proposed during the avian breeding season. Active nests would be avoided, and activities would be restricted to avoid effects.

Implementing BLM-required stipulations (**Table 3-11**) would minimize the potential for effects on special status wildlife species. If a special status species is identified in or near the work area during construction, work near the species would be halted, and a qualified biologist would be consulted to determine an appropriate buffer and other protective measures, as applicable. Ormat would notify the BLM of the discovery within 24 hours. If avoidance is not feasible, consultation with the NDOW and/or the USFWS would be conducted prior to continuing work in the immediate area.

In accordance with BLM-required stipulations (**Table 3-11**), Ormat would conduct western burrowing owl clearance surveys prior to surface disturbance in suitable habitat during the nesting season. Also, avoidance buffers would be established around any active burrows until young have fledged or the burrow is no longer active.

Special Designations and Visual Resources, Including Night Skies

Construction activity could generate dust, which would be temporarily visible from the steeply sloping southeast-facing flank of the Granite Peak LWC area. This would diminish the naturalness character in this area. The naturalness character in this area is already degraded by several factors, including visibility of CR-34, dust from vehicles driving on the Black Rock Desert playa, operations in the existing gravel pits in the AOI, and other visible day-to-day activities in Gerlach. As a result of these existing conditions, the addition of temporary construction dust would be a minor effect.

Proposed Mitigations

The Winnemucca District RMP Record of Decision allows for multiple-use and sustained-yield objectives in LWC areas (see Action LWC 1.1 in BLM 2015a, p. 2-45) with appropriate mitigations applied, if needed, to protect wilderness characteristics. Implementing applicant-committed environmental protection measures (see **Section 2.1.7**) would reduce the potential for temporary construction dust to diminish the naturalness character of the LWC area. These measures include watering work areas and applying gravel to access roads.

Cultural Resources (National Historic Trails)

Because all NRHP-eligible and unevaluated sites in the APE would be avoided during construction and maintenance, and an archaeological monitor would be present during ground-disturbing activity within 30 meters (98 feet) of NRHP-eligible and unevaluated sites to ensure sites are not disturbed, direct effects from ground disturbance on eligible or unevaluated sites are not expected to occur.

Proposed Mitigations

Following applicant-committed environmental protection measures (see **Section 2.1.7**) would minimize the potential for direct, adverse effects on NRHP-eligible and unevaluated resources; this is because these

resources would be avoided. As outlined in the BLM-required stipulations (**Table 3-11**), when ground-disturbing project activities are proposed within 30 meters (98 feet) of a NRHP-eligible or unevaluated cultural resource, an archaeological monitor would be present to ensure sites are avoided and not disturbed during construction and maintenance. Temporary or permanent fencing around NRHP-eligible or unevaluated cultural resources could be installed to prevent disturbance, and personnel would be instructed that all cultural resources are to be protected.

Alternative B: 3-Mile Access Point

Soil Resources

The type of effects on soil resources would be largely the same as those described under Alternative A. However, because Alternative B would require Ormat to build more new access road on the western edge of the Black Rock Desert playa, as compared with Alternative A, there would be additional effects on soil resources. This would mainly be in the soil map units 900—Playas, which is moderately susceptible to water and wind erosion, and 1146—Umberland Association, which is moderately susceptible to water erosion and the least susceptible to wind erosion (see **Table 3-9**). The potential for wind and water erosion effects would therefore be somewhat greater than under Alternative A. Alternative B would include the same proposed mitigation measures as described for Alternative A; this would reduce the effects.

Vegetation and Invasive, Nonnative Species

The type of effects on vegetation would be largely the same as those described under Alternative A. However, because Alternative B would require Ormat to build more new access road, as compared with Alternative A, there would be additional acres of surface disturbance and associated vegetation removal. The additional surface disturbance would be mainly in the Black Rock Desert playa, which is mostly devoid of vegetation. Further, because three segments of new access road between CR-34 and proposed well pads 71-3, 63-3, and 66-3 would not be constructed, the associated impacts in the vegetation types Intermountain Basins Big Sagebrush Shrubland and Western Great Plains Saline Depression Wetland would not occur. As a result, though Alternative B proposes more new access road construction than Alternative A, direct impacts on vegetation could be somewhat reduced.

As under Alternative A, direct effects on special status plants would not occur; this is because surveys did not document special status plants in the AOI (Ormat 2021, p. 22). The type of indirect effects on special status plants would be the same as those described for Alternative A. However, because more acres of Intermountain Basins Playa, and fewer acres of the vegetation communities Intermountain Basins Big Sagebrush Shrubland and Western Great Plains Saline Depression Wetland would be disturbed during construction, less potentially suitable habitat for these species would be affected.

The potential for noxious weed and invasive, nonnative plant species establishment and spread, and the effects on vegetation from fugitive dust would be essentially the same as under Alternative A.

Alternative B also would include the same proposed mitigation measures as described for Alternative A.

Wildlife (General and Sensitive Species) and Migratory Birds

The type of effects on wildlife and migratory birds would be largely the same as those described under Alternative A. However, because Alternative B would require Ormat to build more new access road, as compared with Alternative A, there would be additional acres of surface disturbance and the associated habitat removal. The additional surface disturbance would be mainly in the Black Rock Desert playa, which is considered suitable habitat for shorebirds and some migratory birds. As a result, habitat removal would be slightly higher for these types of species.

Alternative B would include the same proposed mitigation measures as described for Alternative A.

Special Designations and Visual Resources, Including Night Skies
The potential for effects on the Granite Peak LWC area and the proposed mitigations under Alternative B would the same as those described for Alternative A.

Cultural Resources (National Historic Trails)
The potential for effects on cultural resources and the proposed mitigations under Alternative B would be the same as those described for Alternative A.

Alternative C: Existing Well 68-3 Access Point
Soil Resources
The type of effects on soil resources would be largely the same as those described under Alternative A. However, because Alternative C would require Ormat to build more new access road on the western edge of the Black Rock Desert playa, as compared with Alternative A, there would be additional effects on soil resources. This would mainly be in the soil map units 900—Playas, which is moderately susceptible to water and wind erosion, and 1146—Umberland Association, which is moderately susceptible to water erosion and the least susceptible to wind erosion (see **Table 3-9**). The potential for wind and water erosion effects would therefore be somewhat greater than under Alternative A. Alternative C would include the same proposed mitigation measures as described for Alternative A; this would reduce the effects.

Vegetation and Invasive, Nonnative Species
The effects on vegetation and invasive, nonnative species, including rare plant species, would be the same as those described under Alternative B. The proposed mitigations also would be the same as those described under Alternative B.

Wildlife (General and Sensitive Species) and Migratory Birds
The effects on wildlife and migratory birds would be the same as those described under Alternative B. The proposed mitigations also would be the same as those described under Alternative B.

Special Designations and Visual Resources, Including Night Skies
The potential for effects on the Granite Peak LWC area and the proposed mitigations under Alternative C would the same as those described for Alternative A.

Proposed Mitigations
Alternative C would include the same proposed mitigation measures as described for Alternative A.

Cultural Resources (National Historic Trails)
The potential for effects on cultural resources and the proposed mitigations under Alternative B would be the same as those described for Alternative A.

Alternative D: No-Action Alternative
Under Alternative D, surface disturbance from construction would not occur. As a result, vegetation would not be removed, and the potential for water- and wind-driven soil erosion would not increase. Similarly, there would be no removal of habitat for special status plant and wildlife species from construction. The potential for noxious weeds and invasive, nonnative species to establish and spread, and the associated degradation of wildlife habitat, would remain due to passenger vehicle traffic and recreational uses in the AOI.

There would be no dust generated by construction. Dust generated by passenger vehicle traffic on existing dirt roads in the AOI would continue to be visible from the Granite Peak LWC area.

3.3.7 Cumulative Effects

Past, Present, and Reasonably Foreseeable Future Activities

The CEQ defines cumulative effects as "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal and non-federal) or person undertakes such other actions" (40 CFR 1508.7; CEQ 1997).

To determine which other actions should be included in a cumulative effects analysis, the region of influence for each resource must first be defined. These regions should not be limited to only the geographic areas of resources addressed by the project; they should also account for the distances that cumulative effects could travel and the regional characteristics of the affected resources.

The cumulative effects analysis area for water resources is the same as the hydrologic evaluation study area described in the Hydrologic Evaluation (Stantec 2022, Section 2.2 and Figure 2). This area includes portions of the Black Rock Desert playa and alluvial deposits of the Black Rock Desert, San Emidio Desert, Smoke Creek Desert, and Granite Basin hydrographic basins. As described in the Hydrologic Evaluation (Stantec 2022, Section 2.2), this area was chosen due to the potential for connected aquifer system(s) in the hydrologic basins.

The cumulative effects analysis area for special designations and visual resources, including night skies, is the same as the night sky study area described in the Night Sky Baseline Report (BLM 2022b, Section 1.2 and Figure 1). This area includes the project AOI, the communities of Empire and Gerlach, and the BLM-administered lands that extend northward along the Granite Range from Gerlach to the Massacre Rim WSA and east to the Jackson Mountains. The area is largely encompassed by the Black Rock Desert-High Rock Canyon Emigrant Trails NCA; it includes the largest regional sources of ALAN, such as Empire, Gerlach, the Hycroft Mine, and the Burning Man Event.

The cumulative effects analysis area for other resources is the area within 3 miles of the project area that would be visible from the project area. The cumulative effects analysis areas are shown on **Figure A-11** and **Figure A-12** in **Appendix A**.

The time scale for analysis is the lifetime of the geothermal leases (10 years). The geothermal leases could be extended or renewed beyond these time lines.

The BLM has identified past, present, and reasonably foreseeable future actions (**Table 3-16**) that overlap both spatially and temporally with Alternative A on BLM-administered lands in the cumulative effects analysis areas; thus, these actions are relevant for the analysis.

Table 3-16
Past, Present, and Reasonably Foreseeable Future Actions

Past, Present, or Reasonably Foreseeable	Action	Brief Description
Past	Fluid mineral exploration and development	Geothermal gradient test holes and deeper exploration holes were drilled in and around the AOI in the 1970s and 1980s. Borehole depths ranged from approximately 43 to 5,800 feet (Stantec 2022).
Present	Special designations	The NCA Act of 2000 established the Black Rock Desert-High Rock Canyon Emigrant Trails NCA to conserve, protect, and enhance values and resources associated with the Applegate-Lassen and Nobles Trails corridors and surrounding areas. Also in the area are the Calico Mountains Wilderness, Massacre Rim and Selenite Mountains WSAs, and Granite Peak LWC area.

Past, Present, or Reasonably Foreseeable	Action	Brief Description
Present	Locatable minerals exploration and development	Locatable minerals exploration and development are ongoing at the Hycroft Mine and Empire Mine.
Present	Mineral materials development	There are two aggregate pits in the project area, including a NDOT pit northwest of Gerlach and a private aggregate pit located east of Transfer Station Road.
Present	Lands and realty	A Los Angeles Department of Water and Power 500-kilovolt transmission line runs north to south, along the eastern base of the Fox Range and western base of the Granite Range, just west of the AOI.
Present	Fluid minerals exploration and development	Ormat operates the 10-megawatt San Emidio geothermal plant in the San Emidio Desert. Surface disturbance associated with the plant is approximately 64 acres (BLM 2010). There are also seven production or injection wells, well pads, and access roads associated with the San Emidio plant and the decommissioned AMOR II plant.
Present	Fluid minerals exploration and development	Ormat is drilling and testing six geothermal resource exploration wells on BLM-administered land in the San Emidio Geothermal Unit in the San Emidio Desert (BLM 2010).
Present	Agricultural development	Farming and ranching interests are anticipated to continue at current levels into the foreseeable future. Approximately 1,660 acres are under cultivation on private land in the San Emidio Desert (BLM 2010).
Present	Rangeland	Portions of the AOI are in the Rodeo Creek and Buffalo Hills grazing allotments (BLM 2015c, p. 3-120), which are authorized for cattle grazing.
Present	Rangeland	Domestic sheep trailing occurs across most of the AOI in the spring and fall.[28] Trailing consists of four to seven bands of domestic sheep that are moved to and from the Blue Wing Seven Troughs Allotment in the Winnemucca District to the adjacent California BLM districts.
Present	Transportation	SR-447 and CR-34 are main, paved highways that traverse the analysis areas. There are many paved and unpaved access roads in the analysis areas, including Transfer Station Road, SR-49 (Jungo Road), Soldier Meadows Road, transmission line maintenance roads, and others. A Union Pacific Railroad line connecting Susanville, California, and Winnemucca, Nevada, passes through the analysis areas at Gerlach.
Present	Recreation	The BLM signed a decision record and renewed a 10-year SRP for the Burning Man Event. The event is held annually in late August and early September on the Black Rock Desert playa. Under terms of the issued permit, the event is capped at 80,000 total attendees (BLM 2019d).
Present	Commercial development	The Burning Man Project purchased and is in the process of developing a commercial enterprise at a private parcel known as the 360 Property. A Washoe County special use permit currently permits a storage facility for cargo containers on the property; additional improvements are proposed but not yet approved by the county.
Reasonably foreseeable	Fluid minerals exploration and development	The BLM signed the decision record for Ormat's 40-megawatt North Valley Geothermal Development Project San Emidio Geothermal Field (BLM 2021c) in the San Emidio Desert. Surface disturbance associated with the plant and the associated 120-kilovolt overhead generation-tie line will be approximately 190 acres.

[28] Email from Angela Arbonies, BLM, to Morgan Trieger, EMPSi, on February 8, 2022, regarding Gerlach Geothermal Exploration Project - domestic sheep trailing.

Past, Present, or Reasonably Foreseeable	Action	Brief Description
Reasonably foreseeable	Water rights transfer	There is a water rights acquisition and proposed transfer for planned municipal uses in Storey County. Any transfer of water out of the hydrologic basin(s) in the analysis area would be subject to the approval of the Nevada State Engineer.

Sources: As noted in the table

Cumulative Effects Analysis

Past, present, and reasonably foreseeable future actions that have affected, and will continue to affect, GHG emissions are fluid minerals and locatable minerals exploration and development, including the Hycroft Mine and San Emidio geothermal plant. Infrastructure and transportation, including vehicle traffic on regional highways and railroads, have contributed and will continue to contribute GHG emissions to the atmosphere.

Actions that have contributed to the presence of infrastructure in the analysis area are primarily existing geothermal utilization in the San Emidio Desert, locatable minerals development at the Hycroft Mine, the Los Angeles Department of Water and Power 500-kilovolt transmission line, the Union Pacific Railroad line, and SR-447 and CR-34. The communities of Gerlach and Empire, the San Emidio geothermal plant, Hycroft Mine, and the Burning Man Event will continue to contribute to regional sources of ALAN.

Those actions that have affected and will continue to affect ambient noise levels in the analysis area primarily include the mineral developments, regional highways, and railroad mentioned above. The Burning Man Event has, and will continue to, periodically affect ambient noise levels.

Those actions that have affected and will continue to affect water resources are existing and planned geothermal resource utilization in the San Emidio Desert and agricultural irrigation water use. The recent acquisition of water rights in the San Emidio Desert for planned municipal uses in Storey County could result in water being transferred out of the basin. Any transfer of water out of the basin would be subject to the approval of the Nevada State Engineer.

Construction, operation, and maintenance of most of the past, present, and reasonably foreseeable future actions have removed, and will continue to remove, vegetation and disturb soils in the analysis area. This has reduced, and will continue to reduce, habitat quality for general and sensitive plant and wildlife species.

When combined with these past, present, and reasonably foreseeable future actions, Alternatives A, B, and C would contribute incrementally to GHG emissions, the presence of temporary equipment, noise levels, the potential for effects on water resources, and surface disturbance and associated vegetation removal in the analysis area, as described below. Implementing applicant-committed environmental protection measures (**Section 2.1.7**) and additional BLM-required stipulations (**Table 3-11**) would minimize the action alternatives' contribution to the cumulative effects.

Geothermal exploration would have the potential to contribute incrementally to effects on resources in the analysis area. The action alternatives would temporarily increase the presence of equipment and traffic, and increase the presence of access roads, well pads, and wellheads in the long term in the analysis area. The primary potential impacts associated with this are temporarily restricted access to recreation opportunities and changes to the recreation setting, and reduced opportunities and feelings of solitude or primitive and unconfined recreation in special designation areas from changes in ALAN. The potential would be reduced by incorporating visual design standards and lighting measures to minimize ALAN.

Temporary noise would come from constructing proposed access roads and well pads and drilling geothermal exploration wells. Noise generated during construction would affect the recreation setting in

the Granite Range SRMA, the naturalness character in portions of the Granite Peak LWC area, and wildlife, such as from disturbance and displacement from habitat during construction. Since existing commercial and recreational activities in the analysis area already generate noise, anticipated effects would be minor.

Temporary effects on water resources would occur if exploration activities changed the shallow groundwater aquifer's quality or quantity. This could affect the water quality or availability in the hydrologic basins for wildlife and water rights holders. While sampling in the vicinity indicates little to no mixing of the geothermal reservoir and the shallow groundwater aquifer (Stantec 2022a, Section 5.4), ~~developing and implementing~~supplementing the groundwater monitoring plan (Broadbent and Associates Inc. 2022) with the additional monitoring locations and parameters, adaptive management strategies, and potential measures to reduce or mitigate any observed effects as outlined in **Table 3-11**, BLM-Required Stipulations, would identify changes in nearby resources and inform appropriate corrective measures.

The action alternatives would cause surface disturbance, remove vegetation, and increase the potential for water- and wind-driven soil erosion. Surface disturbance in suitable habitat for special status species would result in contributions to cumulative effects on these species and their habitat. The impacts would be incremental, when combined with vegetation removal and soil disturbance from past, present, and future actions in the analysis area. Temporary contributions would occur from constructing the proposed access roads and well pads. Long-term contributions would occur in the footprints of areas that would not be reclaimed after construction. The primary potential impacts associated with these contributions are temporary and permanent vegetation and wildlife habitat removal, soil disturbance that increases the potential for invasive plant establishment and spread, water- and wind-driven soil erosion, and visual impacts, including on the context and setting for special designations areas and the integrity of setting, feeling, and association of cultural resources. However, incorporating visual design standards would reduce these potential visual impacts.

Contributions to cumulative effects on special status species would be greater for those species that are less tolerant of fragmented or disturbed habitats. While some wildlife can inhabit relatively disturbed habitats and reoccupy temporarily disturbed and restored areas relatively quickly, some special status species do not have this ability. Temporarily disturbed suitable habitat, even if restored, can take a relatively long time to regain suitability. Also, this does not guarantee species reoccupation.

Based on the anticipated potential impacts from Alternative A: Proposed Action, Alternative B: 3-Mile Access Point, or Alternative C: Existing Well 68-3 Access Point, when combined with impacts from past, present, and reasonably foreseeable future actions in the cumulative effects analysis area, no cumulatively significant impacts are anticipated.

There would be no cumulative effects from Alternative D: No-Action Alternative, because Ormat would not construct the project.

Chapter 4. Consultation and Coordination

4.1 Tribes, Individuals, Organizations, and Agencies Consulted

During the NEPA process for this EA, the BLM formally and informally consulted and coordinated with other federal agencies, state and local governments, Native American tribes, and the interested public. The BLM did this to ensure its compliance, in both the spirit and intent, with 40 CFR 1501.7 and 1503. In addition to formal scoping, the BLM implemented collaborative outreach and a public involvement process that included inviting agencies to be cooperative partners for the EA planning process. A cooperating agency is any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis.

4.1.1 Government-to-Government Consultation

The federal government works on a government-to-government basis with Native American tribes because they are recognized as separate governments. This relationship was formally recognized on November 6, 2000, with Executive Order 13175 (65 *Federal Register* 67249). As a matter of practice, the BLM coordinates with all tribal governments, associated native communities, native organizations, and tribal individuals whose interests might be directly and substantially affected by activities on public lands. In addition, Section 106 of the NHPA requires federal agencies to consult with Native American tribes for undertakings on tribal lands and for historic properties of significance to the tribes that may be affected by an undertaking (36 CFR 800.2(c)(2)). BLM Manual 1780, Tribal Relations, and BLM Handbook H-1780-1, Improving and Sustaining BLM-Tribal Relations, provide guidance for Native American consultations.

Executive Order 13175 stipulates that, during the NEPA process, federal agencies must consult tribes identified as being directly and substantially affected. The BLM notified several tribes of the proposed action in writing on November 9, 2021, and again on February 7, 2022. The BLM sent letters to the Fallon Paiute-Shoshone Tribe, the Pyramid Lake Paiute Tribe, the Reno-Sparks Indian Colony, the Summit Lake Paiute Tribe, and the Susanville Rancheria. The BLM also notified the Fort McDermitt Paiute and Shoshone Tribe about the project, though the BLM did not send an outreach letter to this tribe. On February 18, 2022, the BLM shared the project's existing cultural documentation with the Reno-Sparks Indian Colony, at the request of the tribe.

On April 26, 2022, the BLM held an information-sharing meeting with the Reno-Sparks Indian Colony. At the meeting, the BLM and tribe's Tribal Heritage Preservation Officer discussed that the project NHPA Section 106 consultation ~~that~~ is being carried out under 36 CFR 800.8(c), and the reasoning for conducting the consultation under this process instead of the 2014 State Protocol Agreement between the BLM and Nevada State Historic Preservation Office for implementing the NHPA.[29] The BLM and tribe also discussed the project time-line and other geothermal projects currently underway in Nevada. A further information sharing meeting was held with the Reno-Sparks Indian Colony on July 18, 2022. The Tribe provided no substantive comments on the project.

Prior to publication of the draft EA, a preliminary EA was sent to the above listed tribes with a request for consultation in late August 2022. On September 19, 2022 a government-to-government consultation meeting was held with the Summit Lake Paiute Tribe tribal council. The council's concerns focused on: 1) traffic on CR-34; 2) the potential for impacting springs in the area; and 3) the size and scope of a potential geothermal plant should the geothermal resource eventually be developed. ~~To date, the BLM has not received a request for formal government-to-government consultation from contacted tribes.~~ Outreach,

[29] The State Protocol Agreement is available online at https://shpo.nv.gov/uploads/documents/BLM_Nevada_State_Protocol_Agreement_2014.pdf.

communication, and coordination ~~will continue~~continued throughout the NEPA process and during drilling. Continued communication and coordination ~~will help to ensure~~ensured that management actions are consistent with rights retained by tribes and that the concerns of tribal groups ~~are~~ were considered.

4.1.2 Nevada State Historic Preservation Office

In accordance with the requirements of Section 106 of the NHPA, the BLM ~~is consulting~~consulted with the Nevada State Historic Preservation Office. NHPA Section 106 consultation ~~is being~~was carried out in accordance with the process described in 36 CFR 800.8(c). Additional information on this process and consultation can be found in **Appendix C**, Cultural Resources.

4.1.3 US Department of the Interior, Fish and Wildlife Service

Consultation with the USFWS is required under Section 7(c) of the ESA before the BLM begins any project that may affect federally listed or endangered species or their habitat. Current surveys have indicated that the proposed action would not affect ESA-listed species. This indicates that a biological assessment would not be needed to evaluate the project's potential impacts on federally listed threatened and endangered species.

The BLM also coordinated with the USFWS Migratory Bird Program during each agency's review of Ormat's Eagle Conservation Plan (Ormat 2022a).

4.1.4 US Department of the Interior, National Park Service

The National Park Service is the administering agency for national historic trails. The BLM ~~is coordinating~~coordinated with the National Park Service because the California National Historic Trail crosses the AOI's southern portion. Additional information on this coordination can be found in **Appendix C**, Cultural Resources.

4.1.5 Cooperating Agencies

Cooperating agencies are any federal, state, or local government agency or Native American tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. Cooperating agencies and tribes work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks. **Table 4-1**, below, presents the agencies that the BLM invited and those that accepted and signed a memorandum of understanding agreeing to participate as cooperating agencies for this NEPA process. See **Section 4.1.1**, Government-to-Government Consultation, for information on outreach to Native American tribes.

Table 4-1
Cooperating Agencies

Agencies Invited to Be Cooperators	Invited	Accepted
NDOW	Yes	No
NPS	Yes	Yes
TMRPA	Yes	Yes
USFWS	Yes	Yes
Washoe County	Yes	No

4.2 LIST OF PREPARERS

This EA was prepared by an interdisciplinary team of staff from the BLM and EMPSi, with their supporting subcontractors. The following tables list those who prepared or contributed to the development of this EA.

Table 4-2
List of Preparers, BLM and Cooperating Agencies

Team	Name and Agency	Role/Responsibility
Management	James Boerigter (BLM)	Assistant Field Office Manager, BRFO
	Mark Hall (BLM)	Authorized Officer; Field Office Manager; Planning and Environmental Coordinator (acting)
	Holley Kline (BLM)	Assistant Field Office Manager, Natural Resources
	Tai Subia (BLM)	Project Manager; WDO Geothermal Program Lead, Geology and Minerals
Interdisciplinary	Jeremy Anderson (BLM)	Wildlife; Threatened and Endangered Species; Special Status Species; Migratory birds
	Jenifer Barnett (BLM)	~~Geology and Minerals~~Lands and Realty
	Wes Barry (BLM)	Range
	Heather Beeler (USFWS)	Golden Eagles and Other Raptors
	Jeanette Black (BLM)	Hydrology, Groundwater
	Alexandra Covault (BLM)	Hydrology, Surface Water
	Brian Deaton (NPS)	National Historic Trails
	Shannon Deep (BLM)	Native American Tribal Consultation
	Frank Giles (BLM NVSO)	Air Quality and Climate Change
	Michael Kizorek (BLM)	Recreation
	Lee Kreutzer (NPS)	National Historic Trails
	Michael Kraus (BLM)	Cultural Resources; Archaeology
	Michael McCampbell (BLM)	Invasive, Nonnative Species
	Brian McMillan (BLM)	~~Wildlife; Threatened and Endangered Species; Special Status Species; Migratory Birds~~Ecology and Soils
	Carolyn Sherve (BLM NVSO)	Visual Resources
	Garrett Swisher (BLM)	Wild Horses and Burros
	Kathy Torrence (BLM)	Special Designations

Table 4-3
List of Preparers, Consultant Team

Team	Name and Company	Role/Responsibility
Management	Jennifer Thies (EMPSi)	Project Manager; Quality Assurance/Quality Control
Interdisciplinary Team and Support Staff	Sean Cottle (EMPSi)	Public Outreach; Special Designations
	Clayton McGee	Comment Analysis and Response Lead
	Chelsea Ontiveros (EMPSi)	Geographic Information System Technician
	Rob Lavie (EMPSi)	Geographic Information System Lead
	Kim Murdock (EMPSi)	Technical Editor
	Cindy Schad (EMPSi)	Word Processing
	Kirsti Davis (EMPSi)	Public Outreach; Geology and Hydrology; Soil Resources; Visual Resources
	Andy Spellmeyer (EMPSi)	Section 508 Compliance
	Morgan Trieger (EMPSi)	Vegetation; Wildlife; Noise; Geology and Hydrology; Visual Resources

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Appendix A

Figures

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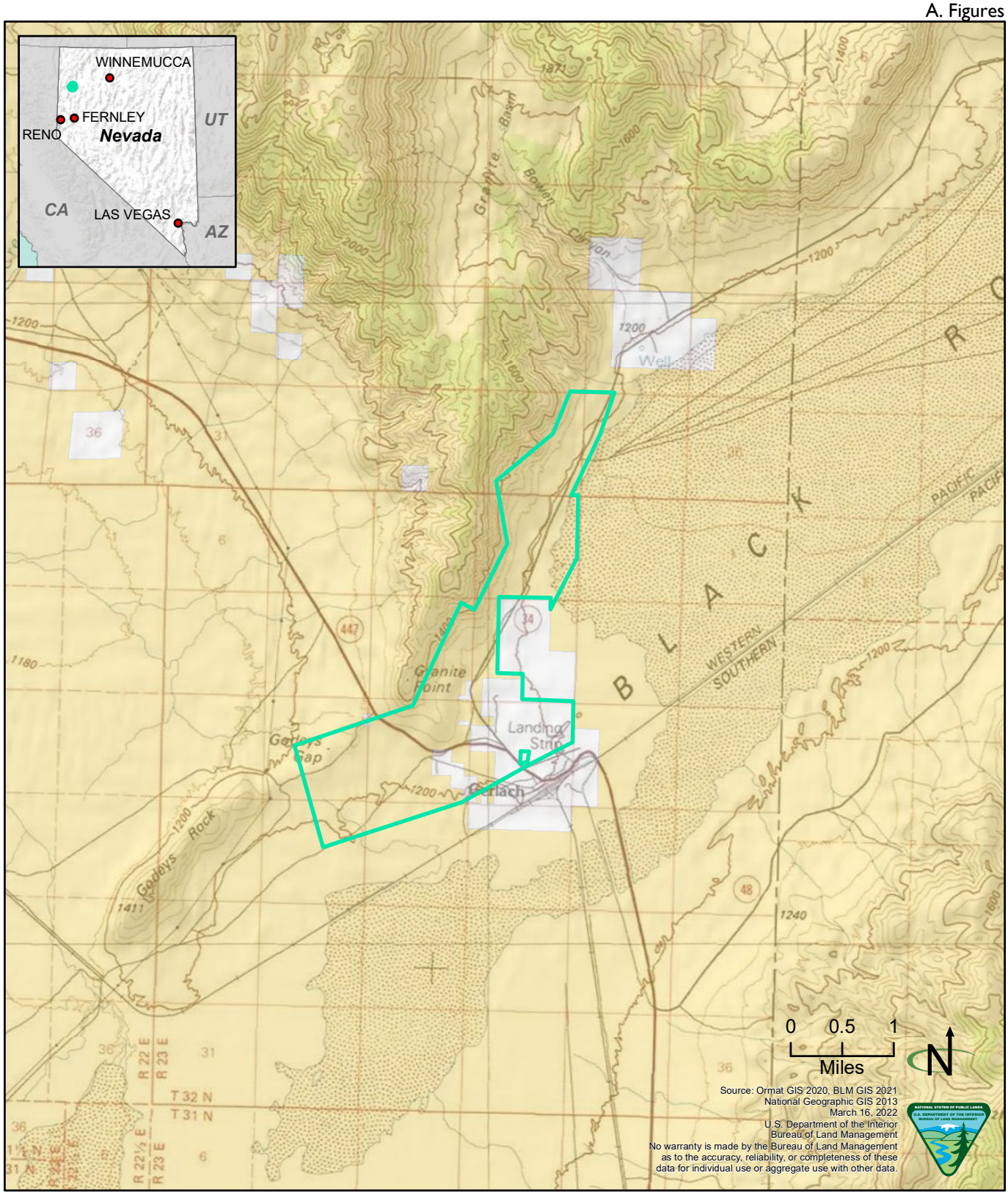


Figure A-1. Project Area

Area of Interest
Bureau of Land Management
Private

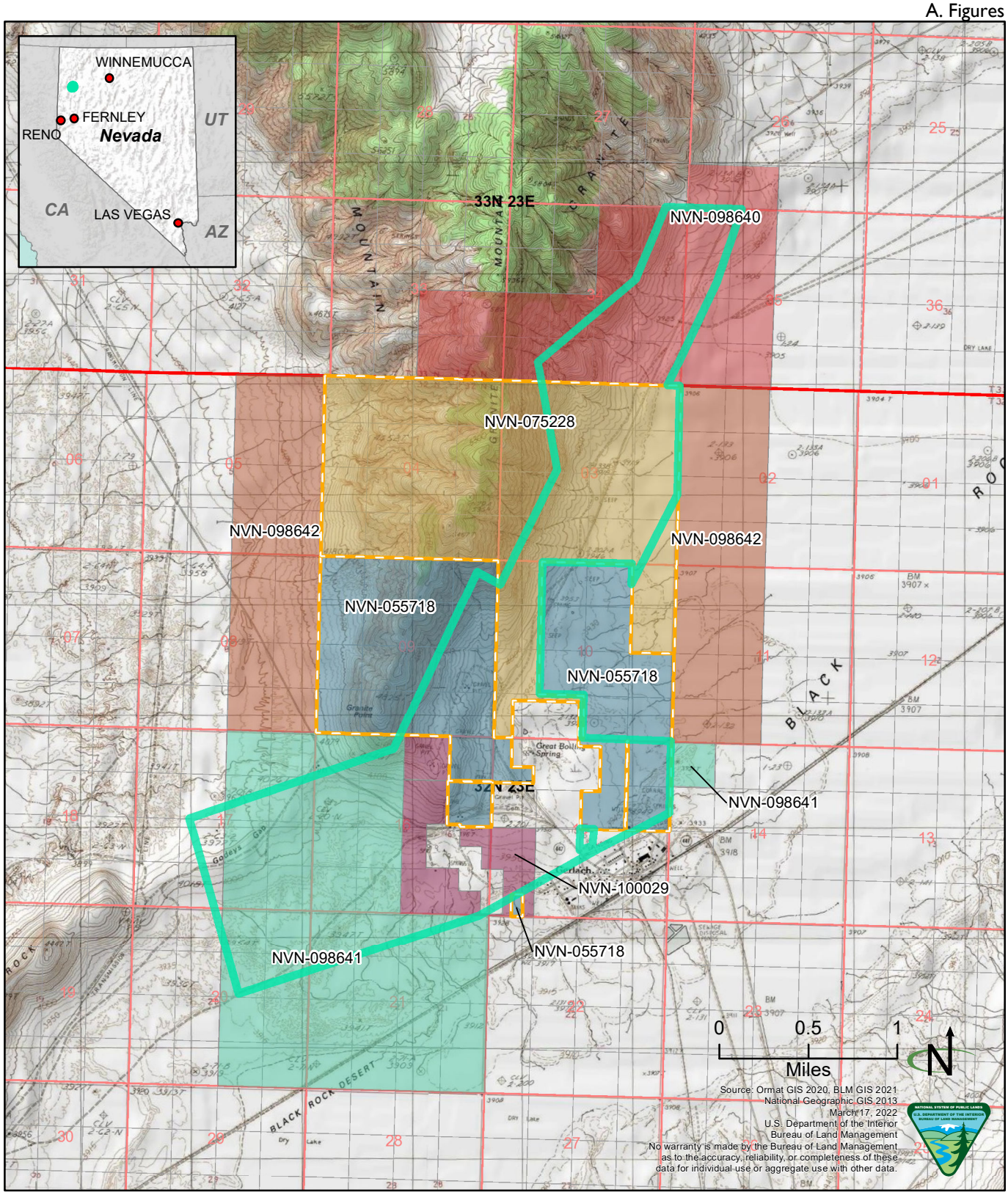


Figure A-2. Geothermal Lease Areas

Area of Interest

Gerlach geothermal lease unit

Geothermal lease area

NVN-055718

NVN-075228

NVN-098640

NVN-098641

NVN-098642

NVN-100029

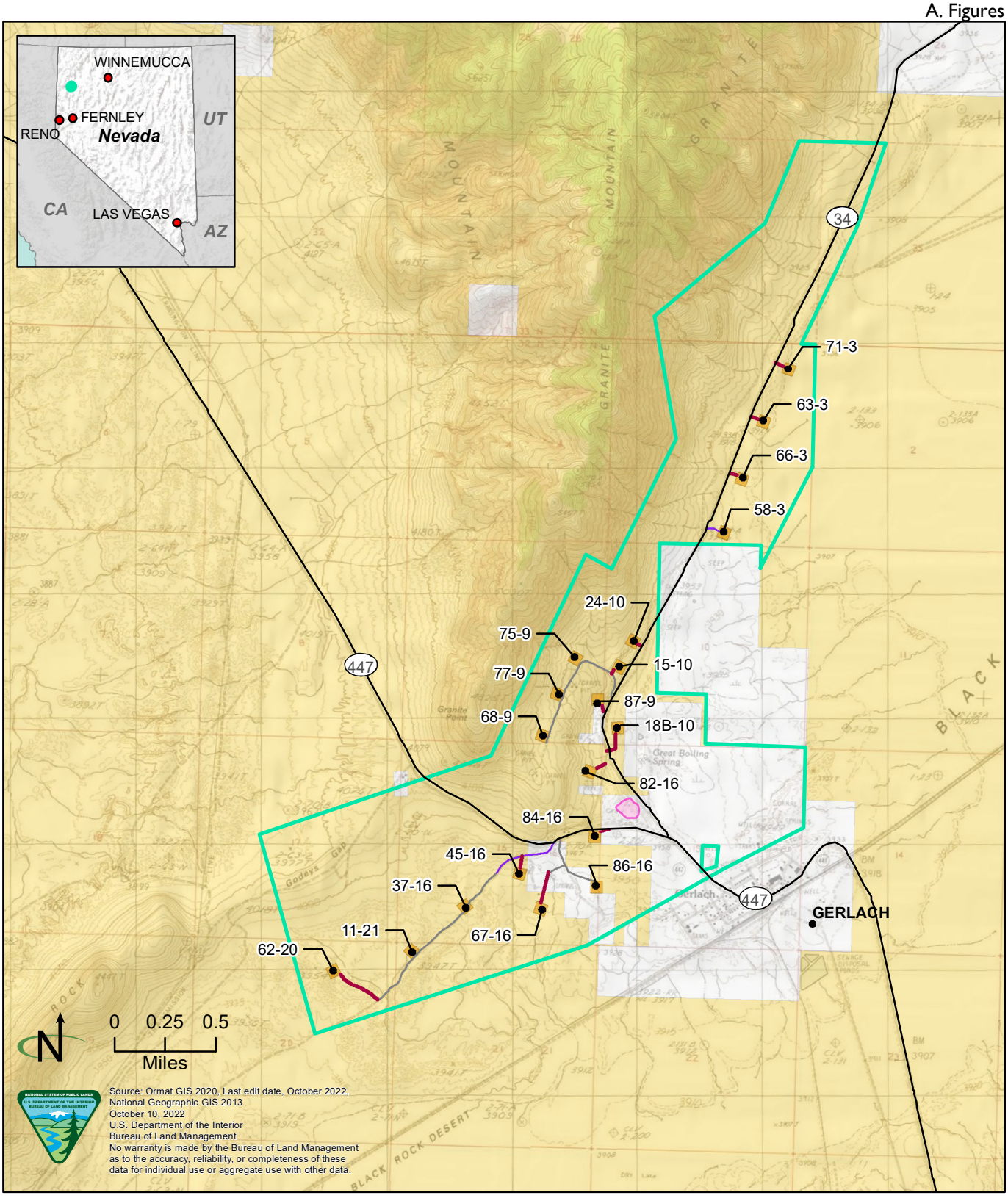


Figure A-3. Proposed Action (Alternative A)

Gerlach geothermal AOI
Existing road
Existing road, no improvements proposed
Proposed access road
Proposed aggregate pit

Surface Management Agency
Bureau of Land Management
Private

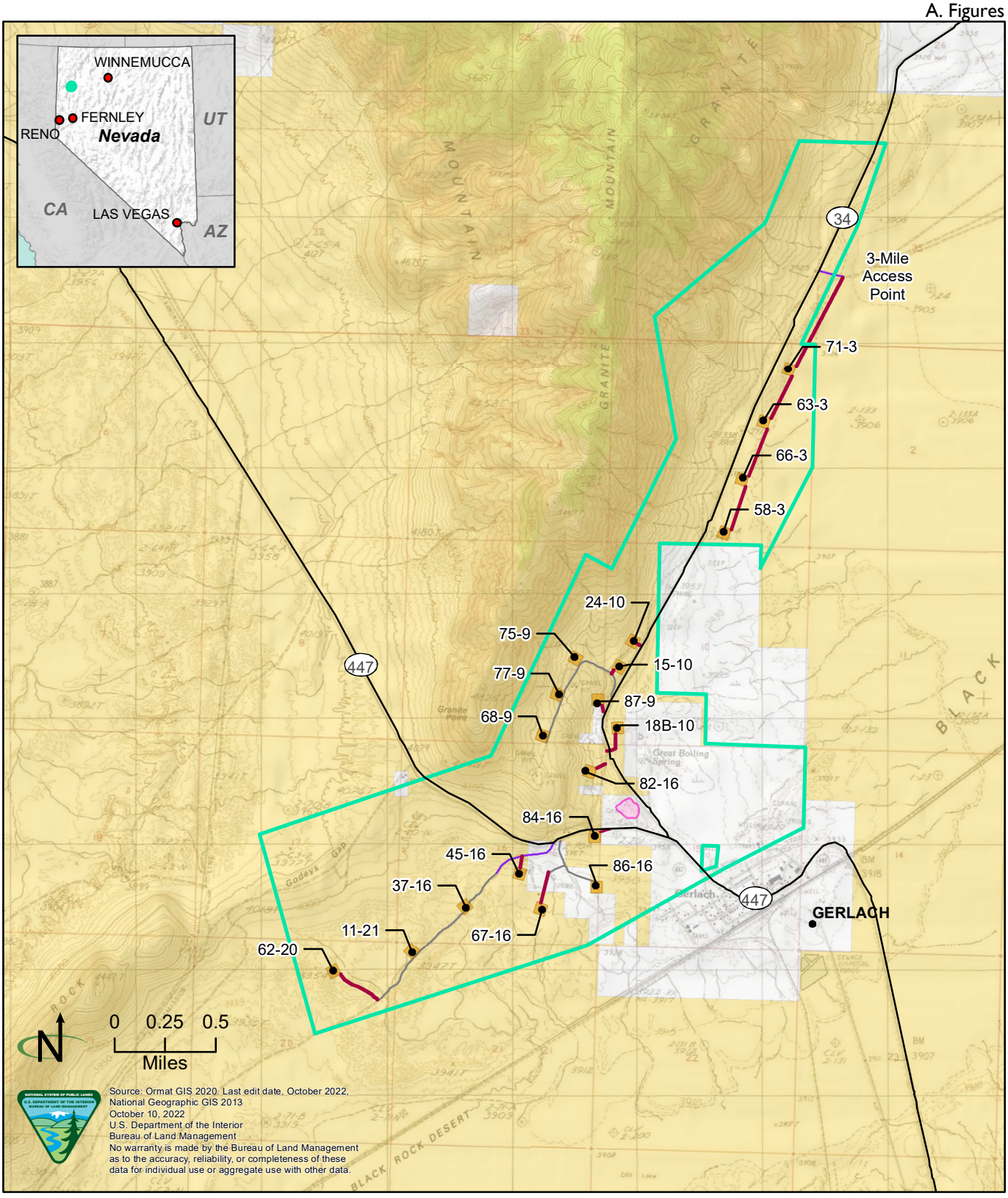


Figure A-4. 3-Mile Access Point (Alternative B)

Gerlach geothermal AOI
Existing road
Existing road, no improvements proposed
Proposed access road
Proposed aggregate pit

Surface Management Agency
Bureau of Land Management
Private

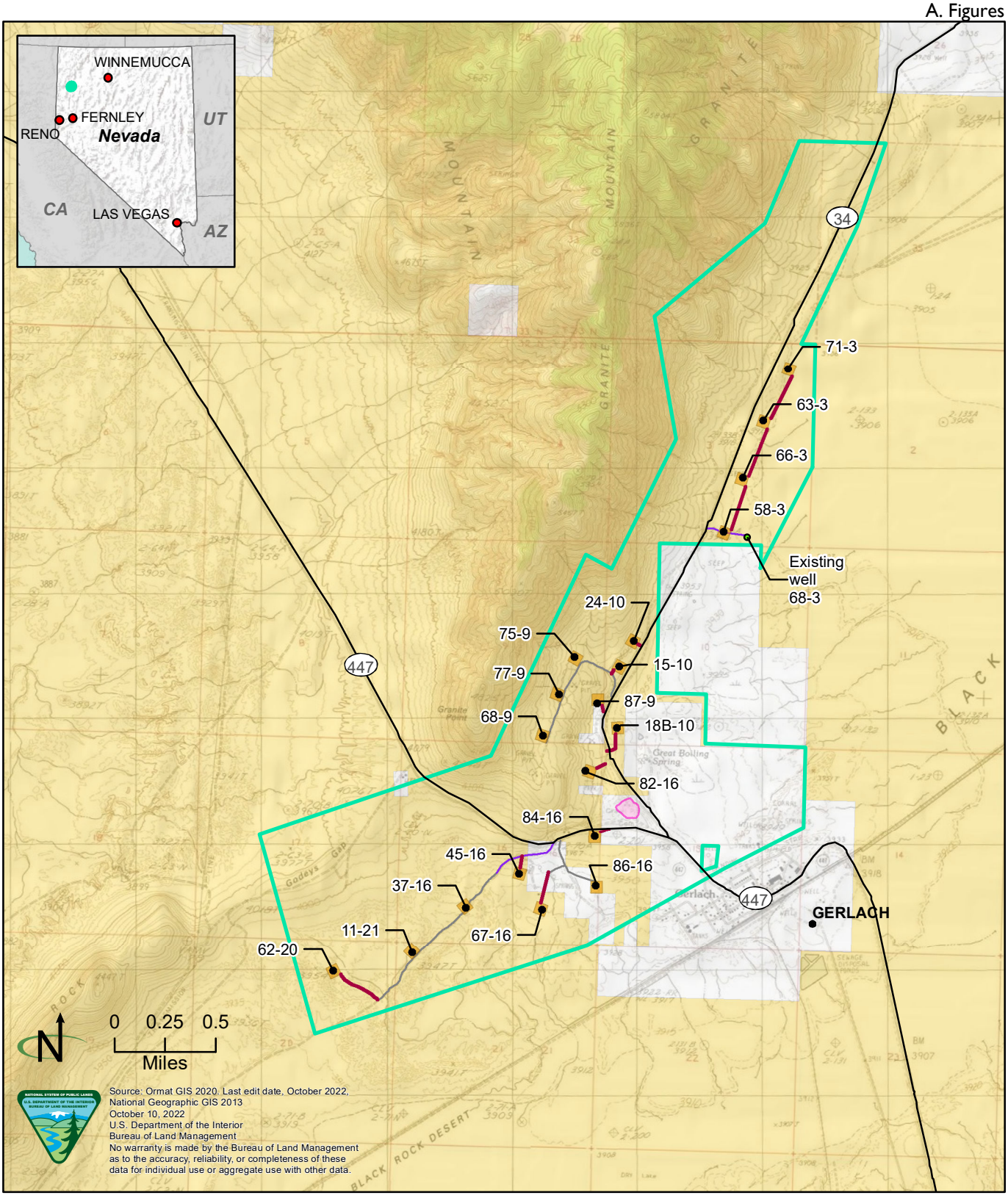


Figure A-5. Existing Well 68-3 Access Point (Alternative C)

- Gerlach geothermal AOI
- Existing well
- Existing road
- Existing road, no improvements proposed
- Proposed access road
- Proposed aggregate pit

Surface Management Agency

- Bureau of Land Management
- Private

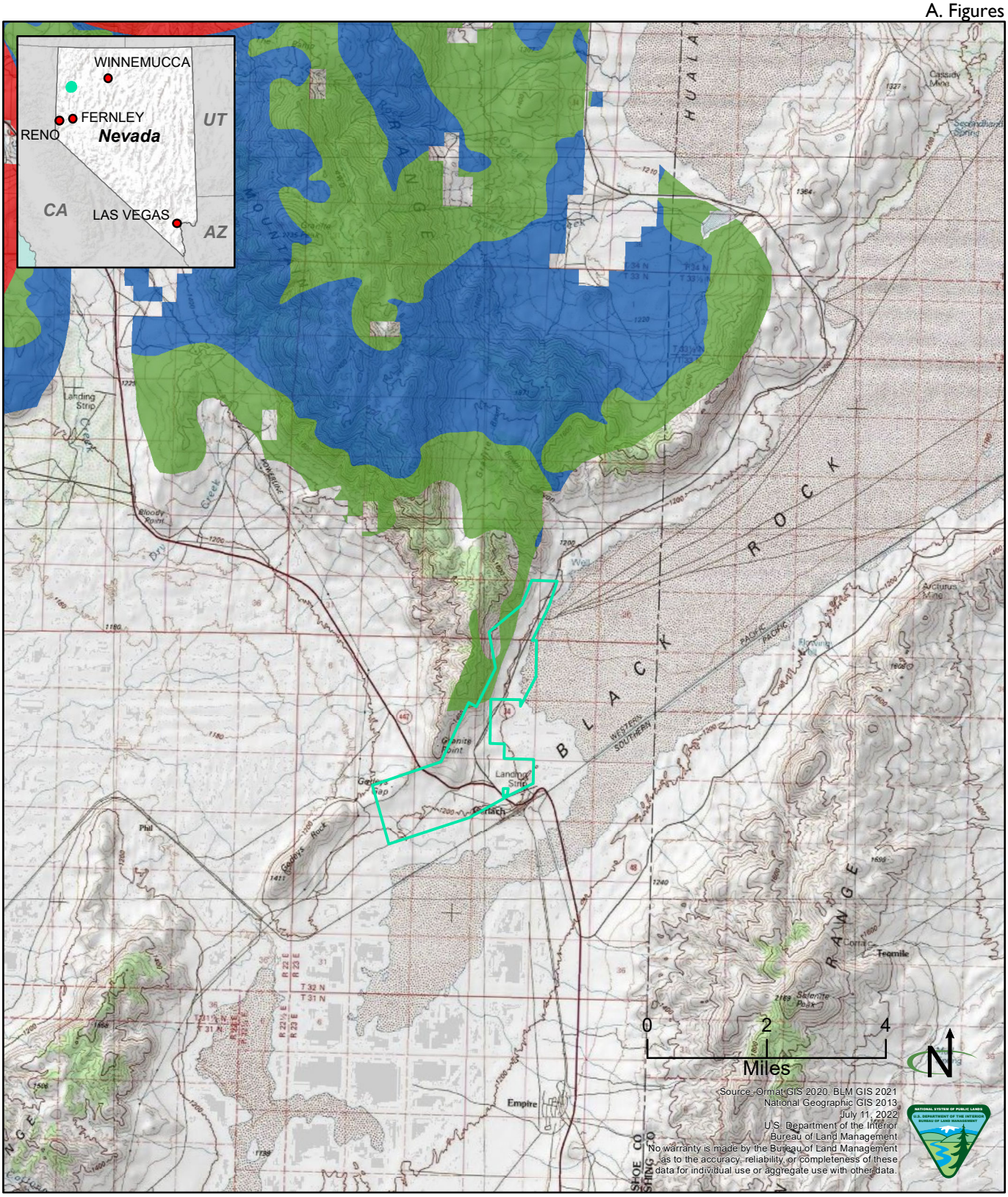


Figure A-6. Greater Sage-Grouse
(2021 Plan Maintenance Action for the Approved Resource Plan Amendment (2015))

General habitat management area
Priority habitat management area
Other habitat management area
Area of Interest

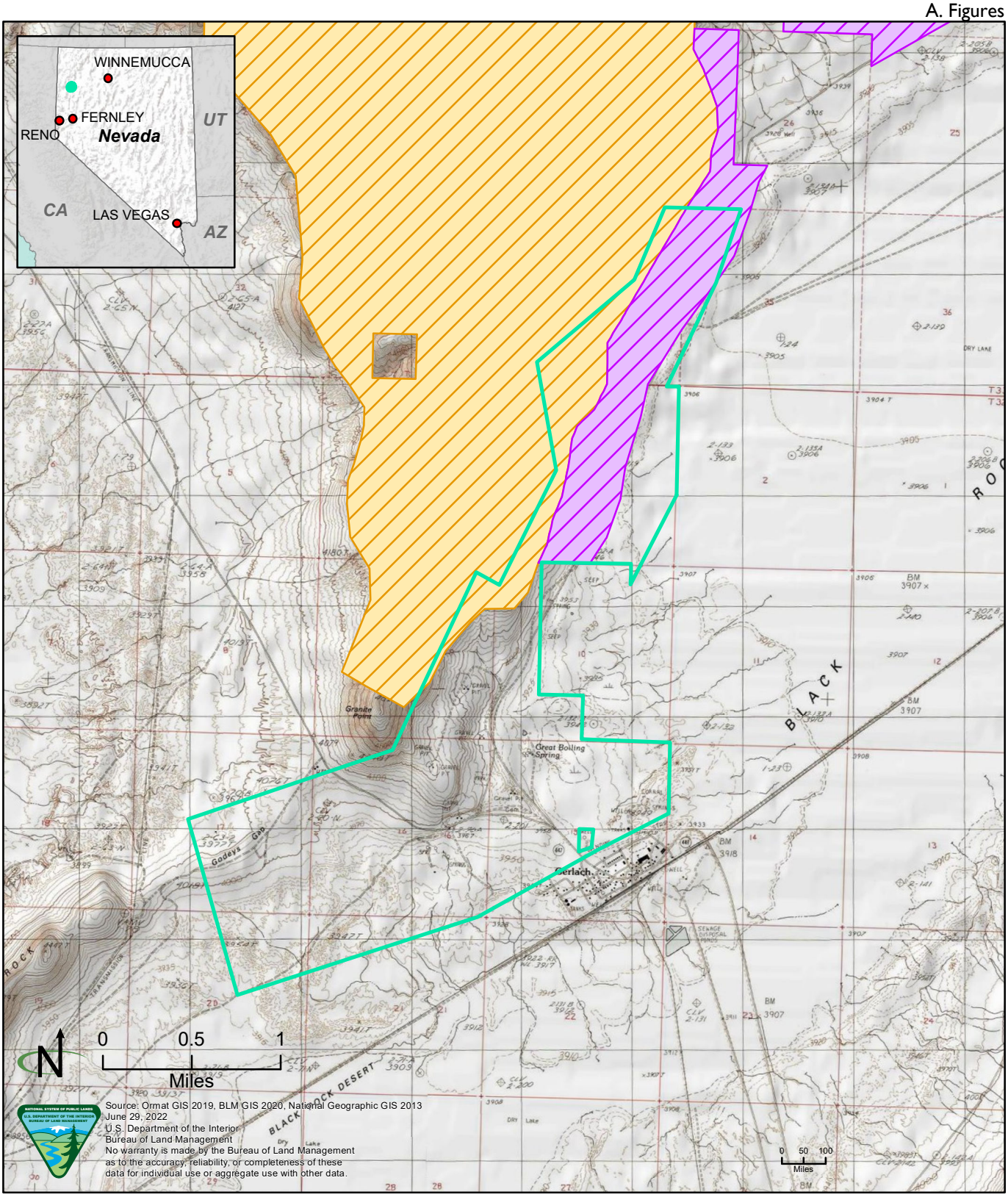


Figure A-7. Granite Range Special Recreation Management Area

Area of Interest

Recreation management zone
- Granite
- Granite Foothills

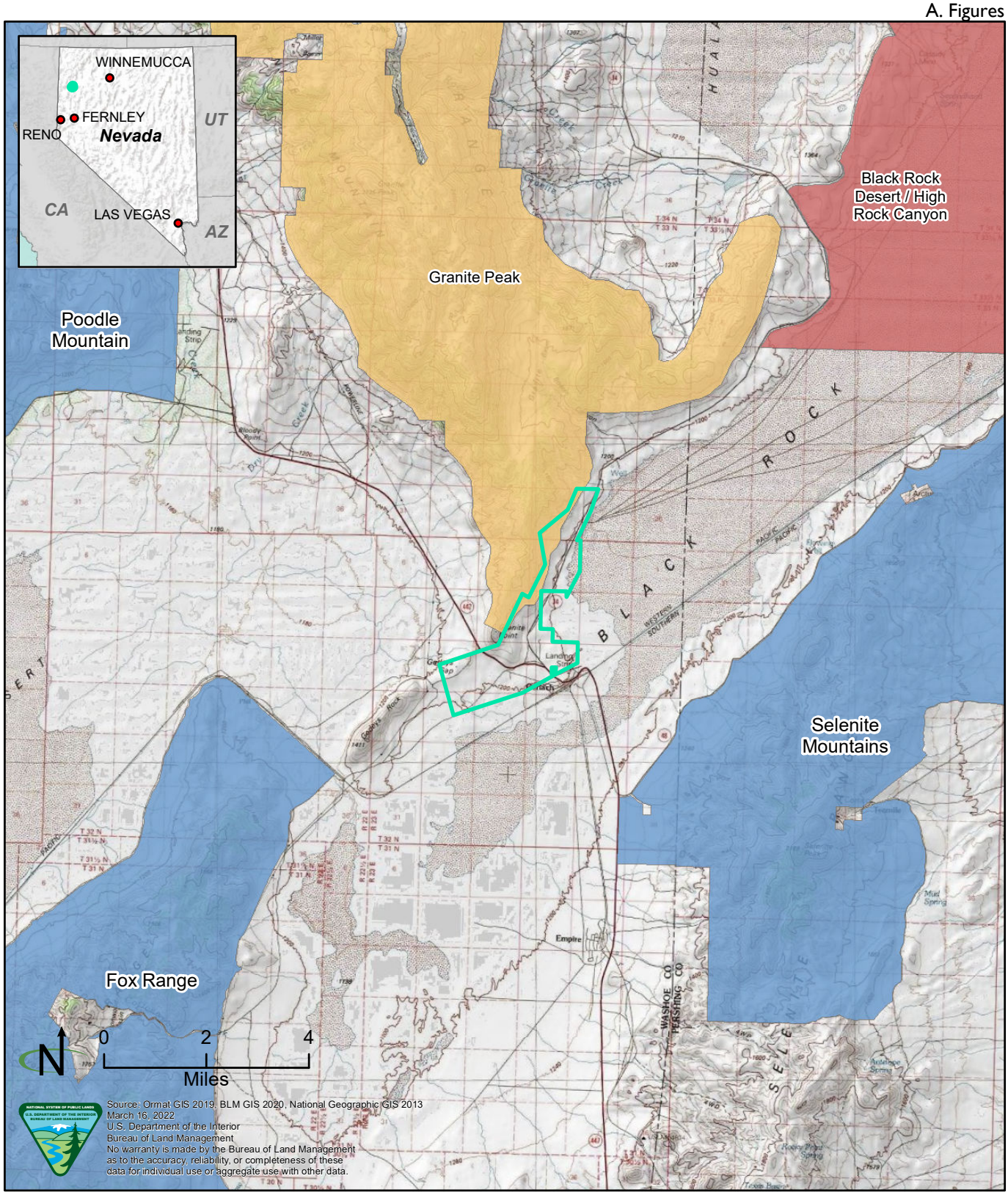


Figure A-8. Special Designations

- Area of Interest
- Land with wilderness characteristics
- National conservation area
- Wilderness study area

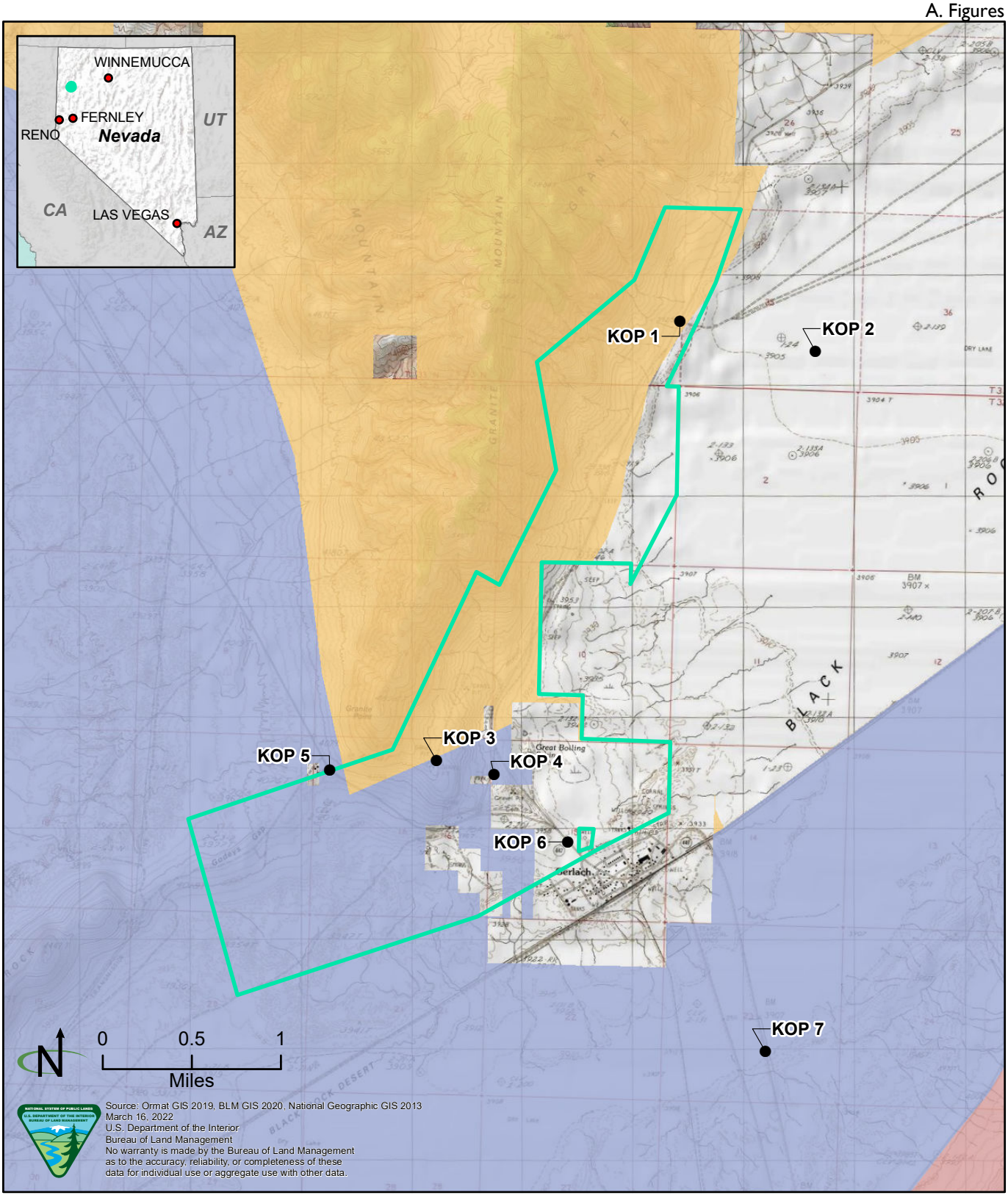


Figure A-9.Visual Resource Management Class and Key Observation Points

- Key observation point
- Area of Interest
- VRM Class I
- VRM Class II
- VRM Class III

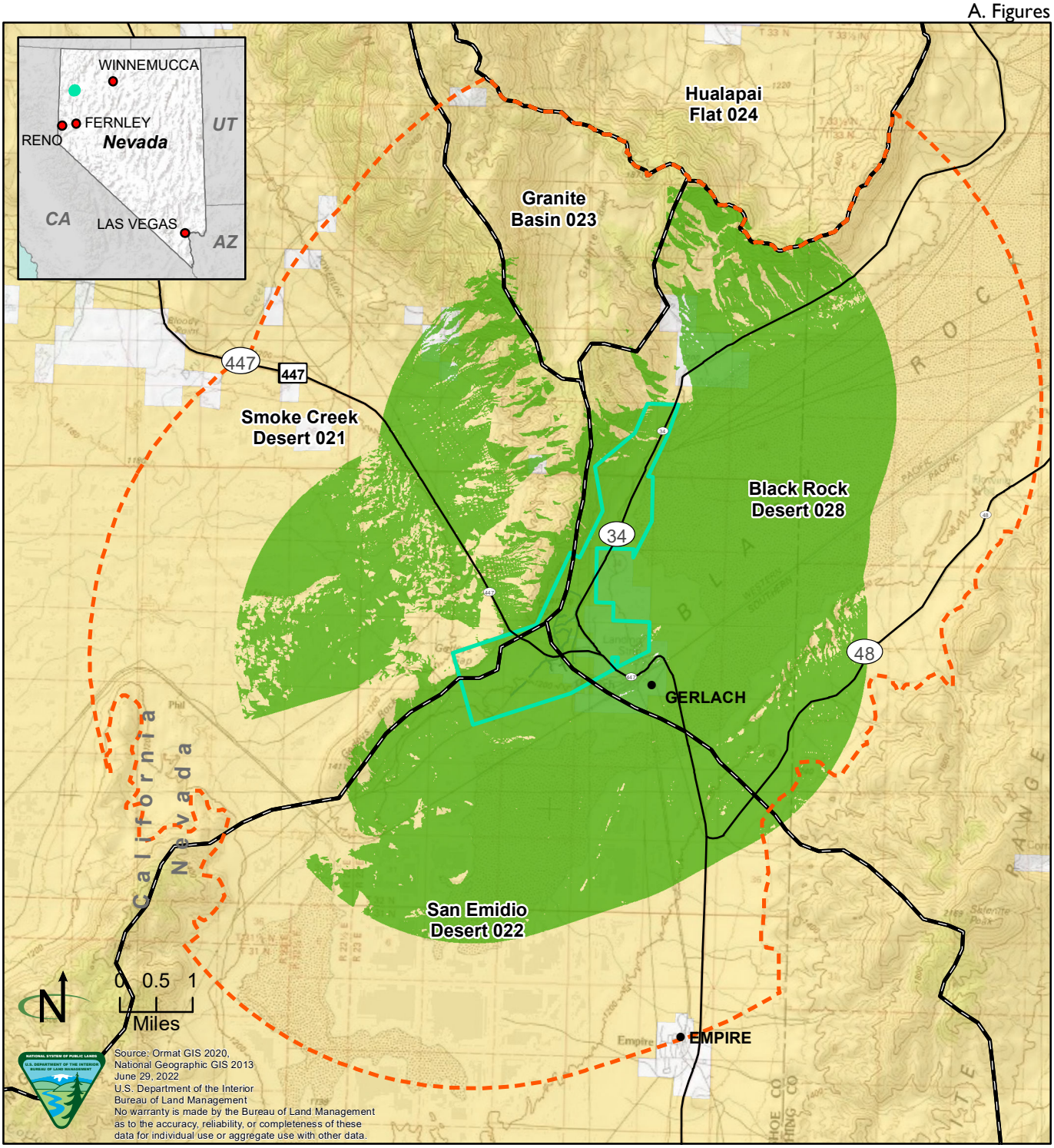


Figure A-10
Cumulative Effects Analysis Areas (Water and Other Resources)

Cumulative effects analysis area - water resources
Cumulative effects analysis area - other resources
Hydrologic Evaluation Study Area
Gerlach geothermal AOI

Surface Management Agency
Bureau of Land Management
Private

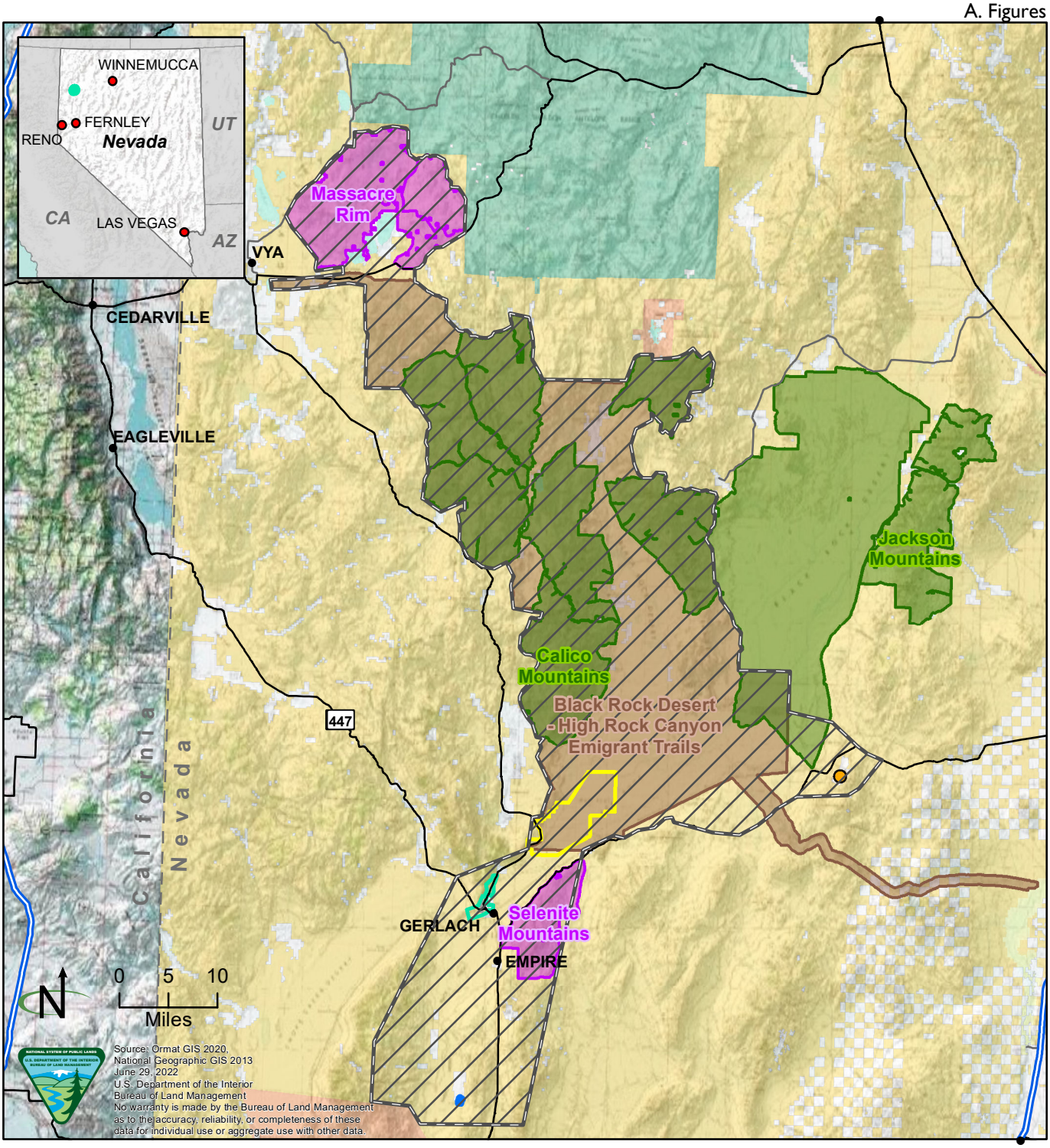


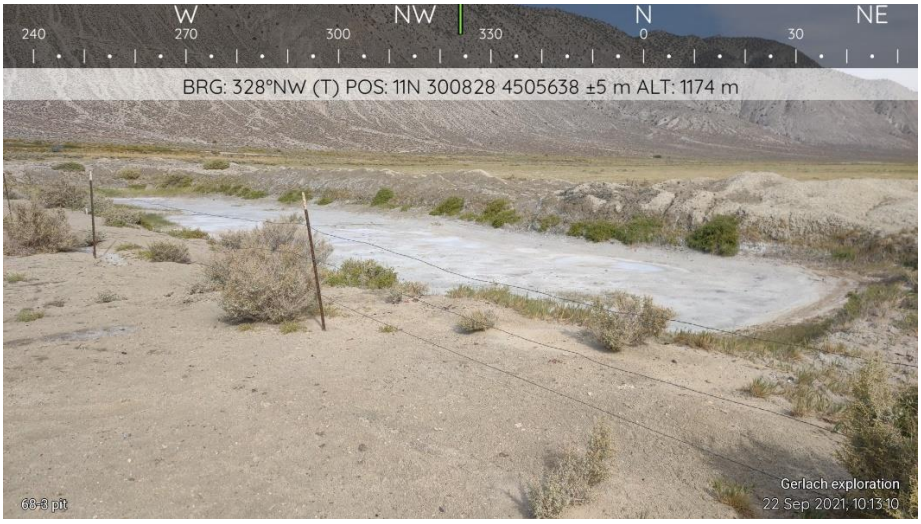
Figure A-11
Cumulative Effects Analysis Areas (Special Designations and Visual Resources, including Night Skies)

- Night Skies study area
- Hycroft Mine
- San Emidio geothermal power plant
- Gerlach geothermal AOI
- Burning Man special recreation permit area
- Wilderness area
- National conservation area
- Wilderness study area

Surface Management Agency
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Private
- Fish and Wildlife Service
- Water

Figure A-12, Photographs of Existing Well and Pad Features

Top: Existing well 68-3 pad. Photograph taken September 22, 2021.



Middle: Existing well 68-3 sump. Photograph taken September 22, 2021.

Bottom: Existing well 18A-10 gravel pad and wellhead. Photograph taken September 22, 2021.

Appendix B
References

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Appendix B. References

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Appendix C
Cultural Resources

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Appendix C. Cultural Resources

A records check of state and federal databases indicated 119 cultural resource inventories have been conducted within 1 mile of the project area since 1976. A total of 336 previously recorded archaeological sites—298 prehistoric, 26 historic, 11 multicomponent, and 1 of unknown age—were located within a 1-mile radius of the project area. Twenty-seven sites were recommended eligible for the National Register of Historic Places (NRHP), 58 were recommended not eligible, 250 were unevaluated, and no data were available for the remaining site. Of the previously recorded archaeological sites, 101 were located within the project area.

After the initial records search was completed, Kautz Environmental Consultants (KEC) completed a 5,578-acre survey and wrote a report titled Cultural Resources Inventory for the Ormat Nevada, Inc. Gerlach Geothermal Development Project, Washoe County, Nevada (CR2-3489). This survey included the 2,724-acre direct area of potential effect (APE) and a 2,854-acre linear corridor that was 23 miles long and 960 feet wide. This survey for the project was done to record any newly identified resources within the direct APE, update any resources recorded over 10 years ago, update the Nobles Route of the California National Historic Trail (NHT) and Western Pacific Railroad, establish key observation points (KOPs), and conduct visual assessments at certain known and new sites to evaluate ~~indirect~~ visual effects on NRHP values.

The Bureau of Land Management (BLM) has consulted with the Nevada State Historic Preservation Office (SHPO) as part of the Section106 process. Letters dated March 8, 2022 and May16, 2022 were sent by the BLM to the SHPO; SHPO responded April 8, 2022 and June 15, 2022. In these letters SHPO acknowledges the adequacy of the KOP study as well as the plan for unanticipated discoveries and plan for inadvertent discovery of human remains. The SHPO gave concurrence to site eligibility of sites in the area in a letter dated September 13, 2021 in relation to report CR2-3489 "Cultural Resources Inventory for the Ormat Nevada, Inc. Gerlach Geothermal Development Project, Washoe County, Nevada" which covers the entirety of the APE.

A total of 198 archaeological sites are addressed in the inventory report. These include 96 newly identified resources and 42 updates to previously recorded sites. These totals include four sites that were combined with resources. Sixty previously recorded sites that have not been relocated are addressed in the inventory report; many of these sites represent isolates and small lithic scatters that were previously collected. KEC identified 134 sites as being within the APE after surface survey and the consideration of collected sites and isolated artifacts.

RESOURCES OF CULTURAL SIGNIFICANCE

Cultural resources include prehistoric and historic archaeological sites, buildings, structures, districts, or other places or objects considered important to a culture, subculture, or community for traditional, religious, scientific, or other purposes. If these resources meet defined significance criteria, they are protected under several federal laws and executive orders. The federal laws include the National Historic Preservation Act of 1966, as amended; the Archaeological and Historic Preservation Act of 1974; the Archaeological Resources Protection Act of 1979; and the Native American Graves Protection and Reparation Act of 1990. These laws also require the ~~Bureau of Land Management (~~BLM~~)~~ to invite federally recognized tribes for government-to-government consultation, as do Executive Order 13007 (Indian Sacred Sites) and Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments).

Cultural resources are eligible for the NRHP if they meet one or more of four significance criteria (36 Code of Federal Regulations 60.4) and retain historic integrity. For an understanding of integrity, see the *National*

Register Bulletin provided by the National Park Service at https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf.

Historic and archaeological districts are evaluated for NRHP eligibility as a whole. Individual sites within a district are evaluated as contributing or not contributing to the district's significance. Sites within a district may also be evaluated individually for NRHP eligibility. Cultural resources eligible for the NRHP or contributing to an eligible district are referred to as historic properties. Unevaluated cultural resources are treated as though they are eligible or contributing; they are considered historic properties in this analysis.

The Guru Road area is not considered a site eligible for the NRHP due to its age. It is not 50 years old, no reports date Guru Road to before 1970. Under the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, Guru Road has been documented as part of the original Noble's Cutoff of the California Trail. The presence of art installments often immediately adjacent to the trail may be identified as a possible impact to the California Trail which is considered eligible for the NRHP. The proposed well pads near Guru Road are located on the other side of CR-34. The visual impact to the trail segment would have less impact to the eligible site than the current Guru Road features. For these reasons Guru Road is not identified as a "cultural resource" for protection and may in fact be degrading identified trail resources of significant cultural value.

RESOURCES IDENTIFIED

Cultural resources addressed in the inventory report are summarized in **Table C-1**. Resources presented in **Table C-1** include the 134 cultural resources that KEC confirmed in the APE.

Table C-1
Identified Cultural Resources

Agency Number CRNV-	Trinomial Number (26WA-)	Historic, Prehistoric, or Multicomponent	Description	National Register Recommendation	Criteria	District (Number: Contributing/ Non-Contributing)
02-31	2250	Multicomponent	Lithic and ground stone/refuse scatter	Eligible	D	—
02-32	2249	Prehistoric	Lithic scatter	Unevaluated	—	—
02-40	2257	Multicomponent	Lithic scatter Refuse scatter	Not eligible	—	—
02-42	2259	Prehistoric	Lithic scatter	Not eligible	—	—
02-106	2306	Prehistoric	Lithic and ground stone scatter	Eligible	D	—
02-122	2322	Prehistoric	Lithic scatter	Not eligible	—	—
02-125	2325	Prehistoric	Lithic scatter	Eligible	D	—
22-00902	6631	Multicomponent	Rock shelter, lithic scatter Prospecting, refuse scatter	Eligible	D	—
22-1211	3133	Prehistoric	Quarry	Eligible	D	D368: Contributing
22-1244	2592	Prehistoric	Lithic scatter	Not eligible	—	—
22-1245	2863	Prehistoric	Lithic scatter	Eligible	D	—
22-1274	2892	Prehistoric	Lithic scatter	Eligible	D	—
22-2858	3011	Prehistoric	Lithic scatter	Eligible	D	—
22-4178	3740	Prehistoric	Lithic scatter	Not eligible	—	D368: Non-contributing
22-4181	3743	Prehistoric	Lithic scatter	Eligible	D	D368: Contributing
22-5619	5540	Prehistoric	Lithic scatter	Not eligible	—	—
22-5620	5541	Historic	Refuse scatter	Not eligible	—	—
22-5656/ 02-4665	26WA5549/ 26PE2301	Historic	Guru Road segment/Nobles Route	Eligible	A	—
22-5702	6624	Prehistoric	Lithic and ground stone scatter	Eligible	D	—
22-5705	6627	Historic	Refuse scatter	Not eligible	—	—
22-5707	6629	Historic	Refuse scatter	Not eligible	—	—
22-5708	6630	Multicomponent	Lithic scatter Refuse scatter	Not eligible	—	—
22-5710	6632	Multicomponent	Rock shelter Historic refuse	Eligible	D	—
22-5711	6633	Prehistoric	Lithic scatter	Eligible	D	—
22-5738	5628	Prehistoric	Lithic scatter	Not eligible	—	—

Agency Number CRNV-	Trinomial Number (26WA-)	Historic, Prehistoric, or Multicomponent	Description	National Register Recommendation	Criteria	District (Number: Contributing/ Non-Contributing)
22-6149	12721	Multicomponent	Prehistorically important spring Historic spring/park	Eligible	A	—
22-6150	12722	Historic	Cemetery	Eligible	A, D	—
22-6151	12723	Prehistoric	Lithic scatter	Not eligible	—	—
22-6152	12724	Historic	Historic habitation	Eligible	D	—
22-6155	12725	Prehistoric	Lithic scatter	Not eligible	—	—
02-6736/ 12903	6358	Historic	Railroad tracks	Eligible	A	—
22-6814	6409	Historic	Gerlach Airport	Unevaluated	—	—
02-9102	9377	Historic	Refuse scatter	Not eligible	—	—
02-9105	9029	Prehistoric	Lithic scatter	Not eligible	—	D368: Non-contributing
02-9106	9030	Prehistoric	Lithic scatter	Not eligible	—	D368: Non-contributing
02-9107	9031	Multicomponent	Lithic scatter Mining claim	Not eligible	—	D368: Non-contributing
02-9108	9032	Prehistoric	Lithic scatter	Not eligible	—	D368: Non-contributing
02-9020	9378	Multicomponent	Lithic/refuse scatter	Eligible	D	—
02-12497	9733	Historic	Road	Not eligible	—	—
02-12498	9735	Historic	Refuse scatter	Not eligible	—	—
02-14303	12636	Historic	Refuse scatter	Not eligible	—	—
02-14304	12637	Historic	Refuse scatter	Not eligible	—	—
02-14305	12638	Historic	Refuse dump	Not eligible	—	—
02-14306	12639	Historic	Refuse scatter	Not eligible	—	—
02-14307	12640	Historic	Refuse scatter	Not eligible	—	—
02-14308	12641	Historic	Refuse scatter	Not eligible	—	—
02-14309	12642	Historic	Refuse scatter	Not eligible	—	—
02-14310	12643	Prehistoric	Lithic scatter	Not eligible	—	—
02-14311	12644	Historic	Refuse scatter	Not eligible	—	—
02-14312	12645	Prehistoric	Lithic scatter	Not eligible	—	—
02-14313	S2702	Historic	Corral	Not eligible	—	—
02-14314	12646	Historic	Refuse scatter	Not eligible	—	—
02-14315	12647	Prehistoric	Lithic scatter	Unevaluated	—	—
02-14316	12648	Prehistoric	Lithic scatter	Not eligible	—	—
02-14317	12649	Historic	Road	Not eligible	—	—
02-14318	12650	Historic	Refuse scatter	Not eligible	—	—
02-14319	12651	Prehistoric	Lithic scatter	Not eligible	—	—
02-14320	12652	Historic	Road	Not eligible	—	—

Agency Number CRNV-	Trinomial Number (26WA-)	Historic, Prehistoric, or Multicomponent	Description	National Register Recommendation	Criteria	District (Number: Contributing/ Non-Contributing)
02-14321	12653	Prehistoric	Lithic scatter	Unevaluated	—	—
02-14322	12654	Prehistoric	Lithic scatter	Not eligible	—	—
02-14323	12655	Prehistoric	Lithic scatter	Not eligible	—	—
02-14324	12656	Historic	Refuse scatter	Not eligible	—	—
02-14325	12657	Historic	Refuse dump	Not eligible	—	—
02-14326	S2703	Historic	Road: County Road 34	Not eligible	—	—
02-14327	S2704	Historic	Fence	Not eligible	—	—
02-14328	12658	Historic	Refuse scatter	Not eligible	—	—
02-14329	12659	Prehistoric	Lithic scatter	Not eligible	—	—
02-14330	12660	Historic	Refuse scatter	Not eligible	—	—
02-14331	12661	Prehistoric	Lithic and ground stone scatter	Eligible	D	—
02-14332	12662	Prehistoric	Lithic scatter	Not eligible	—	—
02-14333	12663	Prehistoric	Lithic scatter	Not eligible	—	—
02-14334	12664	Prehistoric	Lithic scatter	Not eligible	—	—
02-14335	12665	Prehistoric	Lithic scatter	Not eligible	—	—
02-14336	12666	Prehistoric	Lithic scatter	Not eligible	—	—
02-14337	12667	Prehistoric	Temporary camp	Eligible	D	—
02-14338	12668	Prehistoric	Flake and ground stone scatter with probable hearth	Eligible	D	—
02-14339	12669	Prehistoric	Lithic scatter	Not eligible	—	—
02-14340	12670	Prehistoric	Lithic scatter	Not eligible	—	—
02-14341	12671	Prehistoric	Lithic scatter	Not eligible	—	—
02-14342	12731	Multicomponent	Lithic and ground stone scatter Livestock operation	Eligible	D	D375: Contributing
02-14343	12672	Historic	Road	Not eligible	—	—
02-14344	12673	Prehistoric	Lithic scatter	Not eligible	—	—
02-14345	12674	Historic	Road	Not eligible	—	—
02-14346	12675	Historic	Road	Not eligible	—	—
02-14347	12676	Prehistoric	Lithic scatter	Not eligible	—	—
02-14349	12677	Historic	Refuse scatter	Not eligible	—	—
02-14350	12678	Prehistoric	Lithic scatter	Not eligible	—	—
02-14351	12679	Prehistoric	Lithic scatter	Not eligible	—	—
02-14352	12680	Prehistoric	Lithic scatter	Eligible	D	—
02-14353	12681	Historic	Refuse scatter	Not eligible	—	—
02-14354	12682	Multicomponent	Lithic/refuse scatter	Not eligible	—	—

Agency Number CRNV-	Trinomial Number (26WA-)	Historic, Prehistoric, or Multicomponent	Description	National Register Recommendation	Criteria	District (Number: Contributing/ Non-Contributing)
02-14355	12683	Historic	Road	Not eligible	—	—
02-14356	12684	Prehistoric	Lithic scatter	Eligible	D	—
02-14357	S2714	Historic	Corral	Not eligible	—	—
02-14358	12685	Prehistoric	Lithic scatter	Not eligible	—	—
02-14359	12686	Prehistoric	Lithic scatter	Not eligible	—	—
02-14360	12687	Historic	Road	Not eligible	—	—
02-14361	12688	Prehistoric	Lithic scatter	Not eligible	—	—
02-14362	12689	Historic	Cairns	Not eligible	—	—
02-14363	12690	Historic	Cairns	Not eligible	—	—
02-14364	12691	Historic	Refuse scatter	Not eligible	—	—
02-14365	12692	Historic	Refuse scatter	Not eligible	—	—
02-14366	12693	Prehistoric	Lithic scatter	Not eligible	—	—
02-14367	12694	Prehistoric	Lithic scatter	Not eligible	—	—
02-14368	12695	Historic	Road	Not eligible	—	—
02-14369	S2705	Historic	State Highway 447	Not eligible	—	—
02-14370	12696	Prehistoric	Lithic and ground stone scatter	Eligible	D	—
02-14371	12697	Prehistoric	Lithic scatter	Not eligible	—	—
02-14372	12698	Historic	Refuse scatter	Not eligible	—	—
02-14373	12699	Prehistoric	Lithic scatter	Not eligible	—	—
02-14374	12700	Prehistoric	Lithic scatter	Not eligible	—	—
02-14375	12701	Historic	Refuse scatter	Not eligible	—	—
02-14376	12702	Historic	Refuse scatter	Not eligible	—	—
02-14377	12703	Historic	Refuse scatter	Not eligible	—	—
02-14378	12704	Prehistoric	Lithic scatter	Not eligible	—	—
02-14379	12705	Prehistoric	Lithic scatter	Not eligible	—	—
02-14380	12706	Historic	Road	Not eligible	—	—
02-14381	12707	Prehistoric	Lithic scatter	Not eligible	—	—
02-14382	12708	Prehistoric	Lithic scatter	Not eligible	—	—
02-14383	12709	Prehistoric	Lithic scatter	Not eligible	—	—
02-14384	12710	Prehistoric	Lithic scatter	Not eligible	—	—
02-14385	12711	Prehistoric	Lithic scatter	Not eligible	—	—
02-14386	12712	Prehistoric	Lithic scatter	Not eligible	—	—
02-14387	12713	Prehistoric	Lithic scatter	Not eligible	—	—
02-14388	12714	Prehistoric	Lithic scatter	Not eligible	—	—
02-14389	12715	Prehistoric	Lithic scatter	Not eligible	—	—

Agency Number CRNV-	Trinomial Number (26WA-)	Historic, Prehistoric, or Multicomponent	Description	National Register Recommendation	Criteria	District (Number: Contributing/ Non-Contributing)
02-14390	12716	Prehistoric	Lithic scatter	Not eligible	—	—
02-14391	12717	Historic	Gravel pit	Not eligible	—	—
02-14392	12718	Historic	Road	Not eligible	—	—
02-14393	12719	Historic	Road	Not eligible	—	—
02-14394	12729	Historic	Ditch	Not eligible	—	—
02-14395	12730	Historic	Road 5-Mile Playa access	Not eligible	—	—
02-14396	12720	Historic	Road	Not eligible	—	—
02-14397	S2706	Historic	Transmission line	Eligible	A	—

There is one resource previously listed in the NRHP that is located within a 1-mile radius of the direct APE. It is the Gerlach Water Tower (National Register Information System number 81000385). The survey identified a total of 14 architectural resources within the project area; two are eligible for the NRHP under criterion A. These are summarized in **Table C-2**.

Table C-2
Architectural Resources

Agency Number CRNV-	State Historic Preservation Office Resource	Date Built	Name	NRHP Recommendation	Criteria	District
02-14313	S2702	Unknown	Corral	Not eligible	N/A	N/A
02-14326	S2703	1950	County Road 34	Not eligible	N/A	N/A
02-14327	S2704	1940	Fence	Not eligible	N/A	N/A
02-14342	D375	N/A (District)	Ranching Complex	Not eligible	N/A	N/A
02-14342	S2708	circa 1930	Ranch Building	Not eligible	N/A	Not contributing
02-14342	S2709	circa 1930	Livestock Chute	Not eligible	N/A	Not contributing
02-14342	S2710	circa 1960	Storage Structure	Not eligible	N/A	Not contributing
02-14342	S2711	circa 1930	Fence	Not eligible	N/A	Not contributing
02-14342	S2712	circa 1930	Corral 1	Not eligible	N/A	Not contributing
02-14342	S2713	circa 1930	Corral 2	Not eligible	N/A	Not contributing
02-14357	S2714	circa 1930–1964	Corral	Not eligible	N/A	N/A
02-14369	S2705	1911	State Highway 447	Not eligible	N/A	N/A
02-14397	S2706	1909	Western Pacific Telegraph Line	Eligible	A	N/A
02-6736	S2707/WA6358	1906–1909	Western Pacific Railroad	Eligible	A	N/A

VISUAL EFFECTS

KEC conducted an analysis of the project's visual effects on resources. The analysis for the report (CR2-3489) studied KOPs for the Gerlach Water Tower, the Gerlach Cemetery, and a portion of the Nobles Route of the California NHT. Environmental Management and Planning Solutions Inc. (EMPSi) conducted an analysis for a BLM Night Sky Baseline Report for the Gerlach Geothermal Exploration Project.

The BLM Instruction Memorandum NV IM-2021-006 (Bureau of Land Management Nevada Template Visual Area of Potential Effect [APE] Policy) provides a means to uniformly provide a visual APE. Using the intercept theorem/basic proportionality theorem, buffers of the proposed facilities were determined by calculating at what distance the 100- x 60-foot facility would appear 1 inch or less (that is, standing at the edge of the buffer, the facility would look the same size as an object 1 inch in size held at arm's length).

$$\frac{\text{Distance to X}}{\text{Size of X}} = \frac{\text{Distance to Y}}{\text{Size of Y}}$$

Given the intercept theorem, a 60-foot-tall drill rig that has a 100-foot base length could cover an area visually similar to an item 1 x 1 inch, given that the item was held at arm's length (30 inches) and that the

person was 0.44 miles away from the drill rig. This 0.44-mile buffer area did not intersect with any additional sites that would be affected by visual impacts in areas outside the APE on BLM-administered lands. Given that some surface disturbances, such as roads, have no or minimal height disturbances, these are not viewed as major visual impacts.

Concerning the Nobles Route of the California NHT and the Gerlach Cemetery, KEC concludes that "Effects of the planned exploration project will be temporary and limited to the duration of the temporary operations. While temporary changes in the visual baseline conditions of the area will occur, these will be resolved upon completion of the exploration project. This assessment indicates no historic properties would be affected." KEC also concluded that the view of the project from the water tower is already obstructed by the existing built environment of Gerlach.

Similarly, ~~EMPSi indicated that~~ for astrotourism, the "radiance level (of the drill rig) would be equivalent of the observed radiance of Gerlach" in a worst-case scenario (BLM 2022b). The visual effects on any unknown segments of the California NHT would likely be similar to these nighttime light radiance-level effects on astrotourism, given their geographic location on the Black Rock Playa. These effects are also likely to be limited and temporary. These effects may still constitute a temporary adverse effect on the California NHT. These temporary adverse effects would also occur on other sites, such as the Great Boiling Spring or other natural areas that may be associated with the use of the California NHT but that are on private land. These areas were not analyzed in detail as KOPs because they are outside the area of interest. Also, they are on private land and are similar to the known significant resources that were analyzed on BLM-administered lands. Additional visual effects are not anticipated because the KOP analysis indicated the effects would be limited and temporary at worst.

The year a geothermal parcel was leased may have an effect on the stipulations and analysis that can be used in determining mitigation requirements for pads within that parcel. Two of the lease parcels included within the area of interest, NVN-098641 and NVN-100029, have been leased recently under the 2019 and 2020 Geothermal Lease Sales (DOI-BLM-NV-W000-2020-0002-DNA and DOI-BLM-NV-W000-2019-0001-DNA). They contain no surface occupancy (NSO) stipulations, as required under the resource management plan (RMP) for the Winnemucca District concerning trails. Six well pads (86-16, 67-16, 45-16, 37-16, 62-20, and 11-21) are proposed to occur in these NSO areas and would require a waiver to proceed, as discussed in the Winnemucca District RMP. Additionally, well heads 37-16 and 62-20, which have a trails NSO stipulation, are in areas marked NSO due to NRHP-eligible sites. These well~~-head~~s would also require another waiver for surface use due to the NSO stipulations. These wells would not be permitted without a waiver and a further impact analysis. For these reasons, these six pads would not be permitted under this environmental assessment.

Lease areas NVN-075228 (2001) and NVN-055718 (1992) were leased much earlier and do not maintain the same stipulations and requirements as ~~parcels leased~~ later leases. Due to valid and existing rights, the pads in these areas would not have the same visual stipulations and requirements of visual effects that are addressed in the current RMPs (the 2004 Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area and Associated Wilderness and Other Contiguous Lands in Nevada RMP, and the 2015 Winnemucca District RMP) or BLM Trail Manual 6280 (2012); this is because their leasing predates the documents. At the time of their lease, the planning document for this area was the 1998 Sonoma-Gerlach Management Framework Plan, which did not have stipulations regarding trails. If a well pad is not placed directly on the cultural resource in these lease areas, there is little the BLM can mandate for visual effects on cultural properties in these lease areas. However, pad 83-16 proposed in the draft EA, has been found to be located on an eligible resource; for this reason, under the Sonoma-Gerlach Management Framework Plan, the BLM would not permit surface use on pad 83-16 without further consultation and review. Therefore, pad 83-16 would not be permitted under this environmental assessment. As a result of this finding, Ormat moved pad 83-16 so it is no longer located on an eligible resource and assigned it a new

identifying number, 84-16. With the avoidance of all sites directly and the finding that only temporary and no permanent adverse effects will impact cultural resources the BLM finds that the project will have no adverse effects on cultural properties.

Appendix D

Visual Contrast Rating Worksheets and Photographs

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1. KOP 1. Photograph taken March 2, 2021.

2. KOP 2. Photograph taken March 2, 2021.

3. KOP 3. Photograph taken March 2, 2021.

4. KOP 4. Photograph taken March 2, 2021.

5. KOP 5. Photograph taken March 2, 2021.

6. KOP 6. Photograph taken March 2, 2021.

7. KOP 7. Photograph taken March 2, 2021.

Visual Resource Photo Log

Date (MM/DD/YYYY)	**Time** (hh:mm)	**Photo #**	**KOP #** (4 digit sequential #, starting from 0001)	**KOP Name**	**Elevation** (feet)	**Type of Feature Point Represents** (stationary, along a route, boundary)	**Observer Height**	**Comments and Methodology** (description of the reasoning behind determining the KOP and description of the KOP)
03/02/2021	10:49 AM	—	0007	KOP 7	3,900	NV State Route 447, viewing N-NW, 180°	5’6”	Viewpoint at a distance looking towards AOI and including Gerlach; adjacent to NV State Route 447
03/02/2021	11:38 AM	—	0006	KOP 6	3,960	Community of Gerlach, NV; viewing N-NW, 180°	5’6”	Viewpoint from Gerlach adjacent to NV State Route 447 within the AOI
03/02/2021	11:55 AM	—	0005	KOP 5	4,087	Water tanks, viewing E-S-W, 180°	5’6”	Viewpoint toward AOI from an elevated location adjacent to the project and NV State Route 447
03/02/2021	12:45 PM	—	0001	KOP 1	3,948	3-Mile playa access point, viewing SW, 180°	5’6”	Viewpoint from the north-east portion of AOI looking into (SW) the AOI, adjacent to County Road 34
03/02/2021	1:21 PM	—	0002	KOP 2	3,940	Black Rock Desert Playa viewing SW, 180°	5’6”	Viewpoint from Black Rock Desert playa toward AOI
03/02/2021	1:45 PM	—	0004	KOP 4	4,000	Black Rock Station and Visitor Center, viewing N-NW, 180°	5’6”	Viewpoint within central portion of AOI from Black Rock Station and Visitor Center
03/02/2021	2:23 PM	—	0003	KOP 3	4,140	Overlook viewing NE, 180°	5’6”	Viewpoint toward the AOI from an elevated location (KOP is within the AOI)

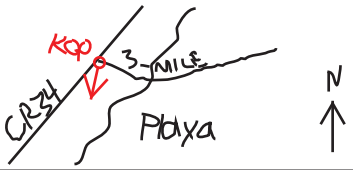
Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/02/2021
District Office: Winnemucca
Field Office: Black Rock
Land Use Planning Area: Winnemucca

SECTION A. PROJECT INFORMATION

1. Project Name Gerlach Geothermal Exploration Project	4. KOP Location (T.R.S) T33N, R23E, S34	5. Location Sketch
2. Key Observation Point (KOP) Name KOP 1		
3. VRM Class at Project Location VRM Class II	(Lat. Long) 40° 41' 49" N, 119° 21' 4" W	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat to steep	Numerous complex forms	None evident
LINE	Horizontal to diagonal, weak transition	Continuous and rugged	None evident
COLOR	Dull light brown	Dull light green	None evident
TEX-TURE	Fine and rough	Coarse and dense, uneven distribution	None evident

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access roads	Linear form from access roads, vertical form from well heads
LINE	Horizontal and vertical	Lines created by access roads	Horizontal access roads
COLOR	Light browns	Tans and greens	Light brown access roads and well heads
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓				✓	
	LINE			✓				✓				✓	
	COLOR			✓				✓				✓	
	TEXTURE			✓				✓				✓	

2. Does project design meet visual resource management objectives? ✓Yes ___No
(Explain on reverses side)

3. Additional mitigating measures recommended
✓Yes ___No (Explain on reverses side)

Evaluator's Names: Morgan Trieger
Date: 02/15/2021

(Continued on Page 2)

Comments from item 2.

Wellheads would be painted a color consistent with BLM visual color guidelines that blends with the surrounding landscape to minimize visibility.

Following construction, areas of disturbed land no longer required for operations would be reclaimed. Reclaimed areas would be recontoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved revegetation methods would be used, including use of stockpiled topsoil to aid revegetation.

The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely, Washoe County Road 34. Access roads and wellheads could be seen by the casual observer, but would not protrude above the skyline and therefore would not attract attention.

Additional Mitigating Measures (See item 3)

No additional mitigating measures are recommended outside of the applicant-committed environmental protection measures described in the Operations Plan.

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/02/2021
District Office: Winnemucca
Field Office: Black Rock
Land Use Planning Area: Winnemucca

SECTION A. PROJECT INFORMATION

1. Project Name
Gerlach Geothermal Exploration Project

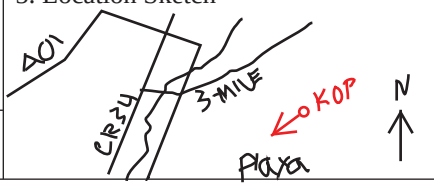
2. Key Observation Point (KOP) Name
KOP 2

3. VRM Class at Project Location
Unassigned

4. KOP Location
(T.R.S)
T33N, R23E, S35

(Lat. Long)
40° 41' 41" N, 119° 20' 12" W

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Simple	Simple	Simple
LINE	Horizontal, bold edge	Simple, irregular, not present in foreground	Horizontal
COLOR	Light tan and brown	Dark green	White
TEX-TURE	Smooth	Fine	Blends with horizon, slightly rough

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access roads	Linear form from access roads, vertical form from well heads
LINE	Horizontal and vertical	Lines created by access roads	Horizontal access roads
COLOR	Light browns	Tans and greens	Light brown access roads and well heads
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) STRONG	MODERATE	WEAK	NONE	VEGETATION (2) STRONG	MODERATE	WEAK	NONE	STRUCTURES (3) STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓					✓			✓	
	LINE			✓					✓			✓	
	COLOR				✓				✓			✓	
	TEXTURE				✓				✓			✓	

2. Does project design meet visual resource management objectives? ✓ Yes ___ No
(Explain on reverses side)

3. Additional mitigating measures recommended
___ Yes ✓ No (Explain on reverses side)

Evaluator's Names
Morgan Trieger

Date
02/15/2021

(Continued on Page 2)

Comments from item 2.

Wellheads would be painted a color consistent with BLM visual color guidelines that blends with the surrounding landscape to minimize visibility.

Following construction, areas of disturbed land no longer required for operations would be reclaimed. Reclaimed areas would be recontoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved revegetation methods would be used, including use of stockpiled topsoil to aid revegetation.

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

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely, the community of Gerlach and associated structures including Washoe County Road 34. Access roads and wellheads could be seen by the casual observer, but would not protrude above the skyline and therefore would not attract attention.

Additional Mitigating Measures (See item 3)

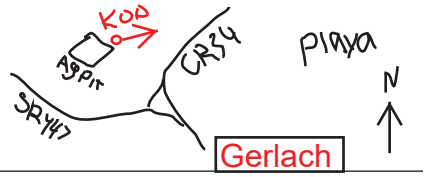
No additional mitigating measures are recommended outside of the applicant-committed environmental protection measures described in the Operations Plan.

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/02/2021
District Office: Winnemucca
Field Office: Black Rock
Land Use Planning Area: Winnemucca

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Gerlach Geothermal Exploration Project	T33N, R23E, S16	
2. Key Observation Point (KOP) Name KOP 3		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 40° 39' 38" N, 119° 22' 27" W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, rugged	Simple, numerous	Rectangular
LINE	Horizontal, broken by highway, angular edges	Transitional edge, uneven	Vertical, horizontal
COLOR	Dull tans and greys	Dull green, light brown	White and black
TEX-TURE	Rough, patchy	Medium grained, scattered	Coarse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access roads	Linear form from access roads, vertical form from well heads
LINE	Horizontal and vertical	Lines created by access roads	Horizontal access roads
COLOR	Light browns	Tans and greens	Light brown access roads and well heads
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓				✓	
	LINE			✓				✓				✓	
	COLOR			✓				✓				✓	
	TEXTURE			✓				✓				✓	

2. Does project design meet visual resource management objectives? ✓ Yes ___ No
(Explain on reverses side)

3. Additional mitigating measures recommended
___ Yes ✓ No (Explain on reverses side)

Evaluator's Names: Morgan Trieger
Date: 02/15/2021

(Continued on Page 2)

Comments from item 2.

Wellheads would be painted a color consistent with BLM visual color guidelines that blends with the surrounding landscape to minimize visibility.

Following construction, areas of disturbed land no longer required for operations would be reclaimed. Reclaimed areas would be recontoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved revegetation methods would be used, including use of stockpiled topsoil to aid revegetation.

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

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely, the community of Gerlach and associated structures including Washoe County Road 34 and areas with disturbed vegetation and aggregate piles. Access roads and wellheads could be seen by the casual observer, but would not protrude above the skyline and therefore would not attract attention.

Additional Mitigating Measures (See item 3)

No additional mitigating measures are recommended outside of the applicant-committed environmental protection measures described in the Operations Plan.

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/02/2021
District Office: Winnemucca
Field Office: Black Rock
Land Use Planning Area: Winnemucca

SECTION A. PROJECT INFORMATION

1. Project Name Gerlach Geothermal Exploration Project	4. KOP Location (T.R.S) T33N, R23E, S15	5. Location Sketch
2. Key Observation Point (KOP) Name KOP 4		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 40° 39' 34" N, 119° 22' 11" W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat to steep	Numerous, complex forms	Rectangular, angular
LINE	Horizontal, undulating	Regular, interrupted by structures, rugged	Vertical, angular
COLOR	Light tans and browns	Dull, light green	Tan and white, brown and black
TEX-TURE	Smooth	Coarse	Coarse, clumped

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access roads	Linear form from access roads, vertical form from well heads
LINE	Horizontal and vertical	Lines created by access roads	Horizontal access roads
COLOR	Light browns	Tans and greens	Light brown access roads and well heads
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓					✓
	LINE			✓				✓					✓
	COLOR				✓			✓					✓
	TEXTURE			✓				✓					✓

2. Does project design meet visual resource management objectives? ✓ Yes ___ No
(Explain on reverses side)

3. Additional mitigating measures recommended
___ Yes ✓ No (Explain on reverses side)

Evaluator's Names: Morgan Trieger
Date: 02/15/2021

(Continued on Page 2)

Comments from item 2.

Wellheads would be painted a color consistent with BLM visual color guidelines that blends with the surrounding landscape to minimize visibility.

Following construction, areas of disturbed land no longer required for operations would be reclaimed. Reclaimed areas would be recontoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved revegetation methods would be used, including use of stockpiled topsoil to aid revegetation.

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

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely, the parking lot, restroom, and shade canopy at the Black Rock Station, Transfer Station Road, Washoe County Road 34, and areas with disturbed vegetation and aggregate piles. Access roads and wellheads could be seen by the casual observer, but would not protrude above the skyline and therefore would not attract attention.

Additional Mitigating Measures (See item 3)

No additional mitigating measures are recommended outside of the applicant-committed environmental protection measures described in the Operations Plan.

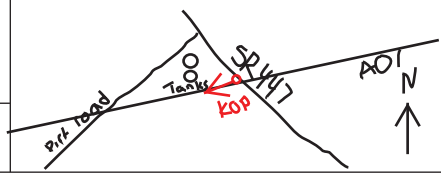
Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/02/2021
District Office: Winnemucca
Field Office Black Rock
Land Use Planning Area: Winnemucca

SECTION A. PROJECT INFORMATION

1. Project Name Gerlach Geothermal Exploration Project	4. KOP Location (T.R.S) T33N, R23E, S16	5. Location Sketch
2. Key Observation Point (KOP) Name KOP 5		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 40° 39' 34" N, 119° 23' 14" W	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Rolling	Complex, numerous shrubs, few trees	Cylindrical, vertical
LINE	Rugged, undulating	Uneven	Vertical
COLOR	Light tans and browns	Tan and dull green	Tan and brown (utility poles)
TEX-TURE	Medium	Medium to coarse, scattered	Coarse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access roads	Linear form from access roads, vertical form from well heads
LINE	Horizontal and vertical	Lines created by access roads	Horizontal access roads
COLOR	Light browns	Tans and greens	Light brown access roads and well heads
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓				✓	
	LINE			✓				✓				✓	
	COLOR				✓			✓				✓	
	TEXTURE			✓				✓				✓	

2. Does project design meet visual resource management objectives? ✓ Yes ___ No
(Explain on reverses side)

3. Additional mitigating measures recommended
___ Yes ✓ No (Explain on reverses side)

Evaluator's Names: Morgan Trieger
Date: 02/15/2021

(Continued on Page 2)

Comments from item 2.

Wellheads would be painted a color consistent with BLM visual color guidelines that blends with the surrounding landscape to minimize visibility.

Following construction, areas of disturbed land no longer required for operations would be reclaimed. Reclaimed areas would be recontoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved revegetation methods would be used, including use of stockpiled topsoil to aid revegetation.

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

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely, the water tanks, utility poles and line, dirt roads, and graded areas with disturbed vegetation. Access roads and wellheads could be seen by the casual observer, but would not protrude above the skyline and therefore would not attract attention.

Additional Mitigating Measures (See item 3)

No additional mitigating measures are recommended outside of the applicant-committed environmental protection measures described in the Operations Plan.

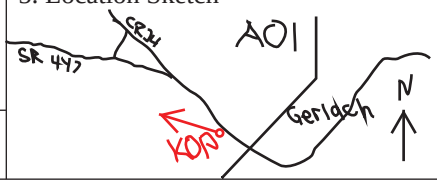
Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/02/2021
District Office: Winnemucca
Field Office: Black Rock
Land Use Planning Area: Winnemucca

SECTION A. PROJECT INFORMATION

1. Project Name Gerlach Geothermal Exploration Project	4. KOP Location (T.R.S) T33N, R23E, S15	5. Location Sketch
2. Key Observation Point (KOP) Name KOP 6		
3. VRM Class at Project Location Unassigned	(Lat. Long) 40° 39' 15" N, 119° 21' 42" W	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat and rolling	Simple	Vertical, angular
LINE	Horizontal, regular	Smooth, broken by patchy shrubs	Vertical
COLOR	Tans, black (road)	Tan and dull green	Green and white
TEX-TURE	Fine, even	Fine to medium, patchy	Coarse and random

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access roads	Linear form from access roads, vertical form from well heads
LINE	Horizontal and vertical	Lines created by access roads	Horizontal access roads
COLOR	Light browns	Tans and greens	Light brown access roads and well heads
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) STRONG	MODERATE	WEAK	NONE	VEGETATION (2) STRONG	MODERATE	WEAK	NONE	STRUCTURES (3) STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓					✓
	LINE			✓				✓					✓
	COLOR				✓			✓					✓
	TEXTURE			✓				✓					✓

2. Does project design meet visual resource management objectives? ✓ Yes ___ No
(Explain on reverses side)

3. Additional mitigating measures recommended
___ Yes ✓ No (Explain on reverses side)

Evaluator's Names: Morgan Trieger
Date: 02/15/2021

(Continued on Page 2)

Comments from item 2.

Wellheads would be painted a color consistent with BLM visual color guidelines that blends with the surrounding landscape to minimize visibility.

Following construction, areas of disturbed land no longer required for operations would be reclaimed. Reclaimed areas would be recontoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved revegetation methods would be used, including use of stockpiled topsoil to aid revegetation.

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

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely, Nevada State Route 447, utility poles and line, and other structures around Gerlach. Access roads and wellheads could be seen by the casual observer, but would not protrude above the skyline and therefore would not attract attention.

Additional Mitigating Measures (See item 3)

No additional mitigating measures are recommended outside of the applicant-committed environmental protection measures described in the Operations Plan.

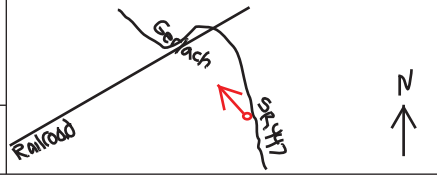
Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 03/02/2021
District Office: Winnemucca
Field Office: Black Rock
Land Use Planning Area: Winnemucca

SECTION A. PROJECT INFORMATION

1. Project Name Gerlach Geothermal Exploration Project	4. KOP Location (T.R.S) T33N, R23E, S34	5. Location Sketch
2. Key Observation Point (KOP) Name KOP 7		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 40° 38' 15" N, 119° 20' 24" W	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat	Simple, few	Horizontal, angular
LINE	Horizontal, bold	Angular, broken	Bold, jagged
COLOR	Light tan	Grey, dark green	White
TEX-TURE	Smooth	Sparse and patchy	Coarse, uniform

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Horizontal and vertical	Linear form from access roads	Linear form from access roads, vertical form from well heads
LINE	Horizontal and vertical	Lines created by access roads	Horizontal access roads
COLOR	Light browns	Tans and greens	Light brown access roads and well heads
TEX-TURE	Fine and smooth	Fine to moderate	Fine to moderate

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓					✓				✓
	LINE			✓					✓				✓
	COLOR				✓				✓				✓
	TEXTURE				✓				✓				✓

2. Does project design meet visual resource management objectives? ✓ Yes ___ No
(Explain on reverses side)

3. Additional mitigating measures recommended
___ Yes ✓ No (Explain on reverses side)

Evaluator's Names: Morgan Trieger
Date: 02/15/2021

(Continued on Page 2)

Comments from item 2.

Wellheads would be painted a color consistent with BLM visual color guidelines that blends with the surrounding landscape to minimize visibility.

Following construction, areas of disturbed land no longer required for operations would be reclaimed. Reclaimed areas would be recontoured to blend with surrounding topography to the extent possible. Suitable, BLM-approved revegetation methods would be used, including use of stockpiled topsoil to aid revegetation.

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

The proposed facilities repeat basic elements present in the landscape character, as there are already non-natural lines and forms, namely, the community of Gerlach and associated structures in the background. Access roads and wellheads likely could not be seen by the casual observer at this distance, and would not protrude above the skyline, therefore they would not attract attention.

Additional Mitigating Measures (See item 3)

No additional mitigating measures are recommended outside of the applicant-committed environmental protection measures described in the Operations Plan.

Appendix E

Greenhouse Gas Emissions

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February 23, 2022

ATTN: Ms. Tai Subia
Bureau of Land Management
Winnemucca District
5100 East Winnemucca Blvd.
Winnemucca, NV 89445

Re: Air Emission Baseline Estimates for the Gerlach Geothermal Exploration Project

Dear Ms. Subia:

Ormat Nevada, Inc. (Ormat) is hereby providing the Bureau of Land Management, Winnemucca District Office baseline air emission estimates for the Gerlach Geothermal Exploration Project (Project). The Project is located in Washoe County, Nevada in portions of Township (T) 32 North (N), Range (R) 23 East (E), Sections 3, 9, 10, 15-17, 20-21 and T33N, R23E, Sections 34-35.

The Project is located in an area designated as attainment for all criteria pollutants as ambient concentrations in the area are below Nevada and National Ambient Air Quality Standards (NvAAQS, NAAQS). The Project is located less than one mile northwest of Gerlach, Nevada in a minimally developed area. Although the Project is not expected to cause an exceedance of any one criteria pollutant as the emission sources are intermittent and short-term in duration, an emission estimation has been prepared. The climate in the area is classified as arid with low rainfall and annual and diurnal temperature ranges.

The air emissions for the Project were evaluated using the U.S. Environmental Protection Agency approved AP-42 emission factors. A conservative hourly and annual emission inventory for criteria pollutants was prepared and is attached summarizing data inputs with maximum expected timeframes. The pollutants include particulate matter in aerodynamic size of 10 and 2.5 microns or less (PM, PM_{10}, $PM_{2.5}$), carbon monoxide (CO), Oxides of Nitrogen (NOx), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOCs), greenhouse gases (GHG), and Hazardous Air Pollutants (HAPs). Best Management Practices were factored into the emission estimations for particulate as watering of roadways would be required to control fugitive dust.

A summary of air emission estimate totals is shown in Table 1 for the three main phases of the Project including construction, well drilling, and well testing. It is proposed that up to 20 geothermal exploration wells would be drilled and tested for the Project. Construction procedures would include drill pad preparation activities including clearing, earthwork, drainage, and other improvements necessary for efficient and safe operation and fire prevention. Ormat would only clear well pads for those wells scheduled to be drilled. The

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typical drilling time per well is approximately 45 days with drilling occurring 24 hours a day, seven days a week. Once wells are drilled, well testing would commence with short term well testing lasts three to five days on average and long-term well testing lasts on average seven to 30 days. To take into consideration worst case scenario, the long-term drilling emissions were analyzed for the Project at 24 hours per day and 45 days per well. In addition, vehicle traffic emissions from workers and material transportation were estimated. All inputs can be found in the reference information (attached).

Table 1: Gerlach Project Air Emission Estimate Totals

Pollutant	Hourly Pounds (lbs/hr)				Annual Tons (tons/yr)		
	Construction	Well Drilling	Testing		Construction	Well Drilling	Testing
PM	13.50	1.52	1.84		0.34	0.65	0.69
PM10	3.44	1.13	0.66		0.10	0.56	0.44
PM2.5	0.36	1.00	0.29		0.01	0.54	0.36
CO	0.17	17.51	8.00		0.59	9.36	10.81
NOx	0.06	29.67	7.44		0.25	16.03	10.37
SO2	0.00	0.03	0.01		0.00	0.02	0.02
VOCs	0.00	1.98	0.69		0.00	1.07	0.93
GHG	346	3446	1448		1552	1898	2069
Single Highest HAP-Formaldehyde	0	0	0		0.0E+00	2.6E-02	5.7E-02
Total HAPs	0	0	0		0.0E+00	8.5E-02	1.9E-01

The emission estimates show that the Project would not result in major emissions of pollutants. In addition, based on the intermittent and short duration of exploration activities and small amount of emission sources, it is hard to predict GHG cumulative impacts and climate change on a local scale to compare to global climate changes. Overall, the remoteness of the Project in combination with the low emission estimates suggests the Project would not contribute significantly to air pollution levels locally or regionally.

Should you have any questions, please feel free to contact me at (775) 446-9648.

Sincerely,

Kim Carter
Environmental Permitting Specialist
Ormat Nevada, Inc.
kcarter@ormat.com

Attachment: Air Emissions Inventory Spreadsheet

Crescent Valley Geothermal Exploration Project
Ormat Nevada, Inc.

Project Emission Totals (Worst-Case)

Pollutant	Hourly Pounds (lbs/hr)				Annual Tons (tons/yr)		
	Construction	Well Drilling	Testing		Construction	Well Drilling	Testing
PM	13.50	1.52	1.84		0.34	0.65	0.69
PM10	3.44	1.13	0.66		0.10	0.56	0.44
PM2.5	0.36	1.00	0.29		0.01	0.54	0.36
CO	0.17	17.51	8.00		0.59	9.36	10.81
NOx	0.06	29.67	7.44		0.25	16.03	10.37
SO2	0.00	0.03	0.01		0.00	0.02	0.02
VOCs	0.00	1.98	0.69		0.00	1.07	0.93
GHG	346	3446	1448		1552	1898	2069
Single Highest HAP-Formaldehyde	0	0	0		0.0E+00	2.6E-02	5.7E-02
Total HAPs	0	0	0		0.0E+00	8.5E-02	1.9E-01

								Emission Factor									
	Emission Source	**Daily Hrs**	**Ann Hrs**	**% Control**	**Type**	**Rating**		**PM**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**VOC**	**CO2**	**CH4**	**N2O**
Construction	EF Unit					***VMT/hr***	***VMT/yr***	***lb/VMT***	***lb/VMT***	***lb/VMT***	***g/mile***	***g/mile***	***g/mile***		***g/mile***		
	Graders	10	280	90%	Water	20	560	12.6	3.1	0.4	1.6	0.7	0.002		4.1E+03		
	Water Trucks	10	280	90%	Water	50	1,400	6.0	1.5	0.2	1.6	0.7	0.002		4.1E+03		
	1-ton Crew Trucks	1	7	90%	Water	15	210	2.7	0.7	0.1	1.6	0.7	0.002		4.1E+03		
	EF Unit					***tons***	***tons/yr***	***lb/ton***	***lb/ton***	***lb/ton***	***g/mile***	***g/mile***	***g/mile***		***g/mile***		
	Loader	10	140	0%	None	5	560	5.9E-04	2.8E-04	4.2E-05	1.6	0.7	0.002		4.1E+03		
	Excavator	10	350	0%	None	3.75	560	5.9E-04	2.8E-04	4.2E-05	1.6	0.7	0.002		4.1E+03		
	EF Unit					acre		***lb/acre***	***lb/acre***	***lb/acre***							
	Wind Erosion- Stockpiles			0%	None	1.00		1.3E-02	6.5E-03	9.7E-04							
Well Drilling						***hp-hr***		***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***
	Large Rotary Drill Rig (Tier 2)	24	1,080	0%	None	1,600		3.3E-04	3.3E-04	3.3E-04	5.8E-03	9.9E-03	1.1E-05	6.6E-04	1.1E+00	4.6E-05	9.3E-06
	3 Diesel Pump Engines (Generator)	24	1,080	0%	None	1,408		3.3E-04	3.3E-04	3.3E-04	5.8E-03	9.9E-03	1.1E-05	6.6E-04	1.1E+00	4.6E-05	9.3E-06
Testing	EF Unit					***hp-hr***		***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***	***lb/ hp-hr***
	Aggreko 500kw Diesel Generator	24	2,880	0%	None	671		3.3E-04	3.3E-04	3.3E-04	5.8E-03	9.9E-03	1.1E-05	6.6E-04	1.1E+00	4.6E-05	9.3E-06
	Light Tower 20kw-Isuzu 4LE2T Tier 4 Engine	12	1,440	0%	None	27		4.9E-05	4.9E-05	4.9E-05	9.0E-03	6.9E-03	1.1E-05	1.3E-03	1.1E+00	4.6E-05	9.3E-06
	Light Tower 20kw-Isuzu 4LE2T Tier 4 Engine-12	12	1,440	0%	None	27		4.9E-05	4.9E-05	4.9E-05	9.0E-03	6.9E-03	1.1E-05	1.3E-03	1.1E+00	4.6E-05	9.3E-06
	6GHT Pump (Tier 4)	24	2,880	0%	None	115		3.3E-05	3.3E-05	3.3E-05	8.2E-03	6.6E-04	1.1E-05	3.1E-04	1.1E+00	4.6E-05	9.3E-06
	7kW Light Towers (Injection Pad - Kubota D1005 Engine, Tier 4)	12	1,440	0%	None	9.4		6.6E-04	6.6E-04	6.6E-04	1.3E-02	1.1E-02	1.1E-05	1.3E-03	1.1E+00	4.6E-05	9.3E-06
	8 GHH Pump (Tier 4)	24	2,880	0%	None	415		3.3E-05	3.3E-05	3.3E-05	5.8E-03	6.6E-04	1.1E-05	3.1E-04	1.1E+00	4.6E-05	9.3E-06
	ROADS - FUGITIVE																
Well Drilling	EF Unit					***VMT***		***lb/VMT***	***lb/VMT***	***lb/VMT***							
	Vehicle Type A on Unpaved Roads	4	480	90%	Water	4.5		2.4E+00	6.1E-01	6.1E-02							
Testing	Vehicle Type A on Unpaved Roads	4	480	90%	Water	4.5		2.4E+00	6.1E-01	6.1E-02							
	ROADS- COMBUSTION					***VMT/hr***	***VMT/yr***	***g/mile***	***g/mile***	***g/mile***	***g/mile***	***g/mile***	***g/mile***		***g/mile***		
Construction	Heavy Tractor/trailers (Delivery/Pickup)	4	200	0%	None	53.5	53.5	0.042	0.042	0.039	1.31	0.68	0.00		4.1E+03		
Well Drilling	Workers Traveling from Gerlach	1	2,880	0%	None	4.5	2.25	0.005	0.005	0.004	1.60	0.68	0.00		4.1E+03		
	Workers 2 trips Reno to Gerlach	2	32	0%	None	107	53.5	0.005	0.005	0.004	1.60	0.68	0.00		4.1E+03		
Testing	Workers Travel from Gerlach	1	2,880	0%	None	4.5	2.25	0.005	0.005	0.004	1.60	0.68	0.00		4.1E+03		
	Workers 2 trips Reno to Gerlach	2	32	0%	None	107	53.5	0.005	0.005	0.004	1.60	0.68	0.00		4.1E+03		

Emissions Estimate (lbs/hr)											Emissions Estimate (tons/yr)										
PM	PM10	PM2.5	CO	NOx	SO2	VOC	CO2	CH4	N2O	GHG	PM	PM10	PM2.5	CO	NOx	SO2	VOC	CO2	CH4	N2O	GHG
2.53	0.61	0.08	0.01	0.00	0.00		1.8E+01				1.77E-01	4.28E-02	5.49E-03	2.8E-02	1.2E-02	3.4E-05		7.2E+01			
2.99	0.77	0.08	0.02	0.01	0.00		4.6E+01				8.37E-02	2.15E-02	2.15E-03	6.9E-02	2.9E-02	8.5E-05		1.8E+02			
7.96	2.05	0.20	0.11	0.04	0.00		2.7E+02				9.29E-04	2.39E-04	2.39E-05	2.6E-04	1.1E-04	3.2E-07		6.7E-01			
3.0E-03	1.4E-03	2.1E-04	1.8E-03	7.5E-04	2.2E-06		4.6E+00				2.3E-02	1.1E-02	1.7E-03	1.4E-01	5.9E-02	1.7E-04		3.6E+02			
2.2E-03	1.1E-03	1.6E-04	1.3E-03	5.6E-04	1.6E-06		3.4E+00				5.8E-02	2.7E-02	4.2E-03	3.5E-01	1.5E-01	4.2E-04		8.9E+02			
0.01	0.01	0.00									6.5E-06	3.2E-06	4.9E-07								
0.53	0.53	0.53	9.21	15.78	0.02	1.05	1.8E+03	0.07	0.01		2.8E-01	2.8E-01	2.8E-01	5.0E+00	8.5E+00	9.4E-03	5.7E-01	9.9E+02	4.0E-02	8.0E-03	
0.46	0.46	0.46	8.10	13.89	0.02	0.93	1.6E+03	0.07	0.01		2.5E-01	2.5E-01	2.5E-01	4.4E+00	7.5E+00	8.3E-03	5.0E-01	8.7E+02	3.5E-02	7.0E-03	
0.22	0.22	0.22	3.86	6.61	0.01	0.44	7.7E+02	0.03	0.01		3.2E-01	3.2E-01	3.2E-01	5.6E+00	9.5E+00	1.0E-02	6.3E-01	1.1E+03	4.5E-02	8.9E-03	
0.00	0.00	0.00	0.24	0.19	0.00	0.04	3.1E+01	0.00	0.00		9.5E-04	9.5E-04	9.5E-04	1.7E-01	1.3E-01	2.1E-04	2.6E-02	2.2E+01	8.9E-04	1.8E-04	
0.00	0.00	0.00	0.24	0.19	0.00	0.04	3.1E+01	0.00	0.00		9.5E-04	9.5E-04	9.5E-04	1.7E-01	1.3E-01	2.1E-04	2.6E-02	2.2E+01	8.9E-04	1.8E-04	
0.00	0.00	0.00	0.95	0.08	0.00	0.04	1.3E+02	0.01	0.00		5.4E-03	5.4E-03	5.4E-03	1.4E+00	1.1E-01	1.8E-03	5.2E-02	1.9E+02	7.7E-03	1.5E-03	
0.01	0.01	0.01	0.12	0.10	0.00	0.01	1.1E+01	0.00	0.00		4.4E-03	4.4E-03	4.4E-03	8.9E-02	7.4E-02	7.3E-05	8.9E-03	7.7E+00	3.1E-04	6.3E-05	
0.01	0.01	0.01	2.39	0.27	0.00	0.13	4.7E+02	0.02	0.00		2.0E-02	2.0E-02	2.0E-02	3.4E+00	3.9E-01	6.5E-03	1.9E-01	6.8E+02	2.8E-02	5.5E-03	
0.27	0.07	0.01									5.67E-02	1.46E-02	1.46E-03								
0.27	0.07	0.01									5.67E-02	1.46E-02	1.46E-03								
1.2E-03	1.2E-03	1.1E-03	3.9E-02	4.4E-05	1.3E-07		2.7E-01				5.0E-04	5.0E-04	4.6E-04	8.0E-03	8.0E-03	2.3E-05		4.9E+01			
4.8E-05	4.8E-05	4.3E-05	1.6E-02	1.5E-05	4.3E-08		9.1E-02				3.4E-05	3.4E-05	3.1E-05	1.1E-02	4.9E-03	1.4E-05		3.0E+01			
5.7E-04	5.7E-04	5.1E-04	1.9E-01	1.8E-04	5.1E-07		1.1E+00				9.1E-06	9.1E-06	8.1E-06	3.0E-03	1.3E-03	3.7E-06		7.8E+00			
4.8E-05	4.8E-05	4.3E-05	1.6E-02	1.5E-05	4.3E-08		9.1E-02				3.4E-05	3.4E-05	3.1E-05	1.1E-02	4.9E-03	1.4E-05		3.0E+01			
5.7E-04	5.7E-04	5.1E-04	1.9E-01	1.8E-04	5.1E-07		1.1E+00				9.1E-06	9.1E-06	8.1E-06	3.0E-03	1.3E-03	3.7E-06		7.8E+00			

Emissions Estimate (lbs/hr)											Emissions Estimate (tons/yr)											TOTALS
PM	PM10	PM2.5	CO	NOx	SO2	VOC	CO2	CH4	N2O	GHG	PM	PM10	PM2.5	CO	NOx	SO2	VOC	CO2	CH4	N2O	GHG	
13.50	3.44	0.36	0.17	0.06	0.00	0.00	345.92	0.00	0.00	345.92	0.34	0.10	0.01	0.59	0.25	0.00	0.00	1552.03	0.00	0.00	1552.03	**Construction**
1.52	1.13	1.00	17.51	29.67	0.03	1.98	3434.51	0.14	0.03	3446.29	0.65	0.56	0.54	9.36	16.03	0.02	1.07	1891.39	0.08	0.02	1897.75	**Well Drilling**
1.84	0.66	0.29	8.00	7.44	0.01	0.69	1443.34	0.06	0.01	1448.29	0.69	0.44	0.36	10.81	10.37	0.02	0.93	2062.31	0.08	0.02	2069.26	**Testing**

Emission Factor Notes

	Fugitive PM EMISSION FACTOR INPUTS										
	k(PM)	k (PM10)	k (PM2.5)	U(mph)	M(%)	s(%)	S(mph)	f(%)	p (days)	W (tons)	
Grader	1	0.6	0.031				10				***AP-42, Section 11.9, Table 11.9-1 (10/98)***
Crew, Water, Other Truck	4.9	1.5	0.15			5			40	3	***AP-42, Section 13.2.2, Expressions 1a and 2 (11/06)***
Loader, Excavator	0.74	0.35	0.053	6.64	7						***AP-42, Section 13.2.4, Expression 1 (11/06)***
Wind Erosion- Annual	1	0.5	0.075			7.4		4.9	40		***AP-42, Section 11.2.3, particle size fractions from AP-42, Section 13.2.5 (11/06)***
Wind Erosion- Hourly	1	0.5	0.075			4.9		1	10		

Vehicle Combustion:	Emission Factors from EPA MOVES model (g/mile)
Drill Rig, Diesel Genset (CH4, N20):	Tier 2 Emission Standards 40 CFR 89.112 for Engines Rated > 560 kW, Diesel Sulfur Content 15 ppm, 40 CFR 98 Tables C-1 and C-2, 7,000 Btu/hp-hr, and 19,300 Btu/lb diesel
90% Water Control:	Control of Open Fugitive Dust Sources (09/88), pages 5-9 through 5-14
CO2e emissions	Summation of individual greenhouse gas emissions multiplied by their global warming potential (GWP). GWP of CO2 = 1, GWP of CH4 = 25, GWP of N2O = 298.

MOVES 3.0 Run

Medium Vehicle Combustion:	PM	PM10	PM2.5	CO	NOx	SO2	
2022	1486487	1486487	1326567	239110	105120	292	
2023	1442364	1442364	1286272	237439	97810	294	
	2928851	2928851	2612839	476549	202930	586	g/ 2 yr/mile
	1464426	1464426	1306419.5	238274.5	101465	293	g/yr/mile
				CO	NOx	SO2	
	0.004828	0.004828	0.00430667	1.5968856	0.6800056	0.0019636	g/mile
			303348288	149212	miles	2 years	

Heavy		PM	PM10	PM2.5	CO	NOx	SO2	
	2022	2050891	2050891	1886788	47754	25848	71	
	2023	1803676	1803676	1659348	48943	24111	72	
		3854567	3854567	3546136	96697	49959	143	g/ 2 yr/mile
		1927283.5	1927283.5	1773068	48348.5	24979.5	71.5	g/yr/mile
					CO	NOx	SO2	
		0.0421569	0.0421569	0.0387837	1.3083782	0.6759803	0.0019349	g/mile
				45716864	36953	miles	2 years	

Well Drilling							
	ANNUAL	RATE UNITS	HAP INFORMATION				
EMISSION UNIT	PROCESS RATE		NAME	CODE	EF	EF UNITS	Tons
Large Rotary Drill Rig (Tier 2)	1728000	hp-hr	Benzene	71432	6.5E-06	lb/hp-hr	5.6E-03
			Toluene	108883	2.9E-06	lb/hp-hr	2.5E-03
			Xylenes	1330207	2.0E-06	lb/hp-hr	1.7E-03
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	2.4E-04
			Formaldehyde	50000	8.3E-06	lb/hp-hr	7.1E-03
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	4.6E-03
			Acrolein	107028	6.5E-07	lb/hp-hr	5.6E-04
			Naphthalene	91203	5.9E-07	lb/hp-hr	5.1E-04
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	3.1E-05
			Acenaphthene	83329	9.9E-09	lb/hp-hr	8.6E-06
			Fluorene	86737	2.0E-07	lb/hp-hr	1.8E-04
			Phenanthrene	85018	2.1E-07	lb/hp-hr	1.8E-04
			Anthracene	120127	1.3E-08	lb/hp-hr	1.1E-05
			Fluoranthene	206440	5.3E-08	lb/hp-hr	4.6E-05
			Pyrene	129000	3.3E-08	lb/hp-hr	2.9E-05
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	1.0E-05
			Chrysene	218019	2.5E-09	lb/hp-hr	2.1E-06
			Benzo(b)fluoranthene	205992	6.9E-10	lb/hp-hr	6.0E-07
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	9.4E-07
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	1.1E-06
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	2.3E-06
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	3.5E-06
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	3.0E-06
			Total HAPs	--	**2.7E-05**	**lb/hp-hr**	**2.3E-02**
3 Diesel Pump Engines (Generator)	4562157	hp-hr	Benzene	71432	6.5E-06	lb/hp-hr	1.5E-02
			Toluene	108883	2.9E-06	lb/hp-hr	6.5E-03
			Xylenes	1330207	2.0E-06	lb/hp-hr	4.6E-03
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	6.2E-04
			Formaldehyde	50000	8.3E-06	lb/hp-hr	1.9E-02
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	1.2E-02
			Acrolein	107028	6.5E-07	lb/hp-hr	1.5E-03
			Naphthalene	91203	5.9E-07	lb/hp-hr	1.4E-03
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	8.1E-05
			Acenaphthene	83329	9.9E-09	lb/hp-hr	2.3E-05
			Fluorene	86737	2.0E-07	lb/hp-hr	4.7E-04
			Phenanthrene	85018	2.1E-07	lb/hp-hr	4.7E-04
			Anthracene	120127	1.3E-08	lb/hp-hr	3.0E-05
			Fluoranthene	206440	5.3E-08	lb/hp-hr	1.2E-04
			Pyrene	129000	3.3E-08	lb/hp-hr	7.6E-05
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	2.7E-05
			Chrysene	218019	2.5E-09	lb/hp-hr	5.6E-06
			Benzo(b)fluoranthene	205992	6.9E-10	lb/hp-hr	1.6E-06
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	2.5E-06
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	3.0E-06
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	6.0E-06
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	9.3E-06
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	7.8E-06
			Total HAPs	--	**2.7E-05**	**lb/hp-hr**	**6.2E-02**
Greatest Single HAP Emissions:			Formaldehyde	50000			2.6E-02
Total Emissions:							8.5E-02

Long Term Test							
	ANNUAL		HAP INFORMATION				
EMISSION UNIT	PROCESS RATE	RATE UNITS	NAME	CODE	EF	EF UNITS	Tons
Aggreko 500KW Diesel Generator	4827680	hp-hr	Benzene	71432	6.5E-06	lb/hp-hr	1.6E-02
			Toluene	108883	2.9E-06	lb/hp-hr	6.9E-03
			Xylenes	1330207	2.0E-06	lb/hp-hr	4.8E-03
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	6.6E-04
			Formaldehyde	50000	8.3E-06	lb/hp-hr	2.0E-02
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	1.3E-02
			Acrolein	107028	6.5E-07	lb/hp-hr	1.6E-03
			Naphthalene	91203	5.9E-07	lb/hp-hr	1.4E-03
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	8.5E-05
			Acenaphthene	83329	9.9E-09	lb/hp-hr	2.4E-05
			Fluorene	86737	2.0E-07	lb/hp-hr	4.9E-04
			Phenanthrene	85018	2.1E-07	lb/hp-hr	5.0E-04
			Anthracene	120127	1.3E-08	lb/hp-hr	3.2E-05
			Fluoranthene	206440	5.3E-08	lb/hp-hr	1.3E-04
			Pyrene	129000	3.3E-08	lb/hp-hr	8.1E-05
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	2.8E-05
			Chrysene	218019	2.5E-09	lb/hp-hr	6.0E-06
			Benzo(b)fluoranthene	205992	6.9E-10	lb/hp-hr	1.7E-06
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	2.6E-06
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	3.2E-06
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	6.3E-06
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	9.9E-06
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	8.3E-06
			Total HAPs	--	**2.7E-05**	**lb/hp-hr**	**6.5E-02**
Light Tower 20kw-Isuzu 4LE2T Tier 4 Engine	193107	hp-hr	Benzene	71432	6.5E-06	lb/hp-hr	6.3E-04
			Toluene	108883	2.9E-06	lb/hp-hr	2.8E-04
			Xylenes	1330207	2.0E-06	lb/hp-hr	1.9E-04
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	2.6E-05
			Formaldehyde	50000	8.3E-06	lb/hp-hr	8.0E-04
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	5.2E-04
			Acrolein	107028	6.5E-07	lb/hp-hr	6.3E-05
			Naphthalene	91203	5.9E-07	lb/hp-hr	5.7E-05
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	3.4E-06
			Acenaphthene	83329	9.9E-09	lb/hp-hr	9.6E-07
			Fluorene	86737	2.0E-07	lb/hp-hr	2.0E-05
			Phenanthrene	85018	2.1E-07	lb/hp-hr	2.0E-05
			Anthracene	120127	1.3E-08	lb/hp-hr	1.3E-06
			Fluoranthene	206440	5.3E-08	lb/hp-hr	5.1E-06
			Pyrene	129000	3.3E-08	lb/hp-hr	3.2E-06
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	1.1E-06
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	3.9E-07
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	3.3E-07
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	1.0E-07
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	1.3E-07
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	2.5E-07
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	3.9E-07
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	3.3E-07
			Total HAPs	--	**2.7E-05**	**lb/hp-hr**	**2.6E-03**
Light Tower 20kw-Isuzu 4LE2T Tier 4 Engine-12	96553.59065	hp-hr	Benzene	71432	6.5E-06	lb/hp-hr	3.2E-04
			Toluene	108883	2.9E-06	lb/hp-hr	1.4E-04
			Xylenes	1330207	2.0E-06	lb/hp-hr	9.6E-05
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	1.3E-05
			Formaldehyde	50000	8.3E-06	lb/hp-hr	4.0E-04
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	2.6E-04
			Acrolein	107028	6.5E-07	lb/hp-hr	3.1E-05
			Naphthalene	91203	5.9E-07	lb/hp-hr	2.9E-05
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	1.7E-06
			Acenaphthene	83329	9.9E-09	lb/hp-hr	4.8E-07
			Fluorene	86737	2.0E-07	lb/hp-hr	9.9E-06
			Phenanthrene	85018	2.1E-07	lb/hp-hr	9.9E-06
			Anthracene	120127	1.3E-08	lb/hp-hr	6.3E-07
			Fluoranthene	206440	5.3E-08	lb/hp-hr	2.6E-06
			Pyrene	129000	3.3E-08	lb/hp-hr	1.6E-06
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	5.7E-07
			Chrysene	218019	2.5E-09	lb/hp-hr	1.2E-07
			Benzo(b)fluoranthene	205992	6.9E-10	lb/hp-hr	3.3E-08
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	5.2E-08
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	6.4E-08
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	1.3E-07
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	2.0E-07
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	1.7E-07
			Total HAPs	--	**2.7E-05**	**lb/hp-hr**	**1.3E-03**

	ANNUAL		**HAP INFORMATION**				
EMISSION UNIT	**PROCESS RATE**	**RATE UNITS**	**NAME**	**CODE**	**EF**	**EF UNITS**	**Tons**
6GHT Pump (Tier 4)	828000	hp-hr	Benzene	71432	6.5E-06	lb/hp-hr	2.7E-03
			Toluene	108883	2.9E-06	lb/hp-hr	1.2E-03
			Xylenes	1330207	2.0E-06	lb/hp-hr	8.3E-04
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	1.1E-04
			Formaldehyde	50000	8.3E-06	lb/hp-hr	3.4E-03
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	2.2E-03
			Acrolein	107028	6.5E-07	lb/hp-hr	2.7E-04
			Naphthalene	91203	5.9E-07	lb/hp-hr	2.5E-04
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	1.5E-05
			Acenaphthene	83329	9.9E-09	lb/hp-hr	4.1E-06
			Fluorene	86737	2.0E-07	lb/hp-hr	8.5E-05
			Phenanthrene	85018	2.1E-07	lb/hp-hr	8.5E-05
			Anthracene	120127	1.3E-08	lb/hp-hr	5.4E-06
			Fluoranthene	206440	5.3E-08	lb/hp-hr	2.2E-05
			Pyrene	129000	3.3E-08	lb/hp-hr	1.4E-05
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	4.9E-06
			Chrysene	218019	2.5E-09	lb/hp-hr	1.0E-06
			Benzo(b)fluoranthene	205992	6.9E-10	lb/hp-hr	2.9E-07
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	4.5E-07
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	5.4E-07
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	1.1E-06
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	1.7E-06
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	1.4E-06
			Total HAPs	**--**	**2.7E-05**	**lb/hp-hr**	**1.1E-02**
7kW Light Towers (Injection Pad - Kubota D1005 Engine, Tier 4)			Benzene	71432	6.5E-06	lb/hp-hr	1.6E-02
	135175	hp-hr	Toluene	108883	2.9E-06	lb/hp-hr	6.9E-03
			Xylenes	1330207	2.0E-06	lb/hp-hr	4.8E-03
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	6.6E-04
			Formaldehyde	50000	8.3E-06	lb/hp-hr	2.0E-02
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	1.3E-02
			Acrolein	107028	6.5E-07	lb/hp-hr	1.6E-03
			Naphthalene	91203	5.9E-07	lb/hp-hr	1.4E-03
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	8.5E-05
			Acenaphthene	83329	9.9E-09	lb/hp-hr	2.4E-05
			Fluorene	86737	2.0E-07	lb/hp-hr	4.9E-04
			Phenanthrene	85018	2.1E-07	lb/hp-hr	5.0E-04
			Anthracene	120127	1.3E-08	lb/hp-hr	3.2E-05
			Fluoranthene	206440	5.3E-08	lb/hp-hr	1.3E-04
			Pyrene	129000	3.3E-08	lb/hp-hr	8.1E-05
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	2.8E-05
			Chrysene	218019	2.5E-09	lb/hp-hr	6.0E-06
			Benzo(b)fluoranthene	205992	6.9E-10	lb/hp-hr	1.7E-06
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	2.6E-06
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	3.2E-06
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	6.3E-06
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	9.9E-06
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	8.3E-06
			Total HAPs	**--**	**2.7E-05**	**lb/hp-hr**	**6.5E-02**
8 GHH Pump (Tier 4)	2988000	hp-hr	Benzene	71432	6.5E-06	lb/hp-hr	9.8E-03
			Toluene	108883	2.9E-06	lb/hp-hr	4.3E-03
			Xylenes	1330207	2.0E-06	lb/hp-hr	3.0E-03
			1,3-Butadiene	106990	2.7E-07	lb/hp-hr	4.1E-04
			Formaldehyde	50000	8.3E-06	lb/hp-hr	1.2E-02
			Acetaldehyde	75070	5.4E-06	lb/hp-hr	8.0E-03
			Acrolein	107028	6.5E-07	lb/hp-hr	9.7E-04
			Naphthalene	91203	5.9E-07	lb/hp-hr	8.9E-04
			Acenaphthylene	208968	3.5E-08	lb/hp-hr	5.3E-05
			Acenaphthene	83329	9.9E-09	lb/hp-hr	1.5E-05
			Fluorene	86737	2.0E-07	lb/hp-hr	3.1E-04
			Phenanthrene	85018	2.1E-07	lb/hp-hr	3.1E-04
			Anthracene	120127	1.3E-08	lb/hp-hr	2.0E-05
			Fluoranthene	206440	5.3E-08	lb/hp-hr	8.0E-05
			Pyrene	129000	3.3E-08	lb/hp-hr	5.0E-05
			Benzo(a)anthracene	56553	1.2E-08	lb/hp-hr	1.8E-05
			Chrysene	218019	2.5E-09	lb/hp-hr	3.7E-06
			Benzo(b)fluoranthene	205992	6.9E-10	lb/hp-hr	1.0E-06
			Benzo(k)fluoranthene	207089	1.1E-09	lb/hp-hr	1.6E-06
			Benzo(a)pyrene	50328	1.3E-09	lb/hp-hr	2.0E-06
			Indeno(1,2,3-cd)pyrene	193395	2.6E-09	lb/hp-hr	3.9E-06
			Dibenz(a,h)anthracene	53703	4.1E-09	lb/hp-hr	6.1E-06
			Benzo(g,h,i)perylene	191242	3.4E-09	lb/hp-hr	5.1E-06
			Total HAPs	**--**	**2.7E-05**	**lb/hp-hr**	**4.1E-02**
Greatest Single HAP Emissions:			Formaldehyde	50000			5.7E-02
Total Emissions:							1.9E-01

	QTY	PROCESS DESCRIPTION	MAX Daily PROCESS RATE	MAX Annual PROCESS RATE	UNITS	INFORMATION DESCRIPTION
Construction						
	1	Graders	10	280	hrs	Hours of operation per grader
			2	2	mph	Mean vehicle speed
			20	560	VMT	Vehicle miles traveled per grader
	1	Water Trucks	10	280	hrs	Hours of operation per water truck
			13	13	tons	Mean vehicle weight
			2,500	2,500	gal	Water tank capacity
			5	5	mph	Mean vehicle speed
			50	1,400	VMT	Vehicle miles traveled per water truck
	2	1-ton Crew Trucks	1	7	hrs	Hours of operation per crew truck
			3	3	tons	Mean vehicle weight
			30	30	mph	Mean vehicle speed
			15	210	VMT	Vehicle miles traveled per crew truck
	1	Loader	5	140	tons	Total amount of material moved per loader
	1	Excavator	3.75	105	tons	Total amount of material moved per excavator
			10	350	hrs	
	1	Wind Erosion- Stockpiles	1.00	1.00	acres	Acreage of stockpiles
			7.4	7.4	%	Silt content of stockpile material
			4.9	4.9	%	Percentage of time with mean wind speed greater than 12 mph at the mean pile height
			1	30	days	Days the stockpiles are used
	25	Heavy Tractor/trailers (Delivery/Pickup)	214	10700	VMT	Reno to Gerlach 107 miles
			4	200	hrs	
Well Drilling						
	1	Large Rotary Drill Rig (Tier 2)	24	1,080	hours	Hours of operation
			1,600	1,600	hp	Engine horsepower (not generator output).
			1	4	wells	Wells/Year
	3	3 Diesel Pump Engines (Generator)	24	1,080	hours	Hours of operation
			1,408	1,408	hp	Gen output
	8	Vehicle Type A on Unpaved Roads	3	3	tons	Mean vehicle weight
			4	180	hours	Annual hours of operation per vehicle
			15	15	miles/hour	Mean vehicle speed
			5	5	%	Silt content of unpaved road surface
		Workers Traveling from Gerlach	4.5	6480	VMT	For Gerlach
			1	2880	hrs	
		Workers 2 trips Reno to Gerlach	214	1712	VMT	
			2	32	hrs	
Long-term Test						
	1	Aggreko 500kw Diesel Generator	24	2,880	hours	Hours of operation
			500	500	kw	Engine kw
	1	Light Tower 20kw-Isuzu 4LE2T Tier 4 Engine	12	1,440	hours	Hours of operation
			20	20	kw	Engine kw
	1	Light Tower 20kw-Isuzu 4LE2T Tier 4 Engine-12	12	1,440	hours	Hours of operation
			20	20	kw	Engine kw
	1	6GHT Pump (Tier 4)	24	2,880	hours	Hours of operation
			115	115	hp	Engine horsepower
	2	7kW Light Towers (Injection Pad - Kubota D1005	12	1,440	hours	Hours of operation
			7	7	kw	Engine kw
	1	8 GHH Pump (Tier 4)	24	2,880	hours	Hours of operation
			415	415	hp	Engine horsepower
	8	Vehicle Type A on Unpaved Roads	3	3	tons	Mean vehicle weight
			4	480	hours	Annual hours of operation per vehicle
			15	15	miles/hour	Mean vehicle speed
			5	5	%	Silt content of unpaved road surface
			4.5	2160	VMT	For Gerlach

Appendix F

Draft EA Comment Response Matrix

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Appendix F. Draft EA Comment Response Matrix

Comment Code Name	Comment Text	Response Text
Range of alternatives	I'm not a "Burner" and have never been to Burning Man - just a Nevada resident who loves the Black Rock Desert and the Gerlach area and would hate to see its unique and irreplaceable beauty and character slowly diminished by a project to "explore" the geothermal potential (which any idiot knows is present in the area) with subsequent projects that will "develop" the geothermal power generation potential of the site until the whole west end of the Playa is dotted with geothermal well heads, aboveground pipelines and power generation facilities. There must be other locations within the BLM's vast holdings in Northern Nevada that could host such a project without such permanent degradation of a very significant natural, cultural and recreation resource - I am convinced that such sites exist and that they should be considered long before any such "exploration" is approved for the Gerlach area.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA).
Visual resources, including night skies	Specifically, the impacts of the 20 well sites are incompatible with the irreplaceable values of the proposed location. This site, adjacent to the Black Rock Desert, Nevada Highway 34 and within sight of the town of Gerlach, has particular significance for tens of thousands of visitors to the area each year and the proposed project would significantly and permanently alter the landscape and diminish the enjoyment and appreciation of the area by visitors.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA).

Comment Code Name	Comment Text	Response Text
Cultural resources	Additionally, the wells and sediment pits are an absolute eyesore and being built on top of Guru Lane is a travesty. Yes, Guru Lane is a bit of a folly, but it is a part of the Gerlach Charm and a source of entertainment and also a place of contemplation for thousands who visit the Black Rock and Gerlach. There is a memorial on Guru Lane (right near the start) for fallen motorcyclists - their names are engraved on stone memorials in their honor and many ashes have been placed there - constituting grave sites. This memorial has been maintained by the Iron Butt Association and is well tended by volunteers and has been for decades.	As discussed in Appendix C, Cultural Resources, of the Final EA, the Guru Road area including its art and memorial installations, is not considered a site eligible for listing on the NRHP due to its age. Per the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, Guru Road has been documented as part of the original Noble's cutoff of the California Trail. The presence of art and memorial installments often immediately adjacent to the trail may be identified as a impacts to the setting of the California Trail which is considered eligible for the NRHP. The proposed well pads near Guru Road are located on the other side of County Road 34. The visual impact to the trail segment would have less impact to the eligible site than the current Guru Road features. For these reasons Guru Road is not identified as a "cultural resource" for protection and may in fact be degrading identified resources of significant cultural value.
General vegetation communities	The restoration or reclamation plans are also a little questionable. We all know that toxins will be taken out of the ground - to what extent we don't know - but we are supposed to believe the well owners will tell us the truth. Whatever toxins are brought out will condense in the sludge ponds and cant be mitigated by covering them with concrete - and then with dirt and BLM approved seeds - and expect this to be safe and to look like the land before the exploration began. You can't grow the indigenous grasses and bushes over night. Many of those plants are decades or hundreds of years old. Who will water those "seeds" to insure that they recover the land? This is a harsh environment and reseeding projects rarely work as the rainfall typically either pours through - or is absent. growing plants from seeds is near impossible without care. Restoration is near impossible.	The BLM would require reclamation bonding to be completed prior to project implementation. Reclamation bonding would ensure that funds to perform satisfactory reclamation are available, including the cost of any action needed to prevent unnecessary or undue degradation of Federal lands should premature cessation or abandonment of the operation occur. Further, proposed well pads on the Black Rock Playa are in areas that are devoid of vegetation, so revegetation would not be needed in these areas. The water resources monitoring stipulations in the Final EA (see Table 3-11) would require identification of potential toxins, and proper notification and handling procedures would be followed if any are found.

Comment Code Name	Comment Text	Response Text
Visual resources, including night skies	The environmental impact to the dark skies environment that I so enjoy on my visits to the Black Rock will be damaged. Sure....just go out farther and away from the lighting at the wells. That is what we keep hearing - go out farther! Pretty soon we will be out of "farther".	Effects on night sky conditions are described in Section 3.3.3 of the Final EA. Anticipated changes in ALAN, radiance, and sky glow would have temporary effects, which would differ in magnitude based on the observer's location. Effects would be minor because, under a worst-case scenario, drill rig radiance would be equivalent to observed radiance of Gerlach; actual lighting produced would be lower, and measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations). Further, numerous sources of nearby ALAN are present in this area, so night sky conditions are already low in the project area. As stated previously, effects would be temporary, lasting the duration of construction.
Groundwater	Geothermal development is important as an alternative to polluting fossil fuel energy sources. But sustainable water use is also important in this time of drought and depleted aquifers. The EA addresses water issues without sufficient hydrologic analysis to know what amount of pumping would be sustainable and not lower the aquifer. If the aquifer is lowered, that may affect other water users or threaten surface waters that emanate from that aquifer. BLM should revise the EA to provide this analysis and ensure sustainable water use.	Without drilling and testing exploration wells to identify the characteristics of the aquifers, this statement is speculative. Exploration drilling collects the data to determine this information. Generally, exploration uses little water compared to geothermal production, and each drilled exploration well will further characterize the aquifer systems. During exploration drilling, spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

Comment Code Name	Comment Text	Response Text
Groundwater	My biggest concern, however is the potential for disruption to local water systems as a result of the exploratory drilling. While the Environmental Assessment says that, "Spring discharges would be monitored to detect any potential changes..." and that "appropriate measures to mitigate effects ... would be implemented," this scant explanation lacks any detail at all about how the springs will be monitored and what kinds of mitigation strategies might be employed in the event that spring discharges are impacted. Which springs will be monitored? How often? What methods will be employed to monitor the springs? What level of alteration of a spring discharge would trigger mitigation measure(s)? What mitigation measure(s) could be employed? How quickly would mitigation measures be employed in the event of a discharge impact? How will the effect of mitigation measures be evaluated? I am deeply concerned that Ormat's exploratory drilling could inadvertently and permanently alter some of the unique hot springs in the area; the hot springs are part of what make the Black Rock area special.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Groundwater	In addition, the community of Gerlach and other nearby areas depend on local groundwater. Alterations to the quality, quantity, and/or sustainability of the groundwater and local springs as a result of exploratory drilling would be a HUGE tragedy for the area.	The town of Gerlach's water is supplied by the Gerlach General Improvement District (GGID), which sources its water from Granite Spring and Garden Spring which are respectively 5.04 and 7.8 miles northwest of the project and separated from the AOI by the Granite Range. Granite Spring and Garden Spring are in the Smoke Creek Desert Basin, which is within 5 miles of the AOI, but no proposed geothermal wells are in the Smoke Creek Desert Basin. Because springs may supply some local water users, they are included in the monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) to be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations.

Comment Code Name	Comment Text	Response Text
Mitigation	Please do not approve the project without demanding, and making publicly available for comment, a much more detailed plan for monitoring and mitigating potential effects on springs and groundwater resources.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Visual resources, including night skies	I am very concerned that the number and density of proposed exploration wells will significantly impact my enjoyment of the area, through noise, light, and permanently disrupted natural features, despite what Ormat describes as its proposed mitigation measures for these effects. They will be long-lasting and, in some cases, permanent alterations to currently natural places.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA).

Comment Code Name	Comment Text	Response Text
Groundwater	I hope that this project will be implemented to minimize water use and the need for groundwater pumping. Many aquifers are already depleted and this may jeopardize springs and seeps where wildlife must drink to survive. Sustainable water use is imperative during this new era of extreme drought.	Generally, exploration uses little water compared to geothermal production, and each drilled exploration well will further characterize the aquifer systems. During exploration drilling, spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Visual resources, including night skies	The exploration project will have minimal environmental effects compared to the environmental impacts caused by two recent developments of private lands that destroyed native vegetation. A company that operates an annual festival with 80,000 people held on the Black Rock Desert National Conservation Area is developing approximately 360 acres north of Gerlach and in converting the desert environment into a cargo container storage area that is visible from all directions and is inconsistent with the preservation of scenic quality values in the area. Another company that supports sanitation operations at the same before mentioned festival also converted the desert environment into a porta-potty and equipment storage area north of Gerlach that is also visible from all directions and is also inconsistent with the preservation of scenic quality values in the area. Compared to the annual festival operation the Gerlach Geothermal Exploration Project will have far less effects to dark skies, noise, and ground water sources where the festival pumps large amounts water each year for playa road dust control.	Comment noted.

Comment Code Name	Comment Text	Response Text
Analysis type (CE, EA, EIS)	An EA is not the appropriate vehicle to assess these potential impacts to surface and groundwater, and damage to both public and private land that could occur. While ORMAT has reduced the scope of the project from the full development of the resource as previously proposed, there is still potential for controversial and significant long term adverse impacts to this small community and an EIS is warranted with an alternative to move the development away from the population and private lands of this community.	An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action.
Analysis type (CE, EA, EIS)	An EA is not the appropriate vehicle to assess these potential impacts to the environmental, economic, social and cultural resources, and near constant disruption to the citizens of Gerlach and adjacent private lands that could occur. Separating the development of exploration wells from the overall goal of a fully developed geothermal plant is unacceptable and does not include all the potential long term impacts of the proposal. There is no point in drilling twenty wells if the resource will not be used and a generation plant has no utility in an area where there are no known resources. An EIS should be required.	The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. If the proponent determines a well to have no commercial potential, it could continue to monitor the well for the duration of the project; or, the well could be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM. Abandonment procedures are described in Final EA Section 2.1.8, Surface Reclamation. An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action.
Cultural resources	Guru Road is a unique one of a kind cultural art work of great importance to Gerlach and must be off limits to disturbance or development. This mile long art feature is an important and treasured piece of Gerlach history and is under a Right of Way issued by BLM. It must be protected from adverse impacts. Guru Road is a tourist destination and visited year round. The proposed well field immediately adjacent to this unique feature will diminish the relatively undisturbed environmental and recreation setting and will erode the visitor experience to this iconic cultural phenomena.	As discussed in Appendix C, Cultural Resources, of the Final EA, the Guru Road area including its art and memorial installations, is not considered a site eligible for listing on the NRHP due to its age. Per the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, the presence of art and memorial installments often immediately adjacent to the trail may be identified as a possible impact to the setting of the California Trail which is considered eligible for the NRHP.

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Groundwater	If the Great Boiling Springs located on neighboring private land sees a reduction or ceases functioning, this would adversely impact the Black Rock Mud Company that relies upon its proper function. The same for the numerous springs located within the AOI. Same for other adjacent private lands that rely on ground and surface waters.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Groundwater	There is also no analysis or discussion of consequences of subsurface fracking should it occur. Fracking may have very significant long term impacts to the springs on adjacent private lands as well as the community of Gerlach just a short distance away. Fracking may disrupt natural underground flows through the aquifer drying up springs and wetlands vital to wildlife in the desert environment with potential for contamination from drilling muds, fluids and chemicals.	Enhanced geothermal systems, in which the natural permeability of rock is increased by creating a fracture network in the rock, is not proposed and would not be permitted.

Comment Code Name	Comment Text	Response Text
Groundwater	Geothermal development in this region has the potential for significant negative impacts by altering or stopping existing surface springs from functioning. Such impacts can harm local businesses. It appears that the construction of 20 well pads that will be allowed and never be required to be fully reclaimed.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. Effects on socioeconomics are described in Table 3-2 of the Final EA for Socioeconomics and are expected to be minor and temporary. If the proponent determines a well to have no commercial potential, it could continue to monitor the well for the duration of the project; or, the well could be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM. Abandonment procedures are described in Final EA Section 2.1.8, Surface Reclamation.
Groundwater	There is no plan as to what processes should be implemented should there be an unlawful discharge to groundwater. Any resulting regulatory obligation of Ormat should include a spill and discharge plan that specifically addresses groundwater contamination, and includes immediate notification to contiguous landowners, regardless of whether the Drilling Supervisor believes the spill affects their property.	Section 2.1.7, Applicant-Proposed Environmental Protection Measures, describes the process for unintended discharges. As stated under Measures to Minimize Public Health and Safety Hazards, Ormat has prepared a spill or discharge contingency plan, which is available in its entirety in Ormat's Exploration Operations Plan, published on the project ePlanning website with the Draft EA.

Comment Code Name	Comment Text	Response Text
Noise	The noise effects would not be temporary as it is reasonable to assume that development would follow exploration. Any development in this isolated region is not in keeping with the area's isolation and remoteness. Because of the potential significant noise impacts to the residents of Gerlach along with impacts to recreationists and wildlife, a full noise analysis needs to be completed.	The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis.
Noise	Because the AOI is located so close to Gerlach residences, it is critical that a Noise Analysis be completed through the NEPA process to identify the impacts to residents of noise from the Project, and the efficacy of Ormat's suggested "one rock muffler" per drilling rig. The level to which a rock muffler, portable or permanent, can reduce noise to acceptable levels from well pads proposed within a few hundred feet on adjacent private property appears to be insufficient. The Burningman commercial property is currently under development to include among other things campsites, modular housing, and a cafe and community space. This constant noise associated with consecutive drilling of exploration wells may also be significantly disruptive to the serenity of public land users in the nearby National Conservation Area. The Draft EA does little to address mitigating this issue. The Draft EA states that the community of Gerlach, and recreational users, should simply be prepared to be "sensitive noise receptors". Stating that the area is already degraded by noise effects from traffic on the one county road in the remote area of northern Nevada, other vehicles, the existing gravel pit, and the handful of residents of the town of Gerlach is not accurate. A major geothermal operation is allowed to emit 65 decibels of noise at .5 miles.	Sensitive noise receptors are individuals or groups that could be aware of or be affected by changes in ambient noise levels (Final EA Section 3.2.9). Implementing applicant-committed environmental protection measures (see Section 2.1.7), including using mufflers on drilling rig engines, and a rock muffler to attenuate steam venting noise during well testing, would reduce project noise effects. The project would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)). Construction noise is not anticipated to affect the recreation setting in the Black Rock Desert-High Rock Canyon Emigrant Trails NCA; this is because the NCA's southern border is about 4 miles away from the AOI, and the NCA Act of 2000 does not designate a buffer around the NCA border. At this distance, noise receptors would experience noise levels that are comparable with current conditions (Final EA Section 3.3.4).

Comment Code Name	Comment Text	Response Text
Range of alternatives	The EA does not adequately analyze all the impacts of the proposed project and mitigation measures are inadequate to address all potential impacts. This project is at our very front door and will lead to significant and controversial long term adverse impacts to the residents and the small community of Gerlach. The project will lead to permanent changes of the very character and sense of place that is of utmost importance to the community and makes Gerlach what it is. Gerlach is the gateway community to the Black Rock Desert and is surviving and dependent upon undeveloped public lands and outdoor recreation / tourism. The only way to mitigate the significant adverse impacts to the character of the community, the sense of place to Gerlach is to move all of the geothermal development away from the community and adjacent private properties so it is out of sight and sound of the community. The EA is inadequate because there is no analysis of an alternative to this affect.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA).
Recreation	Recreational users' experiences would be significantly impacted by viewing an industrial scale geothermal development in a nationally significant area that currently has very limited development. Gerlach is the gateway to the NCA and any additional development would significantly diminish the values for which Congress designated the area.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA). Given the distance between the AOI and the NCA boundary, and applicant-committed environmental protection measures (Section 2.1.7) and BLM-required stipulations (Table 3-11) to minimize and avoid effects on cultural resources, visual resources, and recreation values, there would be minimal if any effects on NCA values.

Comment Code Name	Comment Text	Response Text
Recreation	Additionally, the assertion that impacts to the Nobles Trail section of the California National Historic Trail are minor and limited to the duration of two and one-half years of exploration is highly concerning. Obviously, ORMAT would not be drilling up to 21 wells if they did not believe there is a geothermal source and clearly the 2.1 acre well pads, new access roads, and fencing are not being proposed with the idea that these would be removed after exploration is complete.	As discussed in Appendix C, Cultural Resources, of the Final EA, the Guru Road area including its art and memorial installations, is not considered a site eligible for listing on the NRHP due to its age. Per the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, the presence of art and memorial installments often immediately adjacent to the trail may be identified as a possible impact to the setting of the California Trail which is considered eligible for the NRHP. The proposed action avoids all sites eligible for the NRHP directly and, only temporary adverse effects will impact cultural resources (see Appendix C, Cultural Resources, of the Final EA). The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis.
Recreation	The proposed geothermal exploration project overlaps a portion of the Granite Mountain Special Recreation Management Area. Easy access to a favorite local recreation area encompassing the west end of the Granite mountain foothills will be eliminated and the environmental setting as well as recreation setting and resulting experiences will be permanently changed by altering the landscape, development of facilities or infrastructure. Residents and visitors to the area utilize this area for camping, hiking, and for the grand vistas from these higher elevations. No exploration or development should occur within the Granite Range Special Recreation Management Area, including the Granite or the Granite Foothills recreation management zones.	The Granite Range SRMA was designated by the 2015 BLM Winnemucca District Office Resource Management Plan. Three of the geothermal leases analyzed in this Final EA overlap portions of the SRMA, these include NVN-055718 (issued in 1992), NVN-075228 (issued in 2001), and NVN-098640 (issued in 2019). Geothermal exploration well pads 58-3, 66-3, 63-3, and 71-3, and access roads, are proposed on lease NVN-075228, which was issued prior to designation of the SRMA. Geothermal exploration on leases issued before the SRMA designation would be allowed as a valid and existing right. Further, geothermal exploration would not be incompatible with the management recommendations for the SRMA in the RMP (see p. 2-68 of the RMP). The Final EA (Section 3.3.3 for Recreation) found that exploration activities would have a minor effect on the recreation setting and access to recreation opportunities in the SRMA.

Comment Code Name	Comment Text	Response Text
Recreation	The proposed Gerlach Community Trail from Gerlach to Guru Road is being planned to help enhance and further develop the tourism economy of Gerlach as well as enhance the recreation opportunities and experiences for visitors and the community. This trail will be adversely impacted by well field development by changing the very character of the environmental setting of this most important resource.	To date, a proposed action for the trail has not been submitted to the BLM. The trail alignment would cross existing geothermal leases in the AOI; as such, geothermal exploration would be a valid and existing right in this area.
Scope of analysis	As part of the NEPA analysis, the BLM should conduct a Net Energy Analysis comparing the energy input with energy outputs for the Proposed Action. This comment was raised and ignored during pre-scoping.	A net energy analysis cannot be conducted until the energy generation potential of the geothermal resource is better known. The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis.
Socioeconomics	The Proposed Action does not bring local jobs to the region. The Final Operations Plan indicates that approximately 10 workers will be on site for the duration of a well drilling (approximately 45 days each), and that these will be current Ormat employees or contractors who would travel to the site. On site housing is necessary because there is no adequate housing in Gerlach and if they used the one motel in town it would reduce rooms available that otherwise would be taken by visitors who are vital to the tourism economy of the community.	As described in Final EA Section 2.1.6, the drilling crew would likely live on-site in mobile trailers. In addition, the BLM is aware that mining operators have in fact booked the hotel rooms in Gerlach for over 6 months at a time.

Comment Code Name	Comment Text	Response Text
Socioeconomics	The Proposed Action does not reflect any specific economic benefits to the Town of Gerlach and the surrounding region. Rather, it appears that the benefits of exploration will be minimal and possibly counterproductive. While Gerlach could benefit from modernized energy infrastructure, without the benefit of an EIS, it is unknown to what degree the ultimate construction of a geothermal plant would meet that demand. It is unknown if the energy generated therefrom would even remain in the State of Nevada.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. As noted for Socioeconomics in Final EA Table 3-2, Resource Effects Determinations and Rationale for Analysis, effects on Gerlach's local economy, including from astrotourism and local induced economic effects, are anticipated to be minor and temporary, lasting the duration of construction.
Socioeconomics	There is inadequate analysis of the exploration, and any consequent construction of a geothermal plant that would negatively impact the local economy by the intrusion of additional lighting, noise, workers, and impacts to surface springs and groundwater, and consequent reduction of recreational activities.	The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis.
Special Designations	The 42,700-acre Granite Peak lands with wilderness characteristics (LWC) area is in the Granite Range and possesses sufficient size, naturalness, and outstanding opportunities for either solitude or primitive and unconfined recreation. Approximately 275 acres of the LWC area's southern portion overlap with the AOI and adverse impacts to this important area must be recognized.	The Final EA (section 3.2.8) discusses that the Winnemucca RMP ROD allows for multiple-use and sustained-yield objectives in areas identified as having LWC (see Action LWC 1.1 in BLM 2015a, p. 2-45) with appropriate mitigations applied, if needed, to protect LWC criteria. The Final EA (section 3.3.4) also analyzed potential impacts of proposed project within the LWC unit (including temporary noise, disruption to solitude and recreation, etc.). The Final EA applicant-committed environmental protection measures (section 2.1.7) identify how temporary noise effects to LWC may be reduced by using mufflers on drilling rig engines and mufflers during well testing.

Comment Code Name	Comment Text	Response Text
Transportation System	The Proposed Action anticipates up to two and half years of near continual construction, including the transportation of heavy vehicles and drill rigs. Increased traffic of heavy vehicles on State Route 447 could lead to an increased deterioration of the road surface. There is one primary road into the Black Rock NCA which would run directly through this proposed project. Increased traffic of heavy vehicles and traffic on State Route 447 and particularly County Road 34 with a substandard surface, will lead to an increased deterioration of the road surface. Ormat should be required to assist in the maintenance or even upgrading of these routes and at the very least provide data and consult with the Washoe County Roads Department to determine if the roadway rating and the Roads Department's maintenance schedule are adequate for the specific transportation needs of the Project.	As described in Final EA Table 3-2, for Land Use and Infrastructure, project vehicles would access the AOI using SR-447 and CR-34, resulting in potential road surface deterioration. Potential impacts on road surface condition would be addressed through normal maintenance performed by the NDOT or Washoe County, or both and through agreements with special event operators.
Visual resources, including night skies	This area has extremely high value recreation and is one of the darkest night sky locations in the nation. The potential dark sky impacts of this project could impact the single most precious natural resource of this portion of Nevada, the deepest and darkest skies in the contiguous United States. This precious resource will be unduly compromised for residents of this area, recreationists, astronomers, astrophotographers, and wildlife. The BLM has failed to address these impacts or to ensure meaningful mitigation measures would be adopted by Ormat for reducing these impacts. Each and every drilling location will need to have its individual dark sky impacts addressed and mitigated to provide a minimally meaningful environmental impact analysis.	The Night Sky Baseline Report (BLM 2022b) modeled night-sky conditions at four well pad locations, and conducted photographic simulations at five key observation points. Using findings from the baseline report, the Final EA reports anticipated minor effects on recreation (see Final EA Section 3.3.3), astrotourism (see Final EA Table 3-2, Socioeconomics), and wildlife (see Final EA Section 3.3.3). The project would include measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations).

Comment Code Name	Comment Text	Response Text
Water Quantity	Northern Nevada is undergoing its worst drought in 1200 years and water is continuing to decline across the state and the western US. The operations plan does not take into account the fact that there may not be enough water to support an industrial scale geothermal plant in the future nor does it accurately describe why a scarce resource such as water needs to be redirected to another geothermal plant	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

Comment Code Name	Comment Text	Response Text
Analysis type (CE, EA, EIS)	The residents of the Gerlach area want a full EIS to be done in lieu of the current EAS that is not sufficient to examine the effects of pumping water from below our town for a 50 year period. This whole area looks like desert, but if you dig 5' down you'll quickly see it's all water and resembles swamp more than anything. If the water is removed from below us, how will long term settlement affect the properties that rely on the the aquifer for support settle? Will the clay that the town sets on lose its water content and we'll have to contend with long term settlement issues? Will the land stay stable for us and future generations to inhabit?	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The proposed action in the Final EA includes short-term and long-term pumping from the geothermal aquifer during well testing only; as described in the Final EA Section 3.3.5, the volume of fluid withdrawn during the well tests is expected to be minor, compared with the volume of fluid available in the geothermal resource, and is not expected to affect the geothermal reservoir's quantity or quality. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Noise	A standard drill rig creates upwards of 130dB. OSHA requires hearing protection above 90dB. There are 23 well pads, each requires 45 days to drill. The drilling operations will run 24/7 during this period creating an incredible wall of sound that will drive off native animals and disturb the residents for 1,035 days if the drilling is continuous. Imagine listening to a dozen or more jackhammers outside of your window for over three years, does that sound pleasant to you?	Implementing applicant-committed environmental protection measures (see Section 2.1.7), including using mufflers on drilling rig engines, and a rock muffler to attenuate steam venting noise during well testing, would reduce project noise effects. The project would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)).

Comment Code Name	Comment Text	Response Text
Noise	How loud are the drilling rigs?	Final EA Table 3-12, Project Noise Sources, reports anticipated noise levels for project equipment. A large rotary drill rig is anticipated to range from 91 to 106 dBA at the rig.
Socioeconomics	This project brings zero jobs and zero benefit to the residents of Gerlach. All it does is produce power for a consumer out of state. Why should we have our way of life wrecked so someone can charge their Tesla in California?	Comment noted. There is no power purchase agreement for the project.
Visual resources, including night skies	4.3 miles of overhead pipelines, access roads and 46 acres of disturbed land and fencing around this beautiful area will scar the landscape and the viewshed for decades to come. This area is heavily tourist dependant, and wrecking the solitude and views will destroy any chance of tourism continuing. How many people ask to visit chemical plants, nuclear plants or power plants when they want to go on vacation to relax with their families? How many people want to live under the glaring lights and terrible sounds created by these facilities? The answer is no one. Not you, not me, not this community. Ormat doesn't care about anything but profit. How they get profit doesn't affect the shareholders, but it sure does affect us, the residents. Please do your job and require the full EIS process and NEPA process to protect this community.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit.
Visual resources, including night skies	Ormat plans on building a plant right through the middle of Gerlach, the noise and light pollution alone will make Gerlach uninhabitable. Please show us where you have done this invasive procedure inside a residential area before?	The proposed action is located outside of the town of Gerlach. The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit.

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Water Quantity	Where will you get the 10,000 gallons/day you require for the project, and how will this amount of water being pumped and dispersed on our adjacent lands affect the town?	As described in Section 2.1.4 of the Final EA, water would be supplied from one or more shallow water wells drilled from one or more of the proposed drill sites, as approved by the BLM and under a waiver for the temporary use of groundwater from the Nevada Division of Water Resources (NDWR). Alternatively, water could be obtained from an established private ranch source under a temporary permit from the NDWR to change an existing water right, and trucked to each drill site, or as a bulk water purchase from the Gerlach General Improvement District (GGID), pending contract and availability from the GGID.
Analysis type (CE, EA, EIS)	The National Renewable Energy Laboratory has examined projects similar to the Proposed Action under applicable NEPA timelines. NREL states that drilling projects such as this can equally fall under an EA or EIS analysis: "Typical geothermal activities that would require an EIS include drilling large well fields, POUs, or controversial activities such as a proposed project location in an environmentally sensitive area." Geothermal Permitting and NEPA Timelines, Young, et. al, GRC Transactions Vol. 38 (2014) at page 896, Table 2. BMP believes that the proposed project location warrants a full EIS analysis given its location and eventual scope. Failing to do so would amount to unlawful and harmful segmentation of the NEPA process that would allow Ormat to get halfway to its generation goal without a proper and thorough inquiry. An EA is not the appropriate vehicle to assess these potential impacts to the environmental and cultural resources, and near constant disruption to the citizens of Gerlach and Empire that could occur. While it is understood that a project may be analyzed separately where there is "independent utility" in this case the drilling and generation plant cannot be separated. There is no point in drilling twenty wells, or even five wells, if the resource will not be used and a generation plant has no utility in an area where there are no known resources. An EIS should be required.	An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an EIS for the proposed action. It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA).

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General wildlife	Habitat. The Project has the potential to impact important wildlife habitat in a number of ways. If the reasonably foreseeable geothermal plant development occurs, decreases in flow and temperature from springs hydrologically connected to the geothermal resource may impact wetland habitat created by the springs. The 360 Property includes such valuable habitat. Wetlands in the desert are biodiversity hotspots, providing habitat for invertebrates, fish, resident and migratory birds, and a vital water source for larger terrestrial wildlife. The BLM should analyze in detail the potential changes in flow due to geothermal development to all potentially connected springs, and what the ecological consequences of such changes would be. Further analysis of the impact on protected species and their habitats is warranted.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Groundwater	Ormat should provide the following pre-drilling and data collection in assessing this Project:	The hydrologic evaluation baseline report (Stantec 2022a; published on ePlanning with the Draft EA) provides baseline data for the project area.
Groundwater	Groundwater Contamination. Groundwater contamination is possible with exploration well drilling. The Final Operations Plan includes a Spill or Discharge Contingency Plan. Upon a spill or discharge to groundwater, any resulting regulatory obligation of Ormat should include immediate notification to contiguous landowners, regardless of whether the Drilling Supervisor believes the spill affects their property. Final Operations Plan, page 16.	As noted in the Spill or Discharge Contingency Plan (p. 15), the drilling supervisor would also advise local population and affected property owners, if they determine that a spill affects residents or property.

Comment Code Name	Comment Text	Response Text
Mitigation	he Draft EA does not examine the full range of "effects" and fails to provide meaningful mitigation and monitoring	The CEQ regulations under 40 CFR 1500 and the BLM NEPA handbook require the BLM to identify significant issues for analysis and focus only on those issues (Final EA Section 3.1.1). An issue "has a cause and effect relationship with the proposed action and alternatives; is within the scope of analysis; has not [been] decided by law, regulation, or previous decision; and is amenable to scientific analysis rather than conjecture" (BLM 2008, p. 40). The issues identified during scoping and carried forward for analysis are in Chapter 3 of the Final EA. Table 3-1 provides a summary of issues and affected resources. Table 3-2 summarizes the resources not significantly affected. Measures for mitigation and monitoring are referenced in the Final EA analyses in Chapter 3.
Mitigation	Reclamation of Well Pad Sites. BMP believes that the reclamation plan for well pad sites is insufficient and unclear. First, the Draft EA describes the twenty proposed well pads as a "temporary surface disturbance." See Section 2.1.2. Next, the draft states, "Once drilling is complete, the shoulders of the pad would be reclaimed; however, the majority of the pad would be kept clear for ongoing operations and the potential need to work on or re-drill the well." Id. The specifics as to reclamation in Section 2.1.8 do little to clarify whether wells not necessary for the Proposed Action will ultimately be plugged and fully reclaimed. "If Ormat judges a well to have no commercial potential, it could continue to "monitor" the well for the duration of the project; or, the well could be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM." Emphasis added. This is inconsistent with the public outreach conducted. Representatives from Ormat represented to BMP that in fact they would never cap a well drilled here, primarily because of the financial investment involved. The questions presented are thus, what is the duration of the project? And, will the BLM actually require plugging of wells without commercial potential, or in excess of that required for a generation plant, upon the conclusion of the project? 11 This description adds to the sense that the project is being segmented.	Following well drilling, the portions of the well pads not needed for operational and safety purposes (that is, the well pad "shoulders") would be reclaimed following the process in Final EA Section 2.1.8. As described in Section 2.1.1. (see Table 2-1), Ormat assumes half of the well pad would be reclaimed in this manner. The time frame for plugging and abandoning wells is regulated by NDWR and is no more than one year after the well is no longer deemed necessary. A project proponent may extend this timeframe, if they choose to continue monitoring. If and when the well is abandoned, reclamation of the remaining half of the pad would be done following the process in Section 2.1.8.

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Mitigation	NEPA allows the agencies to consider mitigation in assessing whether an action will have a "significant" environmental impact. "Mitigation measures may be relied upon to make a finding of no significant impact" and obviate the need for an EIS, where such measures are "submitted by an applicant or agency as part of the original proposal. In order to ensure the adequacy of mitigation: (1) proposed mitigation measures should be considered throughout the NEPA process (2) a monitoring program should be in place to ensure mitigation measures are implemented and effective; and (3) public participation and accountability should be supported through proactive disclosures of and access to agency mitigation monitoring reports and documents. Here a more robust mitigation and monitoring plan is required to avoid these obviously significant effects.	An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

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Monitoring	During pre-scoping, BMP put forth the following minimum parameters for a monitoring plan: - Test-hole mud-drilling exploration sites should avoid "targets" that could affect springs, wetlands, and wells within the Project vicinity. - Directional-drilling beneath private property should not be allowed unless authorized by the property owners, given the site-specific conditions. - Thermal studies show average heat flow and temperatures are affected in an area within roughly one mile around springs, or larger if the springs harvest heat flow over a larger area (Luijendijk, and others, 2020). These parameters should be taken into account. - Springs with connections to habitat, wetlands, and potable groundwater resources in the Gerlach area are known to contain heavy metals, including arsenic and uranium at levels requiring treatment, which could become mobilized by incremental geochemical changes due to well drilling or long-term operations (temperature). - There should be buffering/setbacks around springs, wetlands, habitat, well sites, and where geothermal and mineral lease rights areas of others reasonably could be affected. Ormat should be required to perform a hydrogeologic analysis to determine whether sensitive areas and private property are within the zone of influence of the proposed wells. The Broadbent plan addresses flow measures and water sampling only, and it does not appear to specifically address these additional items. BMP reiterates the need to specifically address these issues with an effective mitigation and monitoring plan. That plan should be subject to further public review.	The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

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New alternative proposed	Likewise, the proposed alternatives are not meaningful for consideration by the public, given the location of the Project and reasonably foreseeable geothermal generation plant facility that will arise should the exploration wells be commercially viable. The project proponent should be required to analyze alternatives that result in less environmental effects including for example (1) fewer wells; (2) wells in different locations within the 2,724-acre area of interest; and (3) other, off-site locations that might result in lesser overall environmental impacts.	The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. See Final EA Section 2.1.6, Alternatives Considered but Eliminated from Detailed Study, for an analysis of alternative project locations. Alternative project locations would be inconsistent with the known geothermal resource areas and federal geothermal leases held by Ormat in the AOI.
New alternative proposed	Hydrology. The AOI lies along the northeast trend of the Black Rock Geothermal area which includes many important spring resources. Geothermal development frequently causes substantial changes in the flow rates and flow paths in hydro geothermal systems which could alter existing surface flows at springs in the area. The Hydrologic Evaluation provided by Ormat (Stantec 2022, Section 2.2 and Figure 2) in support of the Draft EA indicated connectivity between the hydrologic basins of Black Rock Desert, San Emidio Desert, Smoke Creek Desert, and Granite Basin. Yet, when pressed as to why Ormat chose an AOI so close to the community of Gerlach, representatives indicated that it was in fact because the Black Rock basin is not much larger than the size of the AOI, and no connectivity with other basins exist. Since connectivity does allegedly exist, Ormat should look elsewhere to conduct exploration and development so disruptive by its proximity to this rural community. At a minimum, this should be an analyzed alternative under NEPA.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA).
Noise	Noise Pollution. With the AOI located within a mile of Gerlach residences, it is critical that a Noise Analysis be completed through the NEPA process to identify the impacts to residents of noise from the Project, and the efficacy of Ormat's suggested "one rock muffler" per drilling rig. Id. In 2010, the World Geothermal Congress was presented with a white paper as to the efficacy of portable rock mufflers for well testing purposes. As to noise emissions, the authors stated, "The noise level recorded	Implementing applicant-committed environmental protection measures (see Section 2.1.7), including using mufflers on drilling rig engines, and a rock muffler to attenuate steam venting noise during well testing, would reduce project noise effects. The project would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)).

Comment Code Name	Comment Text	Response Text
	on this portable rock muffler is typically about 90 to 100 dBA at a radius of 5 m compared to the use of permanent rock muffler, which was about 80 - 90 dBA, while noise [World Health Organization] threshold is 85 dBA for 8 working hours/day. Noise measurement in the adjacent community was below 60 dB, as stated in geothermal environmental policy." The level to which a rock muffler, portable or permanent,12 can reduce noise to acceptable levels from well pads proposed on both the south and north borders of the 360 Property appears to be insufficient. This commercial property is currently under development to include among other things campsites, modular housing, a cafe and community space. The constant noise associated with consecutive drilling of exploration wells may also be significantly disruptive to the serenity of public land users in the nearby National Conservation Area. 12 1 Portable Rock Muffler Tank for Well Testing Purpose, Amri Zein, Paul A. Taylor, Yudi Indrinanto, Heribertus Dwiyudha - Proceedings World Geothermal Congress 2010 Bali, Indonesia, 25-29 April 2010; page 2. While this information was stated in the pre-scoping comments to the BLM, the Draft EA does little to address mitigating this issue. The BLM again cites data from the 2019 BMP Event Special Recreation Use EIS in a manner that supports nothing in the Draft EA. While the BLM will require some drilling mitigations for some species of wildlife, much of it kicks the can down the road: negative impacts to bat habitat is acknowledged and accepted without mitigation. As to humans, the Draft EA states that the community of Gerlach, and recreational users, should simply be prepared to be "sensitive noise receptors." See Section 3.2.9. That the BLM believes these "sensitive noise receptors" should suffer up to two and half years of near continual 24/7 drilling is stunningly insufficient mitigation.	

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Public Outreach	BMP and other concerned stakeholders submitted comments to the BLM during the pre-scoping period in January 2022. On August 19, 2022, the BLM released the Draft EA and eight additional supporting documents to the public. These documents include a 74-page public scoping report dated five months earlier - March, 2022 - wherein the BLM lists 283 substantive comments without discussion. As with the pre-scoping comment period (which ran over the holiday season), the comment period for the Draft EA was scheduled inconveniently to coincide with the Burning Man Black Rock City event (the "Event"), making it quite challenging for the citizens most affected by the Project to engage in a robust public discussion. We understand timelines must be adhered to whenever possible, but the comment period here runs over the period of the Event, which brings some 80,000 people to the region and the communities of Empire and Gerlach. The Event affects each of the stakeholders involved in this Project in some way. Due to the unfortunate timing and the local communities impacted by the Event, it would be prudent and community-minded to extend the public comment period by two to four weeks so that the concerns and potential impacts from the Project - from the perspective of those impacted most directly - can be more fully understood.	The BLM published the Draft EA on August 19, 2022, and public comment was open for 30 days. The Burning Man Event ran from August 28 to September 5, 2022. According to the CEQ publication, A Citizens Guide to NEPA (January 2021, p. 12), when preparing an EA, the federal agency has discretion as to the level of public involvement. The CEQ regulations state that the agency must involve, to the extent practicable, the public, State, Tribal, and local governments, other relevant agencies, and applicants in preparing EAs (see 40 CFR 1501.4(e)(2)). Sometimes agencies will choose to use the scoping and public comment periods that are found in the EIS process. In other situations, agencies make the EA and a draft FONSI available to interested members of the public. For this project, the BLM determined a 30-day public comment period was appropriate and consistent with other project public comment periods in the field office.
Purpose and Need	Here, the Draft EA broadly defines the purpose and need as responding to Ormat's application for exploration of geothermal resources, including construction of geothermal power exploration wells and associated facilities, under the BLM's authority. See Draft EA at pg. 1.3. This appears to be a circular definition of purpose and need. The Draft EA does not describe how the project purpose and need affects the size, location, or scope of the Project. Yet, the BLM attempts - erroneously we believe - to narrow the purpose and need through the extremely limited range of alternatives. The lack of a properly defined purpose and need affects the entire NEPA process.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas.

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Range of alternatives	Furthermore, the range of alternatives must address unresolved conflicts concerning alternative uses of available resources, which exist if there is a lack of consensus based on input from interested parties or if there are reasonable alternatives that are substantially different in design or effect. See NEPA Handbook at 79. Here, there is no consensus on the alternatives given that public comments submitted during the scoping process asked Ormat to consider alternative locations and layouts of the proposed action, which it did not address or incorporate into its Draft EA.	The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. See Final EA Section 2.1.6, Alternatives Considered but Eliminated from Detailed Study, for an analysis of alternative project locations. Alternative project locations would be inconsistent with the known geothermal resource areas and federal geothermal leases held by Ormat in the AOI.
Range of alternatives	Section 3.3.7 of the Draft EA addresses cumulative effects pursuant to 40 CFR 1508.7 CEQ 1997. BLM is required to address reasonably foreseeable future actions "regardless of what agency (federal and non-federal) or person undertakes such other actions." Id. BLM fails to analyze the most likely future action to occur after the Proposed Action is completed: The development of a geothermal generation plant and related distribution and transmission facilities in the Gerlach/Empire region. Should the Proposed Action reveal a viable geothermal resource, many of the exploration wells, and likely additional wells, would be used to support plant operations. This obvious future action is only mentioned once in the Draft EA, noting that Ormat "withdrew its utilization plan and plan of development" scoping period. See Draft EA at page 1.1. Thus, it begs the question of why BLM would approve the drilling of up to 20 wells, granting only partial reclamation of each, if it is unknown whether the ultimate use of those wells to support a generation plant would cause irreparable damage to the region's environmental and cultural resources. Moreover, the approval of the Project through only an EA makes the approval of construction of a geothermal generation facility significantly easier than if the necessary analysis was completed up front, as the proverbial damage will have already been done. Put another way, if resources are found in this location, then a generation plan is inevitable - the alternatives are set. However, NEPA does not allow pre-decisional action by the BLM that will limit future consideration of a related project. Hence, the entire utilization plan and plan of development must be considered at this stage.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The Night Sky Baseline Report (BLM 2022b) modeled night-sky conditions at four well pad locations, and conducted photographic simulations at five key observation points. Using findings from the baseline report, the Final EA reports anticipated minor effects on recreation (see Final EA Section 3.3.3), astrotourism (see Final EA Table 3-2, Socioeconomics and Environmental Justice), and wildlife (see Final EA Section 3.3.3). The project would include measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations).

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Range of alternatives	The Proposed Action allows the installation of up to twenty exploration wells, with an overall disturbance area of 51.5 acres. See Section 2.4, Table 2-6. Each of the twenty well pads takes over two acres of land. See Final Operations Plan, February 1, 2022. The Proposed Action Area of Interest ("AOI") surrounds Burning Man Project's property, 360 acres that straddle State Route 34 (the "360 Property") and include hot springs that Burning Man Project is in the process of developing for recreational use.7 The Proposed Action would allow for the drilling of well pads that abut the 360 Property to the north, and lie closely to the south, both of which are in close proximity to the Ditch Spring and others that fall within this private property. BMP has significant concerns, given repeated, severe, and possibly permanent, impacts to springs caused by existing geothermal generation facilities in the western United States, that similar impacts are likely to occur at the 360 Property upon the ultimate operation of a generating plant. The AOI also lies approximately one mile outside of Gerlach proper, and even closer to individual homes of Gerlach residents. Each well pad will be constructed by drilling 24 hours a day/7 days a week for up to 45 days. The Proposed Action thus allows constant, continuous drilling for approximately two and a half years, including wells that abut private property, commercial enterprise, and residential homes. While representatives of Ormat have stated in public meetings that they "will never drill all twenty wells", they have simultaneously declined to take any proposed well site out of the Operations Plan, including those that abut or are in proximity to private property. They have also stated that they will not allow the community to provide input into which well sites should be drilled first to minimize future impacts. The Proposed Action allows each well to be drilled at depths between 1,500 and 7,000 feet and may include directional drilling to intercept geothermal targets under private property, including the 360 Property. 6 Bark v. U.S. Forest Service, 958 F.3d 865 (9th Cir. 2020). 7 Attached to these comments is Burning Man Project's Master Plan for development of the 360 Property.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. As outlined in Table 3-11 for water resources stipulations, Ormat would drill the geothermal resource confirmation wells that are estimated to have the least potential impact private spring or well resources first. This would allow collection of as much water resource information as possible prior to drilling the resource confirmation wells closest to the private springs or wells, potentially preventing or reducing impacts.

Comment Code Name	Comment Text	Response Text
Range of alternatives	The Draft EA's Proposed Action is the Final Operations Plan of Ormat. Here, the applicant proposes to consider three action alternatives (A, B, C) and one no-action alternative (D). However, the only differences between the three action alternatives are slight deviations in access points of +/- 1 mile and proposed surface disturbance of +/- 3 acres. The alternatives do not contemplate actual differences in the proposed action -- e.g. different geographic locations, layouts, sizes, number of geothermal exploration wells -- but rather seem to try and satisfy the alternatives requirement by making insignificant changes to an ancillary feature (i.e. access points) of the proposed action. This does not illustrate consideration of a reasonable range of alternatives to explore alternative means of meeting the purpose and need for the proposed action while minimizing environmental effects as required under NEPA. 1 A Citizen's Guide to NEPA (2007) at 16, citing 40 C.F.R. § 1502.14. This sentiment remains the same in the 2021 revision. See page 13.	Alternatives B and C would minimize the number of project ingress and egress points along CR-34. Minimizing the number of ingress and egress points would decrease the potential for traffic conflicts between project vehicles and recreationists, in turn reducing the potential for public health and safety issues. It would also minimize vegetation disturbance and the potential for soil erosion along the Black Rock Desert playa shoreline.
Range of alternatives	The Draft EA addresses only one commenter's request to move the Project east of Gerlach and rejects it based upon a lack of geothermal resources. Draft EA at 2-9. The Draft EA fails to examine other areas that do have geothermal resources and Ormat leases, despite noting that several groundwater basins north and west of the AOI have connectivity. This lack of examination of viable alternatives further supports finding that the alternatives analysis is inadequate.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The BLM's purpose for the federal action is to respond to Ormat's application to conduct geothermal exploration at the geothermal leases identified in the application. As a result, as noted in Final EA Section 2.6, Alternatives Considered but Eliminated from Detailed Study, alternative project locations would be inconsistent with the known geothermal resource areas and federal geothermal leases held by Ormat in the AOI.

Comment Code Name	Comment Text	Response Text
Recreation	In addition, the AOI overlaps a significant portion of the Granite Foothills Recreation Management Zone. The RMZ plan recognizes that "national or regional visitors and constituents value the surrounding public lands as a recreation/tourism opportunity." This issue was raised during the pre-scoping process, but aside from highlighting an area on an appedicized map, the BLM fails to address it in the Draft EA. See A-7, p. 92. There are no mitigations suggested nor required stipulations in the Draft EA that address potential impacts to recreation. See Section 3.3.3, pg. 3-31. The BLM should do a detailed study, based on current data, to identify the scale of the Proposed Actions impacts on the identified recreation values and on the socio-economic impact on regional tourism. 10 BPM incorporates its prior comments into this comment on the Draft EA.	The Granite Range SRMA was designated by the 2015 BLM Winnemucca District Office Resource Management Plan, in 2015. Three of the geothermal leases analyzed in this Final EA overlap portions of the SRMA, these include NVN-055718 (issued in 1992), NVN-075228 (issued in 2001), and NVN-098640 (issued in 2019). Geothermal exploration well pads 58-3, 66-3, 63-3, and 71-3, and access roads, are proposed on lease NVN-075228, which was issued prior to designation of the SRMA. Geothermal exploration on leases issued before the SRMA designation would be allowed as a valid and existing right. Further, geothermal exploration would not be incompatible with the management recommendations for the SRMA in the RMP (see p. 2-68 of the RMP). The Final EA (Section 3.3.3 for Recreation) found that exploration activities would have a minor effect on the recreation setting and access to recreation opportunities in the SRMA.
Scope of analysis	Net Energy Analysis. As part of the NEPA analysis, the BLM should conduct a Net Energy Analysis comparing the energy input with energy outputs for the Proposed Action. This comment was raised and ignored during pre-scoping.	A net energy analysis cannot be conducted until the energy generation potential of the geothermal resource is better known. The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis.

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Socioeconomics	The Proposed Action does not bring local jobs to the region. The Final Operations Plan indicates that approximately 10 workers will be on site for the duration of a well drilling (approximately 45 days each), and that these will be current Ormat employees or contractors who would travel to the site. Final Operating Plan at 9. Unintended consequences of the Proposed Action could also negatively impact businesses and landowners. Geothermal development in this region has the potential for significant negative impacts by altering or stopping existing surface springs from functioning, as discussed more fully below. Such impacts can harm local businesses. Again, while exploration wells may not cause immediate impacts to springs, the Proposed Action requires the community to "wait and see" whether a generating facility will be built, all while suffering through the construction of 20 well pads that will never be required to be fully reclaimed. For example, should the Ditch Spring and other hot springs located on the 360 Property cease functioning, the commercial investment to develop the property as a community center would be thwarted or prevented. And, if the Great Boiling Springs, located on neighboring private land, reduce or cease functioning, this would adversely impact the Black Rock Mud Company that relies upon its proper function. With the likelihood of the Proposed Action leading to the construction of a geothermal generation plant, considerations on how that could affect the local economy should be thoroughly addressed now.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

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Socioeconomics	Rural Economy, Energy Reliability, & Environmental Justice. The Proposed Action does not reflect any specific economic benefits to the Town of Gerlach and the surrounding region. Rather, it appears that the benefits of exploration will be minimal and possibly counterproductive. The BLM indicates in Table 3-2 of the Draft EA environmental justice issues are "present/not affected" based upon baseline data indicating that "minority populations and low-income populations are below the statewide averages for Nevada" in Washoe County. BMP submits that this data is inaccurate, and its use by federal agencies hinders economic development in rural communities in the West. Nevada is the 7th largest state in the Union, with only 17 counties. Washoe County is a geographically large county with one of the largest metropolitan regions in the State. Gerlach lies approximately 90 miles from the Reno/Sparks area. The socio-economic data of Gerlach residents do not match those of Reno/Sparks. Thus, this appears to be an issue of environmental justice warranting further investigation. 8 This inaccurate data is used in many federal programs, including the USDA, and often leaves rural communities in large western states ineligible for federal grant monies because they lay within a county with a large municipality hours away. While Gerlach could benefit from modernized energy infrastructure, without the benefit of an EIS, it is unknown to what degree the ultimate construction of a geothermal plant would meet that demand. It is unknown if the energy generated therefrom would even remain in the State of Nevada. Without identified planning between Ormat and NV Energy to address the aging transmission and distribution of the region-which currently still utilizes glass insulators-customers of Sierra Pacific Power Company would only receive some generalized benefit from additional renewable resources coming on line in the intermountain west. Ormat should have engaged early with the community to address how any approval of a geothermal plant and associated distribution and transmission facilities would specifically bring them reliable renewable energy and foster economic growth.	The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis.

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Socioeconomics	Tourism & Recreation. Gerlach's economy significantly benefits from the tens of thousands of visitors from around the world who travel to this region year-round to experience the solitude of the vast open spaces and undeveloped vistas present in the Black Rock Desert, as well as attend numerous events and pursue a variety of recreation experiences. The COVID-19 pandemic saw a significant rise in the number of visitors to public lands, including within the Gerlach region. As to recreation, the Draft EA states, "Compared with surrounding public lands, there is relatively little recreational activity in the AOI. This is because of the proximity to the community of Gerlach, private property, commercial operations, developed gravel pits, and abundant high quality recreation in nearby public lands." See Section 3.2.7. In making this conclusion, the BLM improperly relies on the 2019 Burning Man Event Special Recreation Permit Final Environmental Impact Assessment (BLM 2019b. P. 3-92). Id. This conclusory statement 9 ignores reality: Apparently, the BLM believes that because the boundaries of the AOI border the community, private property, and high quality recreation, but do not cross them, there is little impact. The opposite is true - the closer the AOI is to the community, private property, and high quality recreation, the more severe the impacts from the activities become. Moreover, reliance on the BMP EIS is faulty as the BLM thus fails to address the intervening four years wherein economic development of the community of Gerlach has blossomed, in large part due to significant investments by BMP. This economic development includes BMP's purchase and development of several commercial properties in town including the 360 Property, an RV campground, and a vintage hotel, as well as the numerous proposals by local stakeholders for recreational and art trails throughout the community, including within the AOI. 9 Data and studies supporting this EIS were largely completed in 2018.	The Final EA (Section 3.3.3 for Recreation) found that access to recreation opportunities may be temporarily restricted in the immediate work area during construction, displacing visitors from localized areas. However, numerous other access points to the same opportunities would remain open during construction. Visitors would be permanently displaced from fenced well pads, but this would not restrict access to recreation opportunities in the vicinity. As such, effects from restricting or displacing recreation opportunities would be minor.

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Special Designations	National Conservation Area. On December 21, 2000, the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000 was signed into law. This important piece of legislation was decades in the making, and takes into account multiple uses and attributes therein that provide economic stability, cultural resource preservation, and significant habitat. The location of the AOI so near to the NCA is one of significant concern, as expanded upon in the following paragraphs.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, it is stated that "The Congress does not intend for the establishment of the conservation area to lead to the creation of protective perimeters or buffer zones around the conservation area. The fact that there may be activities or uses on lands outside the conservation area that would not be permitted in the conservation area shall not preclude such activities or uses on such lands up to the boundary of the conservation area consistent with other applicable laws." The proposed action does not overlap with the designated NCA or associated Wilderness Areas.
Transportation System	Transportation Analysis. BMP is well aware of the potential impacts to local roads from increased traffic, as we perform detailed traffic analyses for the BLM through our own EIS process. In fact, the Draft EA again relies on the BMP 2019 EIS in addressing this issue. See Table 3-2, page 3-6. The BLM's conclusion notes heavy traffic during the temporary Burning Man Event, and "...should construction overlap with the event, given the volume of event traffic, the addition of relatively few construction-related vehicles is not anticipated to meaningfully contribute to a lowered level of service on SR-447 and CR34." Again, the BLM ignores the fact that BMP's temporary event is predominantly eight days a year, while the Proposed Action anticipates up to two and half years of near continual construction, including the transportation of heavy vehicles and drill rigs. Increased traffic of heavy vehicles on State Route 447 could lead to an increased deterioration of the road surface. BMP reiterates its request that the BLM require Ormat to provide data and consult with the Washoe County Roads Department to determine if the roadway rating and the Roads Department's maintenance schedule are adequate for the specific transportation needs of the Project.	Construction-related vehicles are not anticipated to meaningfully contribute to a lowered level of service on SR-447 or CR-34 (see Final EA Table 3-2, for Traffic and Transportation). Potential impacts on road surface condition would be addressed through normal maintenance performed by the NDOT or Washoe County, or both (see Final EA Table 3-2, for Land Use and Infrastructure).

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Visual resources, including night skies	Dark Skies. In an era of ever increasing urbanization and development, Dark Skies are becoming a rapidly diminishing resource. This has led to an exponential growth in the awareness of the values of preserving Dark Sky landscapes and in the growth of Astro Tourism. Currently, Gerlach is a gateway community to the Dark Sky resources of the Black Rock High Rock NCA and the Massacre Rim WSA/ Dark Sky Sanctuary. This area is a popular viewing spot for people to view meteor showers, including the Perseids in August, and the Leonids in November. Two years after the completion of the Burning Man EIS, during the 2021 legislative session, the Nevada Legislature passed Senate Bill 52 which declared that dark sky areas "serve to specifically promote, preserve, protect and enhance Nevada's dark sky resources for their intrinsic value and their ecological, astronomical, cultural and economic importance." Further, the Legislature determined that "Designation of dark sky places in Nevada under the program will also attract tourists and other visitors to rural communities near Nevada's dark sky assets, thereby generating increased economic activity for surrounding communities and their small businesses." As with the issues regarding recreation and tourism, the BLM improperly relies on data collected during the EIS process for the Burning Man Event, dating from 2018. The BLM relies on the study presented and heavily critiqued during that process. The report supporting this Proposed Action includes unchanged conclusions, despite the fact that such conclusions were debunked in 2018, and despite the fact that a Black Rock City event occurred in 2019. No additional data was presented from that event. BLM's conclusions further ignore the fact that Black Rock City is an 8-day temporary gathering with zero permanent effects on the night sky - while the Proposed Action allows up to two and a half years of nearly continuous drilling, day and night, and that the reasonably foreseeable generation plant will have permanent lighting features. This effect has not been properly analyzed.	The Night Sky Baseline Report (BLM 2022b) modeled night-sky conditions at four well pad locations, and conducted photographic simulations at five key observation points. Using findings from the baseline report, the Final EA reports anticipated minor effects on recreation (see Final EA Section 3.3.3), astrotourism (see Final EA Table 3-2, Socioeconomics), and wildlife (see Final EA Section 3.3.3). The project would include measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations).

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Water Resources	The Draft EA requires Ormat to follow the draft monitoring plan of Broadbent and Associates, 2022. See Table 3-11, pg. 3-28. BLM acknowledges that the monitoring plan set forth in the BLM-Required Stipulations is insufficient to fully address impacts to water resources. See Section 3.3.5, pg. 3-41. The unknown impacts from exploration well drilling can only be increased by a significant order of magnitude upon the reasonably foreseeable future action of geothermal generation plant operations. The likely impacts from such operations should be thoroughly identified before 51.5 acres of land is permanently scarred, and residents suffer through two and a half years of near constant well drilling.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

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Water Resources	The well testing procedures can also cause potential impacts that need to be addressed by BLM. Specifically: - There is potential for impacts to springs/habitat, wetlands, and private (domestic and/or geothermal) wells. - Again, Ormat has not specified an adaptive management approach to address such impacts. In the post-drilling and testing data phase, additional concerns arise: - Ormat has not provided short- or long-term standard operating procedures for monitoring or for the remedy of impacts to springs/habitat or private wells/owners, given mud-drilling, directional-drilling, rock-fracturing, lost circulation and "blow-out" potential or other changes (flow, level, chemistry). - It is not clear what would happen if the Proposed Action upends the heat flow wherein potable groundwater resources become non-potable or flow restricted. There must be a responsible party and process for replacing affected water supplies in the short- and long-term. - The process must also specify how and where will habitat be mitigated in the Project vicinity if ecologic changes occur.	The proposed action in the Final EA includes short-term and long-term pumping from the geothermal aquifer during well testing only; as described in the Final EA Section 3.3.5, the volume of fluid withdrawn during the well tests is expected to be minor, compared with the volume of fluid available in the geothermal resource, and is not expected to affect the geothermal reservoir's quantity or quality. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Cultural resources	The project area includes locations important to the local community that may be impacted by the project. Four of the proposed wells described in the Draft EA are within 1000 feet of, and parallel to, the Guru Road cultural area where access roads and well pads would be created; this is an area that brings tourists to the region.	As discussed in Appendix C, Cultural Resources, of the Final EA, the Guru Road area including its art and memorial installations, is not considered a site eligible for listing on the NRHP due to its age. Per the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, the presence of art and memorial installments often immediately adjacent to the trail may be identified as a possible impact to the setting of the California Trail which is considered eligible for the NRHP.

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Geothermal resources	The Draft EA states that geothermal wells would be drilled to a depth of 1500-7500 ft., with surface casing set no less than 200 ft. below ground surface (p. 2-2). The Gerlach Hydrologic Evaluation Report (GHER) includes groundwater well data from 49 wells (Table 6, p. 20 and 21). Most wells were drilled in alluvium and encountered groundwater near the surface. The GHER documents that basin-fill alluvial sediments are generally productive aquifers (p. 22), and that alluvial fill continues down to granite bedrock (p. 14). The depth to bedrock increases with eastward distance from the Granite Range front, and the GHER suggests that all alluvial fill to bedrock is potential aquifer. The GHER also states that, based on groundwater chemistry, natural mixing of geothermal water and cool groundwater is not significant (p. 29). Geothermal well surface casing set above granite basement would have the potential to allow mixing of geothermal waters with aquifer groundwater during well testing. In the Final EA, the EPA recommends that the BLM determine and commit to adequate surface casing depths for each well, preferably to bedrock, that would ensure that geothermal waters do not mix with the aquifer.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. As outlined in Table 3-11, additional measures could include increasing casing depth.

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Groundwater	The Great Boiling Spring is on private property northwest of Gerlach next to CR 34 and is also a popular destination and used for local businesses. Three of the proposed wells would be within 1300 feet of Great Boiling Spring; three more wells would be directly up-gradient and 2700 feet from the Spring (Figure A-3). During 30-day well testing, each well could produce up to 15 million gallons of water (~350 gallons per minute). The spring is estimated currently to be recharged by geothermal waters at a rate of 553-754 gallons per minute (GHER p. 26). The well tests could severely diminish flow to the Spring, with unknown consequences during re-injection and after testing is finished. The Draft EA mentions a water monitoring plan, but acknowledges that there would be potential for a time lag between detectable and maximum effects, resulting in maximum impacts that are larger than those observed after mitigation measures are implemented. Further, the recovery to baseline states could occur slowly (p. 3-41). The proposed wells could have major and long-lasting community and hydrological impacts if drilled and tested at the locations in the Draft EA.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. As outlined in Table 3-11, if private landowners do not allow monitoring of their springs or wells, Ormat would drill exploration wells that are estimated to have the least potential impact to these resources first.

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Scope of analysis	The Draft EA analyzes the impacts from the exploratory drilling of 20 proposed well locations (Figure A-3); however, the Draft EA is internally inconsistent regarding the scope of analysis (number of wells) that the ultimate environmental decision will support. The Cultural Resources Appendix C states that the southernmost seven wells would require a waiver and further impact analysis, and would not be permitted under this Draft EA. The Appendix states that the southernmost well pads1 contain no surface occupancy (NSO) stipulations, as required under the resource management plan for the Winnemucca District concerning trails, under the National Register of Historic Places, and under the Sonoma-Gerlach Management Framework Plan (p. C-8). It is unclear if pursuing exploratory drilling in these areas would result in a significant impact to a historical trail and, if so, what mitigation measures are available in order for such impacts to be considered less than significant. 1 86-16, 67-16, 45-16, 37-16, 62-20, 11-21 and 83-16 In the Final EA, clarify which of the wells are intended to be permitted after the completion of this EA process and describe all future, additional environmental analyses that the Appendix references (timing, level of analysis, scope of analysis, etc.) in the context of potential cumulative impacts and significant impacts of reasonably foreseeable future actions.	The analysis for cultural resources in Final EA Section 3.3.3, as well as the additional information presented in Appendix C, were revised in part due to changes to the proposed action requested by the project proponent. These changes include moving previously proposed well and well pad 83-16 and renaming it as 84-16 to reduce cultural resource conflict and removing proposed well and well pad 72-16 from the project following further engineering review. Following the changes, of the 19 wells proposed in the action alternatives, six proposed wells (86-16, 67-16, 45-16, 37-16, 62-20, and 11-21) are within trail NSO areas and would require a stipulation waiver to be drilled (Similarly, proposed wells 37-16 and 62-20 are also within NRHP-eligible sites with a NSO stipulation; they also would require waivers to be drilled). The required analysis and consultations to procure waivers are not included in Alternative A. As a result, these six wells would not be permitted.

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Surface Water	The Draft EA states that each well may undergo 3-5 days of short-term flow testing that would produce 1.5 million gallons of geothermal waters, followed by 7-30 days of long-term flow testing producing 15 million gallons of geothermal waters (p. 2-3). The short-term test volumes would be contained by the drill pad reserve pit; however, the long-term test volume would produce more than a single reserve pit could safely hold. Any excess geothermal waters would be piped to a separate pad and released into the reserve pit or injected into the adjacent well. The first well in the project would not have the benefit of an adjacent well or reserve pit for long-term geothermal well test water injection or storage. The EPA recommends that the Final EA clarify how waters produced by the long-term well test would be handled for the first well. We further recommend that the Final EA include any additional mitigation measures or stipulations to ensure there would be no discharge of the produced waters to the adjacent ground surface resulting from first well production testing.	The Long-Term Well Testing discussion in Section 2.1.2 of the Final EA was revised to clarify that there would be no discharge of the produced geothermal fluid to the ground surface.

Comment Code Name	Comment Text	Response Text
Water Resources	The EPA recommends that the BLM consider well locations to minimize community and hydrological impacts, specifically in the area of Guru Road and Great Boiling Spring. Consider in the Final EA a commitment to avoid exploratory well tests closest to these local resources.	The town of Gerlach's water is supplied by the Gerlach General Improvement District (GGID), which sources its water from Granite Spring and Garden Spring which are respectively 5.04 and 7.8 miles northwest of the project and separated from the AOI by the Granite Range. Granite Spring and Garden Spring are in the Smoke Creek Desert Basin, which is within 5 miles of the AOI, but no proposed geothermal wells are in the Smoke Creek Desert Basin. Per NDEP regulations, should ORMAT's activities impact Gerlach's water supply they will have to provide the residents with water. As noted in Final EA Section 2.6, Alternatives Considered but Eliminated from Detailed Study, alternative project locations would be inconsistent with the known geothermal resource areas and federal geothermal leases held by Ormat in the AOI. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. As outlined in Table 3-11, if private landowners do not allow monitoring of their springs or wells, Ormat would drill exploration wells that are estimated to have the least potential impact to these resources first. Further, in conformance with applicable RMPs, drilling would not occur within 500 feet of a spring.

Comment Code Name	Comment Text	Response Text
General wildlife	Wildlife Habitat The high desert ecosystem is delicate. To borrow from other commenters: "Wetlands in the desert are biodiversity hotspots, providing habitat for invertebrates, fish, resident and migratory birds, and a vital water source for larger terrestrial wildlife." It seems that the Project has the potential to impact wildlife habitat and biodiversity in a number of ways, including the above mentioned water concerns. What are the ecological consequences of the Project? We believe the Draft EA would benefit from additional analysis of the impact on plant and animal species and their habitats.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.
Geothermal resources	Remediation of Disturbed Areas It is our understanding that disturbed areas with no or little commercial potential (mainly well pads) in the Project don't have to be remediated back to their natural state. It is not clear to us what the required level of remediation is. In public meetings Ormat representatives seemed to say that they could "monitor" undeveloped wells for years or forever, thereby eluding remediation requirements. Could the Draft EA be more clear in terms of what and when mitigations will be required for disturbed areas?	Following well drilling, the portions of the well pads not needed for operational and safety purposes (that is, the well pad “shoulders”) would be reclaimed following the process in Final EA Section 2.1.8. As described in Section 2.1.1. (see Table 2-1), Ormat assumes half of the well pad would be reclaimed in this manner. The time frame for plugging and abandoning wells is regulated by NDWR and is no more than one year after the well is no longer deemed necessary. A project proponent may extend this timeframe, if they choose to continue monitoring. If and when the well is abandoned, reclamation of the remaining half of the pad would be done following the process in Section 2.1.8.

Comment Code Name	Comment Text	Response Text
Noise	Noise Pollution The AOI is located within a mile of Gerlach residences. There will be sound impacts from construction, drilling, and transportation if the Project moves forward. Calculations based on the Ormat Operations Plan suggest that residents will be exposed to two and a half years of near constant noise if all of the proposed pads are drilled. During meetings with the public, Ormat representatives were unable to say what noise levels could be expected. We see that mitigations are recommended in the Draft EA, but there is not a thorough noise study for the proposed sites. It is our understanding that Ormat has executed many exploration projects in Nevada and around the world - we request that a noise analysis with expected noise levels in decibels be provided for each part of the project, and that proper mitigations be required to prevent disturbances to residents, businesses, and visitors. Put another way, will a noise analysis with expected noise levels in decibels be conducted for each part of the project and shared, and will proper mitigations be required to prevent disturbances to residents, businesses, and visitors? We would ask that the noise analysis include the power generation plant so that affected stakeholders can understand the likely permanent impacts to the Gerlach area.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Final EA Table 3-12, Project Noise Sources, reports anticipated noise levels for project equipment. A large rotary drill rig is anticipated to range from 91 to 106 dBA at the rig. Implementing applicant-committed environmental protection measures (see Section 2.1.7), including using mufflers on drilling rig engines, and a rock muffler to attenuate steam venting noise during well testing, would reduce project noise effects. The project would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)).
Public Outreach	Friends of the Black Rock High Rock and other affected stakeholders submitted comments to the BLM during the pre-scoping period in December 2021 and January 2022. The Draft EA lists those comments but does not seem to resolve them. We also understand that more questions and concerns will likely be raised by affected stakeholders in this round of comments to the Draft EA. We would like to request more time in the public process to understand the answers to questions raised by the affected stakeholders and to understand what mitigations will be required if the Project moves forward.	According to the CEQ publication, A Citizens Guide to NEPA (January 2021, p. 12), when preparing an EA, the federal agency has discretion as to the level of public involvement. The CEQ regulations state that the agency must involve, to the extent practicable, the public, State, Tribal, and local governments, other relevant agencies, and applicants in preparing EAs (see 40 CFR 1501.4(e)(2)). Sometimes agencies will choose to use the scoping and public comment periods that are found in the EIS process. In other situations, agencies make the EA and a draft FONSI available to interested members of the public. For this project, the BLM determined a 30-day public comment period was appropriate and consistent with other project public comment periods in the field office.

Comment Code Name	Comment Text	Response Text
Recreation	Recreation & Tourism Tens of thousands of visitors travel to the NCA annually, supporting Gerlach's economy and population as they stop for fuel, meals, shopping, and information. These visitors seek solitude and exuberance in the vast open spaces and uninterrupted vistas of the Black Rock Desert, attend special events, learn about history, and participate in recreation experiences. Recreation here increased during the COVID-19 pandemic, and that pattern continues now. The Draft EA states, "Compared with surrounding public lands, there is relatively little recreational activity in the AOI." Since the NCA sees a visitorship of at least 80,000 people annually, we request BLM describe which surrounding public lands are the basis of comparison and share visitorship information for these lands and the NCA.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA).
Socioeconomics	Rural Economy & Environmental Justice The Project does not appear to bring new jobs to locals or significant economic benefits to the Gerlach region. Rather, it appears that the benefits of exploration will be minimal and possibly counterproductive, negatively impacting tourism, land owners, water supplies, existing businesses, and business development. As a stakeholder in Gerlach and the NCA, our organization is concerned about issues of economic development and environmental justice in this tiny rural town. Can mitigations or partnerships be put in place to offset any negative economic or social impacts from the Project?	The Final EA finds anticipated minor effects on Environmental Justice and Socioeconomics (see Final EA Table 3-2 for these topics). Further, the hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. With this stipulation, effects on water resources are also expected to be minor.

Comment Code Name	Comment Text	Response Text
Visual resources, including night skies	Dark Skies Friends of the Black Rock High Rock supports dark skies initiatives and designations. We believe dark skies are an integral and rewarding part of the wilderness experience. Light pollution from the exploration phase of the Project seems to be potentially significant, especially since drilling would be conducted 24/7. Light pollution from a power generation plant seems to be significant also, though not included in the Project. The Draft EA should analyze the likely, known, and potential impacts from the Project to the skies in the AOI and include the appropriate mitigations. We would ask that the dark skies analysis include the power generation plant so that affected stakeholders can understand the likely permanent impacts to the night skies. It also seems important to note that the light pollution impacts from the Project (without a generation facility) would be up to three years and that light from the Burning Man event is created for eight days each year - not at all equivalent to the permanent or semi-permanent impacts of the Project - yet the Draft EA doesn't seem to make this distinction.	The Night Sky Baseline Report (BLM 2022b) modeled night-sky conditions at four well pad locations, and conducted photographic simulations at five key observation points. Using findings from the baseline report, the Final EA reports anticipated minor effects on recreation (see Final EA Section 3.3.3), astrotourism (see Final EA Table 3-2, Socioeconomics), and wildlife (see Final EA Section 3.3.3). The project would include measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations).
Water Resources	Water It is our understanding that local hydrology - including surface water and springs, as well as groundwater - can be impacted by geothermal development, including contamination. If local or regional water quality or quantity are negatively impacted by the Project, what are the guarantees that these impacts would be reversed or repaired and done so in a timely manner? Have the likely impacts in this specific region from the proposed operations been thoroughly identified? Have mitigations been required as part of the permitting? We should have a clear understanding of the likely impacts before 50 acres of land are permanently altered and water sources are impacted.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

Comment Code Name	Comment Text	Response Text
Cultural resources	The Guru Road area adjacent to the proposed project site is also a significant national cultural site, recognized as an important example of Americana art and connected to important cultural figures including Peter Goin and Gary Snyder. In addition, the Guru Road area has become a collective place of artistic representation contributed to by the citizens of Gerlach and visitors, many of whom have created permanent and meaningful art as memorials of loved ones. One alternative to further speculative development of the area would be to designate it as either a wilderness area, or an area of cultural significance and to limit the usage of the geothermal resources to non-mechanical and historical means, allowing the public to enjoy the resources as they have been for hundreds of years.	As discussed in Appendix C, Cultural Resources, of the Final EA, the Guru Road area including its art and memorial installations, is not considered a site eligible for listing on the NRHP due to its age. Per the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, the presence of art and memorial installments often immediately adjacent to the trail may be identified as a possible impact to the setting of the California Trail which is considered eligible for the NRHP.
Special Designations	As a native Nevadan and lifelong visitor to Gerlach and the Black Rock Desert, I am concerned about the potential and far-reaching negative impacts of geothermal exploration in such close proximity to the town of Gerlach and the natural and cultural resources of the natural springs and desert playa nearby. The area is of great importance to both state and local history with the Nobles Emigrant Trail running through the area. The historical, educational, and cultural value of the trail and the adjoining landscape is based on an experience of place that is not compatible with drilling pads and equipment, road building and earth moving equipment, and power lines.	The proposed action would have at most, a temporary adverse effect on cultural and historical resources in the project vicinity. See Final EA Section 3.3.3, 3.3.5, and 3.3.6 for Cultural Resources; also see Appendix C, Cultural Resources.
Visual resources, including night skies	The dark sky environment in Gerlach and on the adjacent playa is a rare feature in the area and would be detrimentally effected by further light pollution necessitated by the installation, maintenance, and safety considerations of geothermal exploration.	Effects on night sky conditions are described in Section 3.3.3 of the Final EA. Anticipated changes in ALAN, radiance, and sky glow would have temporary effects, which would differ in magnitude based on the observer's location. Effects would be minor because, under a worst-case scenario, drill rig radiance would be equivalent to observed radiance of Gerlach; actual lighting produced would be lower, and measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations). Further, numerous sources of nearby ALAN are present in this area, so night sky conditions are already low in the project area. As stated above, effects would be temporary, lasting the duration of construction.

Comment Code Name	Comment Text	Response Text
N/A	No substantive comments provided	No substantive comments provided.
FLPMA	BLM grapples with many issues and conflicting interests. But FLPMA provides the North Star to navigate through them. BLM must manage to ensure the "sustained yield" of renewable resources like water, soil, vegetation, and wildlife habitat. And BLM must manage to avoid "undue degradation" of its lands and resources.	As described in Final EA Section 1.6, the BLM has prepared the Final EA consistent with federal laws and regulations; state and local government laws and regulations; and other plans, programs, and policies, to the extent practicable within federal law, regulation, and policy that govern BLM's actions, including the Federal Land Policy and Management Act of 1976 (43 USC 35), the BLM NEPA Handbook (H-1790-1), as updated (BLM 2008), and the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000 (NCA Act) (Public Law 106-554), among others.
Noise	The information on the affected environment and environmental consequences is lacking in its depth. Of major concern to residents in the area near to the proposed site is the disruption to living in a quiet rural area of Nevada. The statements on changes to ambient noise levels for local residents is based on assumptions that people "would likely experience noise levels that are comparable with current conditions". This is not an adequate analysis. Ormat is proposing to run machines 24 hours per day. This has a significant chance of altering the lives of those living and visiting nearby and is an unacceptable risk. An analysis and data of the actual noise impacts to Gerlach must be known before this proposal should be considered.	Final EA Table 3-12, Project Noise Sources, reports anticipated noise levels for project equipment. A large rotary drill rig is anticipated to range from 91 to 106 dBA at the rig. Implementing applicant-committed environmental protection measures (see Section 2.1.7), including using mufflers on drilling rig engines, and a rock muffler to attenuate steam venting noise during well testing, would reduce project noise effects. The project would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)).

Comment Code Name	Comment Text	Response Text
Recreation	The proposed area is significant specifically because it provides "opportunities and feelings of solitude or primitive and unconfined recreation", which is of utmost importance to residents and tourists. What is not addressed (because we are told it is outside the scope of this EA) is what additional impacts there will be if the proposed drilling exploration leads to a geothermal plant. What is stated as acceptable in this proposal because it is "temporary" has a significant chance of not becoming temporary, and thus of much greater impact.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. As described in Final EA Section 3.3.3 for special designations, the project would have a minor effect on the Granite Peak LWC area due to reduced opportunities and feelings of solitude or primitive and unconfined recreation for visitors in the LWC area; this effect would be minor because numerous nearby developed areas are already visible from this portion of the LWC area, including traffic on CR-34 and SR-447, gravel pits, and other municipal and commercial developments around Gerlach. As a result, opportunities and feelings of solitude or primitive and unconfined recreation are already low. Further, according to BLM Manual 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process, the BLM is not required to protect wilderness characteristics as a priority over other resource values and multiple uses.
Visual resources, including night skies	To say that "numerous sources of nearby ALAN are present in this area, primarily from Gerlach and Empire. As a result, night sky conditions and associated opportunities and feelings of solitude or primitive and unconfined recreation are already low in this area." (3.3.3 Issue 2) is simply untrue. Local residents and tourists regularly use the proposed area for recreation and solitude. Even one mile outside of Gerlach offers dark skies and solitude completely separate from what is "present" in the towns. This proposal specifically states "there would be no specific mitigation measures for recreation", which is unacceptable. The proposed area is important for recreation and that should not be assumed as inconsequential.	There would be no specific mitigation measures for recreation. However, implementing measures to avoid, reduce, or mitigate visual-related impacts on other resources, including night sky conditions, would directly and indirectly reduce the potential for the project to change the recreation setting. Measures are described in Section 2.1.7, Applicant-Committed Environmental Protection Measures, and in Table 3-11, BLM-Required Stipulations, and include minimum night lighting and directed and shielded night lighting to focus light on the immediate work area.

Comment Code Name	Comment Text	Response Text
Groundwater	I am against the Gerlach Geothermal Exploration Project. This has no advantages to Gerlach, we risk our water table and the unique Thermophile that live in the surrounding hot springs Here are some articles https://www.rgj.com/story/life/outdoors/2017/11/24/secrets-life-hide-nevada-hot-springs-yes-really/893762001/ To quote this RGJ article about the owner of the Great Boiling Spring that could be impacted by this exploration Hedlund, who named one of the organisms they've discovered Thermocrinis jamiesonii, after Jamieson. https://pubmed.ncbi.nlm.nih.gov/26419502/ https://en.wikipedia.org/wiki/Thermocrinis_jamiesonii https://lpsn.dsmz.de/species/thermocrinis-jamiesonii https://news.berkeley.edu/2011/07/05/hot-springs-microbe-yields-record-breaking-heat-tolerant-enzyme/ https://www.nature.com/articles/ismej2012157 We don't want the noise the light the abandoned piping when the required temperature is not found. We also don't have enough ground water for the drilling	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. Project water wells or other supply would be approved by the BLM under a waiver for the temporary use of groundwater from the Nevada Division of Water Resources (NDWR). The NDWR would determine if the groundwater basins they manage could support proposed water withdrawals.

Comment Code Name	Comment Text	Response Text
Cultural resources	Page 3-34, Section 3.3.3, states: "Geothermal leases NVN-75228 and NVN-55718 were leased in 2001 and 1992, respectively. At the time these leases were sold, the Sonoma- Gerlach Management Framework Plan was the planning document in effect. Unlike the BLM Winnemucca District RMP mentioned above, this plan did not include similar trails stipulations. The remaining proposed wells are within these lease areas; as a result, they would not be subject to the trail NSO stipulation. However, the plan does provide the BLM discretion to stipulate restrictions for surface use in direct conflict with cultural resources eligible for listing on the NRHP. Proposed well 83-16 would be located directly on such a resource. For this reason, the well would not be permitted without a similar additional analysis and consultations, as described above. As a result, this well would not be permitted, and the direct effects on the eligible resource would not occur." Ormat requests an opportunity to move well pad 83-16 rather than the BLM denying the well pad location. Ormat worked diligently with the cultural contractor to move all well pads out of known eligible cultural resources and would like the same opportunity on the 83-16 well pad. As such, Ormat has updated the Operations Plan to include a proposed well pad replacement for the old 83-16 well pad with a new, proposed 84-16 well pad. Ormat requests that the new 84-16 well pad be reviewed as a replacement for the Final EA. We appreciate the time and effort put into the preparation of this Draft EA and review of the proposed Project.	As discussed in Chapter 2 and shown in the maps depicting the alternatives in Appendix A of the Final EA, the proposed action and action alternatives have been revised to include Ormat's request to move well pad 83-16 to avoid direct conflict with the eligible resource. The moved well pad was renamed 84-16.
Range of alternatives	Overall Section 2.2 Alternative B and Section 2.3 Alternative C: Ormat supports the BLM selection of either Alternative B or Alternative C for the Project. Both alternatives provide appropriate ingress and egress for the proposed project's haul in and load out traffic, including drill rigs.	Comment noted.

Comment Code Name	Comment Text	Response Text
Range of alternatives	Overall Section 2.1 Alternative A: Proposed Action: Due to further engineering review of proposed well pads, Ormat would like to remove well 72-16 from the Operations Plan. Additionally, with the removal of well 72-16, Ormat has slightly adjusted the 82-16 well pad location by approximately 200 feet to the east from its previously selected location. The 82-16 well head coordinates will remain the same. Ormat has updated the Operations Plan to reflect these changes and will provide the updated Operations Plan, dated September 2022, to the BLM and the NEPA contractor and requests the updates are incorporated into the Final EA.	As discussed in Chapter 2 and shown in the maps depicting the alternatives in Appendix A of the Final EA, the proposed action and action alternatives have been revised to include Ormat's request to remove well 72-16 from the project, and adjust the location of well pad 82-16.
Groundwater	I am concerned about how pumping water into the ground adjoining the town of Gerlach will affect the ground water.	The town of Gerlach's water is supplied by the Gerlach General Improvement District (GGID), which sources its water from Granite Spring and Garden Spring which are respectively 5.04 and 7.8 miles northwest of the project and separated from the AOI by the Granite Range. Granite Spring and Garden Spring are in the Smoke Creek Desert Basin, which is within 5 miles of the AOI, but no proposed geothermal wells are in the Smoke Creek Desert Basin. Per NDEP regulations, should ORMAT's activities impact Gerlach's water supply they will have to provide the residents with water.
Noise	I am also concerned about how the aesthetic and environmental changes will affect the inhabitants of Gerlach. Namely, will traveling north of the town feel like traveling through a petrochemical plant or a high tension electric power distribution center like one would see in Long Beach, CA? Will the plant emit noise and light at levels which will be noticeable and irritating to the residents?	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit.

Comment Code Name	Comment Text	Response Text
Visual resources, including night skies	I live in Galena and frequently travel to Carson City passing though the Ormat Steamboat (Geothermal) Power Plant which straddles Interstate 580. Each time I pass through there, I think how beneficial it is to have a geothermal power plant. However, each time I also think about how ugly the facilities look. Indeed, the structures are painted tan to blend in with the surrounding landscape. However, the large elevated and insulated pipes make obvious scars snaking across the hillsides. The cooling units are very obvious large industrial-looking blocks. At night, the well pads and equipment structures are lit up constantly with steam escaping at the top of tall pipes, resembling a petrochemical plant. The worst is the electical substation and its above ground high tension cables spanning out towards Reno. I wish more could have been done to hide these industrial structures behind berms and underground the pipes and cables. Interstate 580 is Reno's southern gateway. The Steamboat plant is located right as drivers see their first glimpse of Reno. The city has enough image problems without having to be associated with industrial processing plants, albeit a relatively environmentally friendly one. I believe the proposed Gerlach site carries the same challenges as the Steamboat Springs site. In fact, I believe its proximity to the town and the town's small size, make designing the plant to blend in with the natural environment that much more critical. Can the profile of the well pads and heads be minimized? Can art be integrated to neutralize their industrial look or distract the viewer - sort of like putting lipstick on a pig. The Burning Man project has a large investment in Gerlach and nearby locations. I imagine they could help. Can the steam and water pipes and electrical lines be put underground? Can the cooling towers, work yards, generators and support buildings be constructed behind berms to hide them from public view? Can the lights be directed to the ground and localized to only where they are absolutely needed for safety and security? Can operation lighting be switched on only when maintenance or inspection is required? Can access to Guru road and the unique art maintained there continue to be accessed by the public?	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit.

Comment Code Name	Comment Text	Response Text
Visual resources, including night skies	Many residents have chosen to live and purchase property in Gerlach because of its remote location and bucolic backdrop. All the residents I know living there are already distraught over the prospect of what the geothermal plant will look and sound like, and how it will affect their livelihoods. I am concerned that putting a geothermal plant so close to the residential area of Gerlach will have a negative impact on their lives mentally, as well as, possibly having a negative impact on tourism, which the town depends on in part.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit. As noted for Socioeconomics in Final EA Table 3-2, Resource Effects Determinations and Rationale for Analysis, effects on Gerlach's local economy, including from astrotourism and local induced economic effects, are anticipated to be minor and temporary, lasting the duration of construction.
Water Quality	What are the potential impacts on the Gerlach public water system?	The town of Gerlach's water is supplied by the Gerlach General Improvement District (GGID), which sources its water from Granite Spring and Garden Spring which are respectively 5.04 and 7.8 miles northwest of the project and separated from the AOI by the Granite Range. Granite Spring and Garden Spring are in the Smoke Creek Desert Basin, which is within 5 miles of the AOI, but no proposed geothermal wells are in the Smoke Creek Desert Basin. Per NDEP regulations, should ORMAT's activities impact Gerlach's water supply they will have to provide the residents with water.

Comment Code Name	Comment Text	Response Text
Other Laws	Wells and Geotechnical Soil Borings All wells must be noticed, drilled, constructed, and plugged in accordance with NRS Chapter 534 and NAC Chapter 534, and the work must be completed by a licensed well driller as provided by NRS Chapter 534. A water right or waiver is required prior to drilling a well in a designated basin pursuant to NRS Chapter 534 and NAC Chapter 534. Any unauthorized or unpermitted drill holes/wells (water or monitor wells or geotechnical soil boring) that may be located on existing, acquired or transferred lands, are ultimately the responsibility of the owner of the property and must be plugged and abandoned as required in NAC Chapter 534. Abandoned wells need to be reported to the State Engineer's Office and must be plugged in accordance with NAC Chapter 534. Construction and abandonment of any well, monitoring well, geotechnical soil boring, instrumentation geotechnical soil boring, or any other type of geotechnical soil boring, including but not limited to any "shot" holes, must comply with the provisions of NAC Chapter 534. The use of water issued under a waiver must comply with the provisions of NRS Chapter 534 and NAC Chapter 534 and the terms of the waiver approval. A waiver to drill a well must comply with the provisions of NRS Chapter 534 and NAC Chapter 534 and the terms of the waiver approval.	Comment noted.
Other Laws	Compliance with Nevada water law is required.	Comment noted.
Other Laws	All waters of the State belong to the public and may be appropriated for beneficial use pursuant to the provisions of NRS Chapters 533 and 534 and not otherwise. Water shall not be used from any source unless the use of that water is authorized through a permit issued by the State Engineer. For underground sources, certain uses of water may be authorized through the issuance of a waiver pursuant to NRS Chapter 534 and NAC Chapter 534. The discussion of water acquired from a nearby ranch requires a temporary permit to change an existing right	Comment noted. Final EA Section 2.1.4, Water Requirements and Source, has been updated to include the requirement of a temporary permit to change an existing water right, should drilling water be sourced from another private source and trucked to the project.
Water Quantity	Ensure that any water used on a project for any manner of use shall be provided by an established utility or under permit or temporary change application or waiver issued by the State Engineer's Office with a manner of use acceptable for suggested project's water needs.	Final EA Section 3.3.5 analysis has been revised to state that regardless of construction water source, water would be provided by an established utility or under permit or temporary change application or waiver issued by the State Engineer's Office with a manner of use acceptable for the project water needs.

Comment Code Name	Comment Text	Response Text
Best available information-baseline data	The Nevada SHPO does not recommend the use of the report. The conclusions found in the report are not based on an accurate understanding of how effects are determined under 36 CFR Part 800, the report contains significant errors of procedure related to the development of an APE, the report does not appear to have been developed with the assistance of individuals knowledgeable with the built environment or with other visual resource studies where the characterization of such effects are more common, its conclusions are not consistent with accepted literature or with the studies cited in the document, and it contains formulas and other methods for determining potential effects that are likely to be difficult for the public to understand. These issues were identified in a letter from the SHPO dated June 18, 2021 (enclosed) and affirmed by the ACHP on April 28, 2022 (enclosed) and February 14, 2020 (enclosed). To date, there have been no revisions to this document or a response to these advisory documents. All the federal agency's districts in Nevada have been informed of the issues with the report and the Nevada SHPO awaits the initiation of consultation and negotiation that will address the flaws and create a useful document that would support a reasonable and good faith identification effort. In addition, we have put these statements on our website: https://shpo.nv.gov/visual.	The referenced report is Nevada BLM Instruction Memorandum NV-2021-006, Bureau of Land Management (BLM) Nevada Template Visual Area of Potential Effect (APE) Policy. Use of this IM is current BLM policy. The IM can be accessed at: https://www.blm.gov/policy/nv-im-2021-006.
Best available information-baseline data	Attachments: ACHP September I, 2022letter SHPO June 18, 2021 Jetter ACHP April 28, 2022 letter ACHP February 14, 2020 letter	The referenced report and attachments relate to Nevada BLM Instruction Memorandum NV-2021-006, Bureau of Land Management (BLM) Nevada Template Visual Area of Potential Effect (APE) Policy. Use of this IM is current BLM policy. The IM can be accessed at: https://www.blm.gov/policy/nv-im-2021-006.

Comment Code Name	Comment Text	Response Text
Cultural resources	The Preliminary EA's Appendix C states that efforts to identify and evaluate historic properties have been previously conducted. However, the Preliminary EA does not include any mention or documentation of the SHPO's review of the inventory reports or concurrence with eligibility determinations. As identified on page 45 of the "Attachment C Checklist for Substitution"of theNEPA and NHPA Handbook for Integrating NEPA and Section 106, by the Council on Environmental Quality Executive Office ofthe President and the Advisory Council on Historic Preservation, March 2013 (ACHP Checklist), Appendix C should contain either a statement of the SHPO's concurrence or the SHPO's concurrence letters (April 8, 2022 and September 13, 2021 -copies provided upon request) to provide clarity of this step in the Section 106 process for the public. Page 3-22 of the Preliminary EA, Paragraph 3 states there are four historic properties eligible for listing in the National Register of Historic Places under Criterion A. The agency resource number and Trinomial numbers are missing for the Historic Railroad Tracks and Transmission Line. These resource numbers should be included in the revised EA.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c).
Direct/Indirect Impacts	Section 3.2.6 discusses "direct/indirect" effects. Per the Advisory Council on Historic Preservation (ACHP) 2019 guidance, the effect is considered "direct" regardless of the specific type of effect (physical, visual, auditory, atmospheric). The "indirect" effects are those caused by the undertaking that are at a later date in time or farther removed in the distance, but reasonably foreseeable. This guidance can be found on the ACHP's website.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c). Use of the terms direct and indirect in the effects analysis was revised per Nevada SHPO comments.

Comment Code Name	Comment Text	Response Text
GIS data and analysis	As the Preliminary EA does not include a map illustrating the boundaries of the APE, it is recommended that a map be included within Appendix C for clarity. Alternatively, the · map(s) located in Appendix A could be referenced within the written APE discussion as long as all consulting parties and the public clearly understand the defined boundaries of the APE.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c). Section 3.2.6 clarifies the boundaries of the area of potential effects.
Public Outreach	The public review and comment period on the Preliminary EA began August 19, 2022 and concludes on September 19, 2022. Per the ACHP Checklist, have the public's concerns regarding historic properties been addressed? Please provide the SHPO with a summary of public consultation regarding historic properties upon availability for our administrative record. This summary should also be included in the revised EA.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c).
Scope of analysis	The BLM-BRFO letter states environmental effects of up to 21 geothermal exploration wells are under analysis. The Preliminary EA discusses 20 geothermal exploration wells. Please clarify this discrepancy.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c). Chapter 2 of the Final EA clarifies that 19 exploration wells are now included in the project.

Comment Code Name	Comment Text	Response Text
Scope of analysis	Finding of Effect Page 3-48 of the Preliminary EA appears to assess direct physical effects. Additionally, Page 3.39 appears to assess auditory effects and Pages C-7 and C-8 of Appendix C appear to assess visual effects. However, the ACHP Checklist recommends that a Finding of Effect pursuant to the Section 106 regulations be stated within the Preliminary EA or the BLM-BRFO's agency letter. We are unable to locate this finding in any ofthe relevant documents. Please clarify the agency's finding of effect for all the alternatives and provide a Finding of Effect to the SHPO for concurrence. This information should also be shared with all consulting and interested parties.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c). Effect findings are clarified for each alternative.
Tribal concerns	Page 2 of the BLM-BRFO letter states "comments may be submitted by September 18, 2022". The link (httL)s://eplanning.blm.gov/eplanning-ui/project/2016744/510) for the EA states that public review and comments will be accepted from August 19, 2022 until September 19, 2022. The SHPO is afforded a 30-day review period under the Section 106 regulations. This 30-day review period begins upon receipt of documents for review. The 30-day review period began on August 22 and closes September 20, 2022. Based on the submitted agency letter and public review link above, the SHPO was not afforded a complete 30-day review. In the future, our office may not be able to respond to requests for project review that are less than 30 days. The SHPO's review of this submission has stopped due to the concerns outline above.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c).

Comment Code Name	Comment Text	Response Text
Tribal concerns	Section 4.1.1 of the Preliminary EA briefly mentions Section 106, specific Native American Tribes that have been contacted to dated, and states "outreach, communication, and coordination will continue throughout the NEPA process". Compliance with 36 CFR §800.4(c) and 36 CFR §800.4(d) requires the federal agency to consult with the SHPO regarding the National Register eligibility of properties of religious and/or cultural significance identified by Tribes and the manner that such properties could potentially be affected by the undertaking. Please provide the SHPO with a summary of consultation efforts that includes the dates consultation occurred, comments received, and any additional information. This information will be added to the SHPO administrative record to ensure the record is complete for this undertaking. This summary should also be included in the revised EA.	The Final EA includes revised discussions and analysis of cultural resources. See affected environment revisions in Section 3.2.6, and analysis revisions in Sections 3.3.3, and 3.3.5. Section 4.1.2 was revised to update consultation status with the Nevada SHPO. Appendix C, Cultural Resources was updated to provide additional detail. Additionally, Appendix G was added to the Final EA, which includes documentation of communications with the Nevada SHPO under Section 106 of the NHPA in accordance with the process described in 36 CFR 800.8(c). Final EA Section 4.1.1 was revised to include the requested information.
Analysis type (CE, EA, EIS)	I feel it adds far more issues than it resolves in this particular area and suggest a more in depth EIS be conducted by Ormat before moving forward, as the EIS for burning man was conducted in relation to an event as opposed to drilling the land and permanently altering the area.	An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action. The EIS referenced by the commenter analyzed issuance of a 10-year special recreation permit.

Comment Code Name	Comment Text	Response Text
Cultural resources	In 1978 there was an art installation started by a local war veteran who had recently returned to the states. It was named Dooby Lane or Guru Road. He was inspired by the petroglyphs made by George Jaquith in 1852, and began his own mark on the area, adding over 50 art pieces and over 450 inscriptions to the project before he passed in '95. Since then, a Pulitzer Prize winner has published a book about the art walk on the edge of Gerlach and recently re-released the book with added content. Dooby Lane is located on a right of way issued by BLM that will expire next year. The expiration of any permits will not change how people far and wide see this contribution to the town. The geothermal plan indicates many of the drill sites in the same area and any development will destroy this delicate and loved piece of gerlach history. It's erasure will be noted and felt by a large community of people, most of all the several dozens of people whose names have been added to the lane over the years.	As discussed in Appendix C, Cultural Resources, of the Final EA, the Guru Road area including its art and memorial installations, is not considered a site eligible for listing on the NRHP due to its age. Per the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, the presence of art and memorial installments often immediately adjacent to the trail may be identified as a possible impact to the setting of the California Trail which is considered eligible for the NRHP.
Public health and safety	The plant will also create a large addition of light, noise, waste, and pollution. Each of which has a stream of consequences that follow. The released operations plan specifies a handful of wildlife that will require spans of "timing limitations." Many of these months are overlapping from November through September, which restricts full operations to within 2 months of the year. Gerlach doesn't have a robust transfer station, doesn't have recycling. Any added waste would be unsustainably taxing to the system without it requiring added resources from the town that we simply don't have.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit. As outlined in Final EA Table 3-2, the project would not use or generate hazardous wastes, portable chemical sanitary facilities would be available and maintained by a local contractor, and trash would be contained on-site and hauled to an approved landfill.

Comment Code Name	Comment Text	Response Text
Range of alternatives	These issues are not sufficiently addressed in the operations plan, which has exception clauses for every reparation provided. The document is riddled with typos that change or at least confuse the content being communicated. These need to be corrected so it is clear what the community is commenting on. It is also preferable that the comment timeline is not strategically during the burning man event or other holidays that keep the community from the ability to thoughtfully respond. It might be another kind of response entirely if we weren't seeing so many corners cut and loopholes provided.	As described in Final EA Section 1.6, the BLM has prepared the Final EA consistent with federal laws and regulations; state and local government laws and regulations; and other plans, programs, and policies, to the extent practicable within federal law, regulation, and policy that govern BLM's actions, including the Federal Land Policy and Management Act of 1976 (43 USC 35), the BLM NEPA Handbook (H-1790-1), as updated (BLM 2008), and the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000 (NCA Act) (Public Law 106-554), among others. The BLM published the Draft EA on August 19, 2022, and public comment was open for 30 days. The Burning Man Event ran from August 28 to September 5, 2022. According to the CEQ publication, A Citizens Guide to NEPA (January 2021, p. 12), when preparing an EA, the federal agency has discretion as to the level of public involvement. The CEQ regulations state that the agency must involve, to the extent practicable, the public, State, Tribal, and local governments, other relevant agencies, and applicants in preparing EAs (see 40 CFR 1501.4(e)(2)). Sometimes agencies will choose to use the scoping and public comment periods that are found in the EIS process. In other situations, agencies make the EA and a draft FONSI available to interested members of the public. For this project, the BLM determined a 30-day public comment period was appropriate and consistent with other project public comment periods in the field office.
Range of alternatives	If any development does proceed, I would urge Ormat and NV power to work out a plan to provide power to the town (less than 130 people on the recent census, most of whom don't live here). I would prefer to see respectful effort being made to address the issues listed, such as exclusively amber lights being used. Until their response to the community comments are made clear, I cannot support any further development of the Ormat geothermal plant.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit. As outlined in Final EA Table 3-2, the project would not use or generate hazardous wastes, portable chemical sanitary facilities would be available and maintained by a local contractor, and trash would be contained on-site and hauled to an approved landfill.

Comment Code Name	Comment Text	Response Text
Recreation	People come for a myriad of reasons; hunting, hiking, ohv trips, camping, stargazing, Fly geyser and other habitat stewardships, seasonal work, burning man festival, and rocketeers, among many others. This ultimately highlights the common denominator of these vastly differing groups, which is the land and area itself. It's crucial for that commonality to be preserved, in an era where productivity and development is being prioritized over the human experience.	Comment noted. The BLM has a mandate of managing public lands for a variety of uses such as energy development and recreation, while ensuring natural, cultural, and historic resources are maintained for present and future use. As described in Final EA Section 1.6, the BLM has prepared the Final EA consistent with federal laws and regulations; state and local government laws and regulations; and other plans, programs, and policies, to the extent practicable within federal law, regulation, and policy that govern BLM's actions, including the Federal Land Policy and Management Act of 1976 (43 USC 35), the BLM NEPA Handbook (H-1790-1), as updated (BLM 2008), and the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000 (NCA Act) (Public Law 106-554), among others.
Visual resources, including night skies	Lastly, but not least, our dark skies. This desert is in the top 10 darkest places in the USA to stargaze, with the added benefit of a huge open sky and low horizons. James Webb has recently reignited people's curiosity of the night sky & we hope that continues. Any added light pollution is not wanted!	Effects on night sky conditions are described in Section 3.3.3 of the Final EA. Anticipated changes in ALAN, radiance, and sky glow would have temporary effects, which would differ in magnitude based on the observer's location. Effects would be minor because, under a worst-case scenario, drill rig radiance would be equivalent to observed radiance of Gerlach; actual lighting produced would be lower, and measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations). Further, numerous sources of nearby ALAN are present in this area, so night sky conditions are already low in the project area. As stated above, effects would be temporary, lasting the duration of construction.

Comment Code Name	Comment Text	Response Text
Analysis type (CE, EA, EIS)	I request a full EIS for this project. That would be required by law for the following reasons. The current proposal is a full set of production wells and not exploratory in any way. Exploratory would be 1-3 wells at the proposed center or edges. The proposal does not consider the life safety of vehicle occupants on highways NV34, US447 N, or US447 S, nor does it consider the impacts of vehicles leaving those roads in an emergency and impacting the wells and future connecting piping. The piping will need to tunnel under those roads. The proposal does not consider dark sky protections in the area or noise. The well drilling and pads, then construction of the plant and future power lines are required by the ESA to study sage grouse impact and other endangered species. The proposal does not consider the use and storage of flammable heat exchange fluids in a future plant. For that reason alone, a full EIS is required	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit. An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action. Alternatives B and C (Final EA Sections 2.2 and 2.3) were developed in part to reduce the number of project ingress/egress points on local roadways, reducing potential traffic conflicts and safety issues. As described in Final EA Table 3-2, the project is not anticipated to meaningfully contribute to a lowered level of service on SR-447 and CR-34, even during other high-use periods on these roadways. Night sky conditions are analyzed in Section 3.3.3 of the Final EA. Anticipated changes in conditions would be temporary and minor as measures to reduce ALAN would be in effect (see Final EA Table 3-11). Noise effects on recreation, wildlife (including on greater sage grouse and other sensitive species), special designation areas, and cultural resources, are analyzed in Final EA Section 3.3.4. There are no ESA-listed threatened or endangered species in the project area.
Analysis type (CE, EA, EIS)	Our Request 2: If the Operation Plan is not denied, we are requesting an EIS be developed to analyze exploration, pre-production and production and its potential significant impacts to the important historic resource values in the area including the National Historic Trail.	Effects on national historic trails are analyzed in Final EA sections 3.3.3, 3.3.5, and 3.3.6. As described in Section 4.1.4 of the Final EA, the BLM coordinated with the National Park Service as the administering agency for national historic trails. An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action. The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed.

Comment Code Name	Comment Text	Response Text
Analysis type (CE, EA, EIS)	ORMAT Needs to Write an EIS to Analyze Exploration, Pre-Production and Production Corporations who benefit from the public lands should be respectful stewards of the land and the people they serve. At the Washoe County pre-scoping meeting on July 19, 2022, ORMAT (Stacie Huggins, Amber Harmon, and Scott Nichols) ended the meeting at exactly 6:30 PM even though all questions were not answered. ORMAT did not explain the reason for this proposal or provide a context for its importance. ORMAT needs to operate in a timely, proficient, and transparent manner rather than piecemealing environmental analysis to avoid taking a hard look at the true costs of developing this plant. As geothermal plants continue to be developed across the public lands in Nevada, how does this proposed particular plant (exploration is a facet of pre-production and the EA is analyzing production wells) fit in with the overall renewable energy needs of the American public? Why is this proposal so important given the permanent impacts to high value resources? What exactly does ORMAT need to find to make this a viable project? How will the energy be distributed and who specifically stands to benefit? Additionally, all other sites in which ORMAT has developed a geothermal plant do not include similar high resource values as this proposed site. ORMAT is proposing to develop an industrial scale geothermal plant less than one-half mile from a community and adjacent to nationally important resource values. According to the EA, exploration alone would occur at approximately 20 well sites for 45 days per well. In total, this is 900 days or two and one-half years of 24-hour seven days-a-week drilling adjacent to important resource values. Geothermal plants are major developments that significantly affect the area surrounding them and exploration cannot be separated from production nor can the development and its associated impacts be ignored. For example, the BLM recently issued a decision to expand the San Emidio II North Valley Geothermal Project south of Gerlach. The project will upgrade the current plant and build a new power plant to produce up to 40 megawatts of electricity on 20,400 acres of public land. Construction will include a substation, up to 26 total geothermal production and injection wells, approximately 7.5 miles of	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Geothermal production is not proposed. It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action.

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	aboveground pipelines and an approximately 58-mile long 120-Kilovolt overhead power line originating at the power plant that will terminate at the NV Energy Eagle Substation near Fernley, Nevada. Exploration is the first phase of development and both actions need to be considered in tandem. Our Request 1: While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, we are requesting an EIS be developed to analyze exploration, pre-production and production and its potential significant impacts to the important resource values in the area.	
Analysis type (CE, EA, EIS)	While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, we are requesting an EIS be developed to analyze exploration, pre-production and production and its potential significant impacts to the important resource values including wildlife in the area.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Geothermal production is not proposed. It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). An environmental assessment provides sufficient evidence and analysis for determining whether to prepare an EIS (40 CFR 1501.4). If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action. Effects on wildlife from the proposed action and alternatives are analyzed in Final EA Sections 3.3.3, 3.3.4, 3.3.5, and 3.3.6, and BLM-required stipulations to reduce effects on wildlife are in Final EA Table 3-11.

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Cultural resources	A visual effects anaysis was also done at KOPs in and around the indirect APE including at the Nobles Trail section of the California NHT, the Gerlach Cemetery, and the Gerlach Water Tower. There is the potential for temporary, indirect, adverse effects on the setting, feeling, and association of eligible or unevaluated sites, including the NHT and Gerlach Cemetery. Temporary adverse effects would occur from the visual and noise intrusion of construction activity during well drilling, which typically would last up to 45 days per well. While temporary changes in the visual and noise baseline conditions of the area would occur, these would be resolved upon completion of the exploration project. The KOP assessment also found that effects on the Gerlach Water Tower would be similarly limited since the view of the project from the water tower is already obstructed by Gerlach's existing built environment. There is also the potential for similar temporary, indirect, adverse effects on Great Boiling Spring. The KOP analysis was not completed for this site because it is on a private surface. The 2006 Final Ethnographic Assessment (Bengston 2006) identified Great Boiling Spring as a potential ritual site for Northern Paiutes, but no tribes have offered any further information on Great Boiling Spring as part of the consultation process. There is also the potential for temporary, indirect, adverse effects on the setting, feeling, and association from anticipated changes in the ALAN, radiance, and sky glow due to nighttime drilling. This is because light generated by drilling would be discernible from eligible and unevaluated sites. This effect would be minor for several reasons. First, under a worst-case scenario, which assumes 1.5 times the amount of expected lighting would be produced, the radiance of the drill rig would increase to a level equivalent to the observed radiance of Gerlach (BLM 2022b, p. 3-4). Actual lighting produced would be lower, and measures to reduce the amount of light produced would be in effect. Numerous sources of nearby ALAN are present in this area, primarily from Gerlach and Empire. As a result, night sky conditions and the associated setting, feeling, and association are already compromised in this area. Finally, effects would be temporary, lasting the duration of construction." As stated under #1 above, not every use should occur on every acre	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Section 2.1 of the Final EA describes proposed project components, including wells, well pads, gravel access roads, and an aggregate pit. Given this context, analysis on cultural resources presented in Final EA Sections 3.3.3, and 3.3.5, and Appendix C, Cultural Resources is valid. Additional details on Government-to-Government consultation has been added to Final EA Section 4.1.1, including a meeting with the Summit Lake Paiute Tribe to discuss potential effects on springs.

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	of public land. The Winnemucca District Resource Management Plan Objective D-MR 4 (BLM 2015a, p. 2-172), states, in part, that "Lands within the [Winnemucca District] would be open to geothermal and oil and gas leasing and development except where incompatible with important resource values." As stated under #2 above, all other sites in which ORMAT has developed a geothermal plant do not include similar high resource values as this proposed site. ORMAT is proposing to develop an industrial scale geothermal plant less than one-half mile from a community and adjacent to important resource values. Geothermal plants are major developments that significantly affect the area surrounding them and exploration cannot be separated from production nor can the development and its associated impacts be ignored. Short and long term impacts to the Nobles Route of the National Historic Trail are unacceptable. Our Request 1: Deny ORMAT's Operation Plan and any future development because it is clearly not consistent with the intent of conserving, protecting, and enhancing the multiple cultural resource values in this region.	

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Cumulative Impacts	ORMAT Cumulative Analysis is Faulty The EA states, "Based on the anticipated potential impacts from Alternative A: Proposed Action…when combined with impacts from past, present, and reasonably foreseeable future actions in the cumulative effects analysis area, no cumulatively significant impacts are anticipated." Given the anticipated impacts from two and one-half years of exploration (or if difficulties are encountered during the drilling process it could be extended to a total of 90 days, as stated in the Night Sky Baseline Report Section 3), and the reasonable expectation that an industrial scale geothermal plant could be built, the above conclusion is unreasonable and cannot be justified. In fact, a reasonable and foreseeable future action would include development of an industrial scale geothermal plant and this potential alternative needs to be analyzed. Additionally, under Past, Present, and Reasonably Foreseeable Future Actions, the possibility of Lands with Wilderness Character and lands included in the Washoe County/Truckee Meadows Public Lands Bill being designated as new Wilderness Areas and additional NCAs with the region adjacent to the ORMAT project (including Wilderness for the Granite Mountains) needs to be analyzed. Our Request: While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, the cumulative effects analysis needs to be re-written to honestly describe and analyze the potential significant impacts to important resource values from the anticipated development of an industrial scale geothermal plant and additional land designations.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. The project proponent proposes exploration drilling to better understand the extent and nature of the geothermal resource, and to determine if the geothermal resource is economically viable for production. Exploration drilling collects the data to determine this information. Because of this, any geothermal development plans have been withdrawn, as stated in Section 1.1. of the Final EA. For this reason, geothermal development is not included in the cumulative effects analysis. The possibility that lands included in the Washoe County/Truckee Meadows Public Lands Bill will be designated as new wilderness areas or additional NCAs in the region is not included as a reasonably foreseeable future action in the cumulative effects analysis. This is because it is not known if or when the bill or any designations that may be contained therein, would be authorized by Congress. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis, including any changes in land designations at that time.
General wildlife	Also, we noted that the section on bird life states that a Glossy Ibis was observed. While theoretically possible, this is highly unlikely since Glossy Ibis are rarely seen outside of their normal habitat along the Atlantic and Gulf coasts of the US and occasionally inland in the eastern part of the country. More likely, a White Faced Ibis, which is relatively common in this part of the country was observed. The two species are very similar and not easily told apart. We point this out because it calls into question the level of knowledge of both the observer and the supervisor reviewing the avian survey data and hence the reliability of the avian survey data.	As stated by the commenter, the two species are difficult to tell apart. Regardless of the species, both are protected by the Migratory Bird Treaty Act. No changes were made to the Final EA.

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General wildlife	The EA states that only 52 acres of wildlife habitat would be disturbed but the AOI consists of 2,724 acres. It also alleges that habitat removal would be temporary because it would be reclaimed. We are highly concerned about this manner of deduction; if a room is removed from a home but rebuilt in two and one-half years, it is reasonable to assume that the homeowner believes the room (i.e. habitat) is lost. As stated in the EA, "Temporarily disturbed suitable habitat, even if restored, can take a relatively long time to regain suitability. Also, this does not guarantee species reoccupation…Construction, operation, and maintenance of most of the past, present, and reasonably foreseeable future actions have removed, and will continue to remove, vegetation and disturb soils in the analysis area. This has reduced, and will continue to reduce, habitat quality for general and sensitive plant and wildlife species."	Table 3-15 in the Final EA discloses acres of direct disturbance of wildlife habitat, by species. The introduction language to Table 3-15 was revised to clarify that these are the areas that would be directly disturbed.
General wildlife	The information on how the mud pits will be fenced and netted to prevent bird access is confusing. At one point the EA says that the pits will be fenced on three sides and open on the fourth for access. The pits need to be fenced on all four sides and covered with netting to prevent bird access. A gate for access should be adequate.	As discussed in Final EA Section 2.1.2, the reserve pits would be fenced on 3 sides during drilling; following drilling, the 4th side would be fenced. At all times, the project proponent would follow NDOW's Design Features and Tools to Reduce Wildlife Mortalities Associated with Geothermal Sumps.
General wildlife	Increased lighting, noise, reduction in water sources, and impacts to habitat are all concerns related to wildlife. The EA continues to state that these are temporary impacts because only exploration is being considered. This argument does not have merit as a reasonable person can assume that if adequate geothermal resources are found, an industrial scale geothermal plant will be built in one of the most isolated regions in our nation.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed.

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Groundwater	The EA also plans for significant withdrawals from the deeper geothermal reservoir. The EA authorizes 1.5 million gallons of pumping per well in a short term well test, and 15 million gallons of pumping per well in a long term well test. At 20 wells that is as much as 330 million gallons of water, or some 1,000 acre-feet. The EA dubiously states in Section 3.3.5 that there will be no impacts to surface water resources from this pumping, stating that "there is little to no mixing of the geothermal reservoir and the shallow groundwater reservoir." This is extremely unlikely, as evidenced by the thermal features present within the AOI. Great Boiling Spring is so called because it is a thermal feature, almost certainly discharging water from the same aquifer that Ormat is proposed to tap in this geothermal project. In the conceptual hydrologic model presented attached to the EA, Stantec makes the unlikely assertion that thermal springs such as Great Boiling Spring are simply sourced from the alluvial aquifer. It seems extremely unlikely that alluvial aquifer-sourced springs, traveling just a few miles from off the Granite Range, would somehow heat to 200°F. The connection between the geothermal aquifer and the surface water features is apparent and obvious. The idea that significant pumping and reinjection could happen in this aquifer and not affect springs discharging from the same aquifer strains credulity. Indeed, there is a long history of pumping and reinjection of geothermal fluids affect adjacent surficial thermal water features. The US Fish and Wildlife Service recently gave emergency Endangered Species Act listing to the Dixie Valley toad, reflecting the dire threat posed to it by the Dixie Meadows Geothermal Project (87 F.R. 20336). The Service's analysis of the threats faced by the toad states, "Changes associated with surface expression of thermal waters from geothermal production are common and are expected." The Service cites numerous peer-reviewed studies demonstrating that geothermal energy production will impact adjacent surficial thermal water features. While the proposed action is not a full production facility, there can be impacts to adjacent surficial thermal water features from exploration as well. During a long-term pump test at Dixie Meadows, changes in surficial water features were observed. In the Aquatic Resources Monitoring and	The Final EA acknowledges that the connection or lack thereof between Great Boiling Springs and the target geothermal resource has not been established. Pump testing as part of geothermal resource confirmation would provide information on whether or not they are connected. Per the EA, "There is a potential to alter or diminish the quality and quantity of groundwater resource... including Great Boiling Spring." The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented.

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	Mitigation Plan (ARMMP) accompanying the revised EA for the Dixie Meadows Geothermal Project released on January 13, 2021 (https://eplanning.blm.gov/public_projects/75996/200167265/20032780/250038979/Dixie%20M eadows_EA_Appendix_H-ARMMP_508.pdf), McGinley and Associates describe the effects of a pump test conducted at Dixie Meadows during geothermal exploration. They conclude that temperature and water level changes at monitoring locations including springs in Dixie Meadows were the result of their pump test. The Nevada Department of Wildlife also confirmed this in their comment letters on the draft EA (attached, page 5). While the results of the pump test were actually excised from the ARMMP in the Final EA for Dixie Meadows, nonetheless the data show that changes to adjacent surficial thermal water features are entirely possible during geothermal well tests. BLM failed to disclose and analyze the impacts of the EA authorizing Ormat to pump 1,000 acre feet of water during the well tests.	

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Groundwater	The EA describes a very sensitive groundwater dependent ecosystem within the project's AOI. Section 3.2.1 says there are 436 acres of wetlands within the AOI according to the USFWS wetland mapper. The EA makes the dubious suggestion that in actuality, there are only 15.87 acres of wetlands in the AOI. This assertion contradicts government experts and only serves for the EA to improperly minimize the potential impacts of the project. In reality, USFWS found 127 acres of freshwater emergent wetlands, perhaps the most valuable aquatic habitat type in the Great Basin. In addition to hundreds of other aquatic features. Even if the amount of total wetlands in the AOI is less than the 436 acres, owing to some amount of it reflecting the Black Rock Playa, it is still far more than 15.87 acres.	As stated by the commenter, the USFWS National Wetland Inventory reports 436 acres of wetlands, including 127 acres of freshwater emergent wetland, in the AOI. As included in the Final EA (see Section 3.2.1, Surface Water - Wetlands), the NWI does not "attempt to define the limits of proprietary jurisdiction of any federal, state, or local government, or to establish the geographical scope of the regulatory programs of government agencies. Further, the mapper shows reconnaissance-level information on the location, type, and size of these resources. Wetlands are identified based on vegetation, visible hydrology, and geography from an analysis of high-altitude imagery, not detailed on-the-ground inspection. Additional information can be found on the mapper's data limitations, exclusions, and precautions page at https://www.fws.gov/node/264582." In contrast, the aquatic resources delineation conducted in the AOI is a detailed on-the-ground inspection, to delineate aquatic resources in the survey area using the methodology defined in the Routine Determination procedure set forth in the U.S. Army Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Arid West Region (USACE 2008). Wetland boundaries were defined based on presence of hydrophytic vegetation, hydric soils, and hydrologic indicators that under normal conditions would indicate wetland conditions. No changes were made to the draft EA.
Groundwater	The EA describes the project as an "exploration project, yet the apparent size of the drilling equipment suggests that the proposed wells will be large enough to serve as production wells if warranted. Unfortunately, there is no mention of casing diameter in the EA so it is impossible to determine if there will be adequate equipment and supplies on hand to deal with a blowout, should that occur. A truckload of barium sulfate will be inadequate to deal with a strong artesian flow in a large bore well. Given the proximity to the community of Gerlach it is essential that planning and equipment and supplies to deal with unexpected events be clearly described in the EA.	The Spill or Discharge Contingency Plan included in Ormat's Operations Plan (p. 13) states that in the event of an accidental geothermal fluid spill or discharge, blowout prevention equipment would be utilized to shut down the flow from the wellhead. This language was added to Final EA Section 2.1.7, Applicant-Committed Environmental Protection Measures.

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Groundwater	Water, particularly groundwater, is a critical resource in the vicinity of Gerlach and the Black Rock Playa. There is a history of drilling projects gone awry. Fly Geyser is a prime example of a well drilling project that got away from the drillers and has been releasing artesian water above the surface for decades. The EA states that the exploratory wells will be cased down to 200 feet to prevent contamination of the shallow aquifer by deeper water of potentially lower quality, yet no evidence is presented that 200 feet is a magic depth where there is an impermeable confining layer that will prevent any possibility of deeper geothermal water from mixing with the shallower groundwater. This glaring deficiency in the EA needs to be addressed.	As stated in Final EA Section 2.1.2, casing depth would comply with the DOI's Geothermal Resources Operational Order No. 2 (DOI 1975) and the Nevada Division of Minerals' (NDOM) requirements, as applicable. In compliance with the DOI order, the well casing depth would be no less than 200 feet belowground to prevent commingling of geothermal fluids and underground aquifers. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. As outlined in Table 3-11, additional measures could include increasing casing depth.
Groundwater	While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project,we are requesting water be obtained from an established private ranch source and trucked to each drill site, or as a bulk water purchase from the Gerlach General Improvement District (GGID) rather than using water from shallow water wells.	Comment noted. Final EA Section 2.1.4, Water Requirements and Source, has been updated to include the requirement of a temporary permit to change an existing water right, should drilling water be sourced from another private source and trucked to the project.

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Groundwater	The EA indicates that 20 wells will be drilled, taking 45 days per well. Section 2.1.4 indicates that 35,000 gallons of water per day would be needed for well drilling. Additionally, 6,000 gallons per day would be required for grading, construction, and dust control. Section 3.3.5 indicates that as much as 1.845 million gallons of water would be consumed per well drilled, or 6.8 acre feet. With the EA authorizing as many as 20 wells, this yields a total water consumption potential of 36.9 million gallons or 136 acre-feet. The EA fails to adequately disclose and analyze the plan for procuring 136 acre-feet of water for drilling. If the water is to be produced on-site from shallow alluvial aquifer wells, as the EA says in Section 2.1.4, then the EA must do a more thorough job of analyzing the impacts of such withdrawals. The EA fails to disclose exactly where such wells would be drilled and how the water would be transported from the wells to the drill sites. Additionally, the EA fails to adequately analyze the environmental consequences of pumping from these new wells. While the EA acknowledges there could be impacts to water rights holders, wetlands, or other surface water resources, it does not specify how or where such impacts would occur or how the included monitoring plan would mitigate such impacts. Monitoring does not equate to mitigation.	Final EA Section 2.1.4 describes that this water would be supplied from one or more shallow water wells drilled from one or more of the proposed drill sites, as approved by the BLM and under a waiver for the temporary use of groundwater from the Nevada Division of Water Resources (NDWR), or water could be obtained from an established private ranch source under a temporary permit from the NDWR to change an existing water right, and trucked to each drill site, or as a bulk water purchase from the Gerlach General Improvement District (GGID), pending contract and availability from the GGID. Final EA Section 3.3.5 analysis has been revised to state that regardless of construction water source, water would be provided by an established utility or under permit or temporary change application or waiver issued by the State Engineer's Office with a manner of use acceptable for the project water needs. The NDWR would determine if the groundwater basins they manage could support proposed water withdrawals.
Groundwater	There are also numerous important springs in the AOI, including Great Boiling Spring, Ditch Spring, Horse (Corral) Spring, Mud Spring, and three unnamed springs. Springs are critical fonts of biodiversity and life in the Great Basin Desert, and their continued proper function is essential to conservation of wildlife in this arid region.	Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

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Groundwater	While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, mitigation based on exploration, pre-production and production and all concerns and potential impacts to groundwater need to be analyzed.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed.

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Mitigation	With all of the renewable energy development occurring across the state of Nevada, it appears that the BLM rarely says no to an applicant and that development is a foregone conclusion, no matter the important resource values that may be impacted by the proposed action. However, an applicant and the BLM must show a need for the project and appropriate mitigation for all resources impacted by the project.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The BLM's purpose for the federal action is to respond to Ormat's application to conduct geothermal exploration at the geothermal leases identified in the application, and the need for action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, the Geothermal Steam Act of 1970, and the implementing regulations provided under 43 CFR 3200. If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action. See Final EA Section 2.1.7, Applicant-committed Environmental Protection Measures, and Table 3-11, BLM-Required Stipulations, for measures that would reduce effects to less than significant levels.
Mitigation	ORMAT Mitigation Analysis is Faulty Throughout the EA, ORMAT claims that mitigation is not needed even though most resources will be impacted, or mitigation only needs to be minimal, because land would be reclaimed and fences removed. When specifically would the land be reclaimed and fences removed? The Wabuska Project in Nevada was built in 1984 and 1987. Has any of the land been reclaimed and fences removed? If not, then it is reasonable to assume that land permitted for geothermal exploration, pre-development, and development will be eliminated from public access and impacted by industrial geothermal development for decades. This means that lands will be impacted for decades to come and therefore a full mitigation analysis needs to be completed. Our Request: While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, mitigation based on exploration, pre-production and production and all impacts to the important resource values in the area needs to be analyzed.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. If the BLM determines that a mitigated Finding of No Significant Impact cannot reduce anticipated effects to less than significant levels, then the BLM would need to prepare an environmental impact statement for the proposed action. See Final EA Section 2.1.7, Applicant-committed Environmental Protection Measures, and Table 3-11, BLM-Required Stipulations, for measures that would reduce effects to less than significant levels.

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Noise	While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, mitigation based on exploration, pre-production and production and all impacts to the important resource values in the area including noise needs to be analyzed.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Effects from project noise on resources are analyzed in Final EA Section 3.3.4. Implementing applicant-committed environmental protection measures (see Section 2.1.7), including using mufflers on drilling rig engines, and a rock muffler to attenuate steam venting noise during well testing, would reduce project noise effects. The project would comply with the BLM regulation that mandates that noise at 0.5 miles—or at the lease boundary, if closer—from a major geothermal operation should not exceed 65 dBA (43 CFR 3200.4(b)).
Public Outreach	Our Request 2: We are requesting a virtual meeting with ORMAT, along with the appropriate BLM representatives, to ensure all questions are answered regarding this proposed project. We are asking that in this meeting the need for a geothermal plant in an area with important nationally recognized resource values be described. We are also asking ORMAT to describe who exactly will benefit from this proposed geothermal power plant, how much power needs to be generated to make exploration, pre-production, and production worthwhile, and how ORMAT's proposal fits in with the administration's overall renewable energy goals. Additionally, ORMAT needs to respond to previous comments submitted by a coalition of concerned groups regarding the potential impact of this project on the rural economy of Gerlach.	The BLM and Ormat are aware of the request for a virtual meeting. According to the CEQ publication, A Citizens Guide to NEPA (January 2021, p. 12), when preparing an EA, the federal agency has discretion as to the level of public involvement. The CEQ regulations state that the agency must involve, to the extent practicable, the public, State, Tribal, and local governments, other relevant agencies, and applicants in preparing EAs (see 40 CFR 1501.4(e)(2)). Sometimes agencies will choose to use the scoping and public comment periods that are found in the EIS process. In other situations, agencies make the EA and a draft FONSI available to interested members of the public. For this project, the BLM determined a 30-day public comment period was appropriate and consistent with other project public comment periods in the field office. The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. There is no power purchase agreement for the project. Effects on socioeconomics are described in Table 3-2 of the Final EA for Socioeconomics and are expected to be minor and temporary.

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Range of alternatives	Impacts to High Value Recreation The Project overlaps a significant portion of the Granite Foothills Recreation Management Zone. The RMZ plan recognizes that "national or regional visitors and constituents value the surrounding public lands as a recreation/tourism opportunity." This plan also directs that any facilities in this area "will be developed, located and designed in such a way as to be consistent with preserving the character of the adjacent Black Rock Desert High Rock Canyon Emigrant Trails National Conservation Area." This means that any exploration or geothermal development is incompatible with the plan direction. The 2015 Resource Management Plan for the Winnemucca District Planning Area also identifies "a site of 'Americana Art' known as "Doobie Lane" or Guru Road," which is entirely within the proposed footprint of the Proposed Gerlach Geothermal Development Project. This area is within the Granite Range SRMA, Granite Foothills Zone. BLM has granted a right of way over Guru to protect this unique cultural feature of great importance to Gerlach. It should remain protected from development and disturbance. At the Washoe County permit administration meeting on July 19, 2022 ORMAT stated that there would be "no disturbance to Guru Road." No exploration or development should take place in or near these historic sites. According to the EA "Alternative A would temporarily increase the amount of equipment, project traffic, and ground disturbance visible from the Granite Range SRMA. Alternative A also would permanently increase the amount of development visible from this area in the form of well pads and access roads. However, numerous developed areas in the AOI are already visible from the SRMA, such as traffic on CR-34 and SR-447, gravel pits, and other municipal and commercial developments around Gerlach. As such, effects on the recreation setting would be minor. Access to recreation opportunities may be temporarily restricted in the immediate work area during construction, displacing visitors from localized areas. However, numerous other access points to the same opportunities would remain open during construction. Visitors would be permanently displaced from fenced well pads, but this would not restrict access to recreation opportunities in the vicinity. As such, effects from restricting or displacing	The Granite Range SRMA was designated by the 2015 BLM Winnemucca District Office Resource Management Plan, in 2015. Three of the geothermal leases analyzed in this Final EA overlap portions of the SRMA, these include NVN-055718 (issued in 1992), NVN-075228 (issued in 2001), and NVN-098640 (issued in 2019). Geothermal exploration well pads 58-3, 66-3, 63-3, and 71-3, and access roads, are proposed on lease NVN-075228, which was issued prior to designation of the SRMA. Geothermal exploration on leases issued before the SRMA designation would be allowed as a valid and existing right. Further, geothermal exploration would not be incompatible with the management recommendations for the SRMA in the RMP (see p. 2-68 of the RMP). The Final EA (Section 3.3.3 for Recreation) found that exploration activities would have a minor effect on the recreation setting and access to recreation opportunities in the SRMA. As discussed in Appendix C, Cultural Resources, of the Final EA, the Guru Road area including its art and memorial installations, is not considered a site eligible for listing on the NRHP due to its age. Per the State Protocol Agreement between the SHPO and the BLM, Nevada "Cultural resources that post-date 1970 (or contain a majority of artifacts that post-date 1970) are not considered eligible for the purposes of Section 106 compliance unless the resource is of exceptional significance" (V.B.1.a.(4)). Additionally, the presence of art and memorial installments often immediately adjacent to the trail may be identified as a possible impact to the setting of the California Trail which is considered eligible for the NRHP.

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	recreation opportunities would be minor." Further, the EA states, "There would be no mitigation measures for recreation. According to our analysis, approximately 714 acres of the Granite Range Special Recreation Management Area would be impacted along with a dispersed camping area that is used for safety when the playa is wet. Mitigation measures must be developed and implemented for all resources impacted by the project including high value recreation. Clearly, restricting access along with increased equipment, project traffic, and ground disturbance are impacts that need to be ameliorated Drill pads, drill roads and the potential industrial geothermal plant are not minor visual elemetns and these will have a major impact on recreationists enjoyment of the area particularly with these developments being on the very outskirts of a gateway community. Our Request: No exploration or development should occur within the Granite Range Special Recreation Management Area, including the Granite or the Granite Foothills Recreation Management Zones.	
Range of alternatives	Not every use should occur on every acre of public land. The Winnemucca District Resource Management Plan Objective D-MR 4 (BLM 2015a, p. 2-172), states, in part, that "Lands within the [Winnemucca District] would be open to geothermal and oil and gas leasing and development except where incompatible with important resource values." Bottom line, we are requesting this Operation Plan be denied. Our Request: Deny ORMAT's Operation Plan.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The BLM's purpose for the federal action is to respond to Ormat's application to conduct geothermal exploration at the geothermal leases identified in the application, and the need for action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, the Geothermal Steam Act of 1970, and the implementing regulations provided under 43 CFR 3200. As stated in Section 1.5 of the Final EA, the proposed action would be in conformance with the Winnemucca District RMP (BLM 2015a, p. 2-172), as well as the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5).

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Range of alternatives	No drilling should occur between the hours of 10:00 PM and 7:00 AM.	It is not feasible to limit exploration drilling to the hours of 7:00 AM to 10:00 PM, due to the prohibitive time and cost of stopping and starting the drill rig and associated drilling operations. The proposed action includes measures, including applicant-committed environmental protection measures (Final EA Section 2.1.7) and BLM-required stipulations (Final EA Table 3-11) to limit the impact of drilling on sensitive resources, including sensitive noise receptors, night sky conditions, and wildlife.

Comment Code Name	Comment Text	Response Text
Range of alternatives	The proposed geothermal plant is adjacent to a National Conservation Area, two Wilderness Study Areas, and the proposed Granite Banjo Wilderness Area that will be in the Truckee Meadows Public Lands Bill which includes BLM recognized Lands with Wilderness Characteristics. In addition to the wilderness resources, these lands are high value recreation with the Granite Foothills Recreation Management Zone and the Nobles Route of the California National Historic Trail. This area is also very well known as having one of the darkest night skies in the nation. Finally, development of an industrial scale geothermal plant virtually on top of a critical gateway community is of strong concern. These impacts, and others, require a hard look at whether or not the proposed project should be allowed.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, the NCA border does not include an associated buffer zone; the southern border of the NCA is approximately 4 miles north of the AOI (see Table 3-2 in the Final EA). As stated in Final EA Table 3-2 for Wilderness, the Calico Mountains Wilderness, the closest wilderness area to the AOI, is 15 miles from the AOI, and public access and use and wilderness character are not anticipated to be affected by the project. The possibility that Congress would designated lands included in the Washoe County/Truckee Meadows Public Lands Bill as new wilderness areas or additional NCAs in the region is not known. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis, including any changes in land designations at that time. Implementing measures to avoid, reduce, or mitigate visual- and noise-related impacts on other resources would directly and indirectly reduce the potential for the project to change the recreation setting in the Granite Range SRMA. Measures are described in Section 2.1.7, Applicant-Committed Environmental Protection Measures, and in Table 3-11, BLM-Required Stipulations. The proposed action would have at most, a temporary adverse effect on cultural and historical resources in the project vicinity. See Final EA Section 3.3.3, 3.3.5, and 3.3.6 for Cultural Resources; also see Appendix C, Cultural Resources.

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Recreation	Our Request: While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, mitigation based on exploration, pre-production and production and all impacts to high value recreation in the area needs to be analyzed.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. There would be no specific mitigation measures for recreation. However, implementing measures to avoid, reduce, or mitigate visual-related impacts on other resources would directly and indirectly reduce the potential for the project to change the recreation setting. Measures are described in Section 2.1.7, Applicant-Committed Environmental Protection Measures, and in Table 3-11, BLM-Required Stipulations.
Socioeconomics	Our Request 2: While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, mitigation based on exploration, pre-production and production and all concerns and potential impacts to the rural economy of Gerlach need to be analyzed.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. As noted for Socioeconomics in Final EA Table 3-2, Resource Effects Determinations and Rationale for Analysis, effects on Gerlach's local economy, including from astrotourism and local induced economic effects, are anticipated to be minor and temporary, lasting the duration of construction.
Socioeconomics	Previously submitted comments regarding concerns for the economic livelihood for the community of Gerlach were completely ignored. We believe that exploration, and any consequent construction of a geothermal plant, would negatively impact the local economy by the intrusion of additional lighting, noise, workers, impacts to surface springs and groundwater, and consequent reduction of recreational activities. We are asking ORMAT to respond to our concerns rather than ignore them. Our previous comments are listed below. "From the initial information provided as to the Project, it appears that economic benefits to the Town of Gerlach and surrounding residents will be minimal, and possibly counterproductive. While all customers of NV Energy may receive some benefit from additional renewable resources coming on line, that is the extent of the benefit to the local community. There is no influx of local jobs, nor any ability to house such workers were there ever to be. Unintended consequences of the Project could also negatively impact businesses and landowners. Geothermal development in this proposed location has the potential for significant impacts by altering or stopping existing surface springs from functioning. For example, if the Great Boiling Springs, located on private land,	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. As noted for Socioeconomics in Final EA Table 3-2, Resource Effects Determinations and Rationale for Analysis, effects on Gerlach's local economy, including from astrotourism and local induced economic effects, are anticipated to be minor and temporary, lasting the duration of construction.

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	reduce or cease functioning, this would adversely impact the Black Rock Mud Company that relies upon its proper function. Moreover, Gerlach's economy significantly benefits from the tens of thousands of visitors from around the world who travel to this region year-round to experience the solitude of the vast open spaces and undeveloped vistas present in the Black Rock Desert as well as attend numerous events and pursue a variety of recreation experiences. The location of the Project within this viewshed would negatively impact the experience of these tourists, and thus the vibrant tourism industry of Gerlach." Finally, we have reason to believe that not all landowners in the town of Gerlach potentially affected by this proposed project have been individually contacted. We are concerned that ORMAT and the BLM may not have reached out to all landowners to let them know about their proposal. Has ORMAT in fact ensured that all landowners in the town of Gerlach have been properly notified of this project? Have all the landowners been given information about how to participate in this process? All of them should be on BLM's notification list to receive information about this project, especially since drill pads are located immediately adjacent to people's property. Please See Map 3 for land ownership in the vicinity of the proposed project area. See PDF for figure Granite Range - Photo by Kirk Peterson See PDF for figure 3: impacts to gerlach	
Socioeconomics	Given ORMAT's significant footprint on public lands in Nevada it is reasonable to expect that this international company will become an integral member of the communities they impact. Other large industrial mining companies contribute to Nevada by participating on boards, funding events, and offering scholarships. We are requesting ORMAT not only respond to our concerns previously submitted regarding the rural economy of Gerlach but include reasonable mitigation for supporting the rural economy in the short and long term.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. As noted for Socioeconomics in Final EA Table 3-2, Resource Effects Determinations and Rationale for Analysis, effects on Gerlach's local economy, including from astrotourism and local induced economic effects, are anticipated to be minor and temporary, lasting the duration of construction.

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Socioeconomics	During the Washoe County pre-scoping meeting on July 19, 2022, it was stated that there would be "No permanent jobs for exploration drilling. The typical employment for this type of plant is ORMAT employees. There are no anticipated jobs for local people, at least for the temporary drilling." Will there be jobs for local people during production? Where exactly will people live long term? How specifically will ORMAT contribute to the local economy and ensure their impact is positive?	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed.
Special Designations	Our Request 2: Further, the BLM should not authorize any actions within the Granite LWC or within the boundary of the Granite Banjo Proposed Wilderness (See Map 1 in PDF; proposed ORMAT projecy overlap with ganite range special designations	The Final EA (section 3.2.8) discusses that the Winnemucca RMP ROD allows for multiple-use and sustained-yield objectives in areas identified as having LWC (see Action LWC 1.1 in BLM 2015a, p. 2-45) with appropriate mitigations applied, if needed, to protect LWC criteria. The Final EA (section 3.3.4) also analyzed potential impacts of proposed project within the LWC unit (including temporary noise, disruption to solitude and recreation, etc.). The Final EA (applicant-committed environmental protection measures, see section 2.1.7) identify how temporary noise effects to LWC may be reduced by using mufflers on drilling rig engines and mufflers during well testing. At this time, there is no designated wilderness within the project area.

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Special Designations	Impacts to National Conservation Area Established on December 21, 2000, the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area Act of 2000 was signed into law. This nationally important area provides essential habitat, natural and cultural resources, high value recreation protection and economic stability to the local community of Gerlach. According to the EA, "The southern border of the NCA is approximately 4 miles north of the AOI (see Figure A-9, Special Designations)" and therefore there would be no impacts from the project. The fact is there is one primary road into the NCA which would run past this proposed project. Recreational users' experiences would be significantly impacted by viewing an industrial scale geothermal plant in a nationally significant area that currently has limited development. Gerlach is the gateway to the NCA and any additional development would significantly diminish the values for which Congress designated the area. In the legislation designating the NCA, Congress outlined their findings for the NCA. These are shown below. The Congress finds the following: (1) The areas of northwestern Nevada known as the Black Rock Desert and High Rock Canyon contain and surround the last nationally significant, untouched segments of the historic California emigrant Trails, including wagon ruts, historic inscriptions, and a wilderness landscape largely unchanged since the days of the pioneers. (2) The relative absence of development in the Black Rock Desert and High Rock Canyon areas from emigrant times to the present day offers a unique opportunity to capture the terrain, sights, and conditions of the overland trails as they were experienced by the emigrants and to make available to both present and future generations of Americans the opportunity of experiencing emigrant conditions in an unaltered setting. Our Request: Deny ORMAT's Operation Plan and any future development because it is clearly not consistent with the intent of conserving, protecting, and enhancing the multiple nationally significant resource values in this region.	It is the BLM's responsibility to allow lease holders to develop their leases, including undertaking geothermal exploration on federal geothermal lease areas. The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). Per Section 7 of the NCA Act of 2000, it is stated that "The Congress does not intend for the establishment of the conservation area to lead to the creation of protective perimeters or buffer zones around the conservation area. The fact that there may be activities or uses on lands outside the conservation area that would not be permitted in the conservation area shall not preclude such activities or uses on such lands up to the boundary of the conservation area consistent with other applicable laws." The proposed action does not overlap with the designated NCA or associated Wilderness Areas.

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Special status wildlife	While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, we are requesting that lands, acre for acre, be purchased for mitigation in response to the loss of Greater Sage Grouse Other Habitat Management Area lands.	Under the 2015 Nevada and Northeastern California Approved RMP Amendment (BLM 2015b), OHMAs are open to geothermal activities with standard stipulations applied. None of the proposed exploration project components are in OHMA areas. Further, Proponents of projects that would involve human disturbances in or within 3.7 miles (6 kilometers) of PHMAs, GHMAs, or OHMAs are required to consult with the Nevada Sagebrush Ecosystem Technical Team to determine whether mitigation is necessary. Ormat has coordinated with the team. To date, the team has not recommended any additional habitat quantification or mitigation measures beyond the applicant-committed environmental protection measures (Section 2.1.7) already included in this EA.

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Surface Water	Additionally, the mitigation plan for impacts to surface water resources is completely insufficient. The EA does not detail what the response would be if monitoring detects changes to surface water features. Section 3.3.5 of the EA simply says, "If water quality or quantity effects were detected, appropriate measures to mitigate effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented." This is not a plan to mitigate impacts to surface water resources, rather it is a plan to make a plan.	The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. Appropriate measures could include, at a minimum: Increase monitoring frequency and parameters, add additional monitoring locations, change drilling operations (i.e., drill wells further away from the affected monitoring points prior to drilling wells closer, add additional casing to separate the aquifers), cease installation of geothermal resource confirmation well, cease pump testing of geothermal resource confirmation well, and provide alternative water supply to affected water users. Ormat will also propose thresholds for potential changes for which mitigations will be required.

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Surface Water	Where an agency relies on mitigation measures to avoid preparing an EIS, NEPA requires "analytical data to support the proposed mitigation measures." Idaho Sporting Cong. v. Thomas, 137 F.3d 1146, 1151 (9th Cir. 1998), overruled on other grounds, Lands Council v. McNair, 494 F.3d 771 (9th Cir. 2007). The proposed mitigation plan must be carefully considered, based on scientific studies, and designed to protect against significant environmental harm. Greenpeace Action v. Franklin, 14 F.3d 1324, 1332-33 (9th Cir. 1992). An agency's analysis should focus on the effectiveness of any proposed mitigation measures. Western Watersheds Project v. Salazar, 993 F. Supp. 2d 1126, 1139 (C.D. Cal. 2012), aff'd, 601 Fed. Appx. 586 (9th Cir. 2015). "essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective." S. Fork Band Council Of W. Shoshone Of Nev. v. U.S. Dep't of Interior, 588 F.3d 718, 727 (9th Cir. 2009). The EA fails to outline what mitigation measures will be taken if there are impacts to surface water features, fails to cite scientific studies as to how such mitigation measures might be effective, and fails to evaluate the effectiveness of the vague and uncertain mitigation plan. There is functionally no plan in place in the relative likelihood that the project causes impacts to surface water features.	The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. Appropriate measures could include, at a minimum: Increase monitoring frequency and parameters, add additional monitoring locations, change drilling operations (i.e., drill wells further away from the affected monitoring points prior to drilling wells closer, add additional casing to separate the aquifers), cease installation of geothermal resource confirmation well, cease pump testing of geothermal resource confirmation well, and provide alternative water supply to affected water users. Ormat will also propose thresholds for potential changes for which mitigations will be required.

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Surface Water	The EA also fails to adequately describe the planned mitigation measures for impacts to surface water features. The EA relies heavily on a proposed surface water monitoring plan. This monitoring plan is clearly inadequate, mandating only quarterly monitoring of surface waters. The effects on surface water monitoring points of the pump test at Dixie Meadows were seen in direct temporal proximity to the pumping, and monitoring was conducted real time. If monitoring of surface water resources in the AOI of this project is only conducted quarterly, it is possible that impacts to surface water resources will go undetected. The monitoring plan also does not cover the most important and significant springs in the AOI - the privately held named springs such as Great Boiling Spring. These springs are what create the significant wetland habitat in and adjacent to the AOI, and it is their discharge levels that are most essential to maintain the value of these habitats. Without monitoring these privately held resources, it will be impossible for Ormat and the public to understand and avoid impacts from the pump tests. Thus the monitoring plan is inadequate to fully capture the impacts to surface water resources from the project.	The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. Appropriate measures could include, at a minimum: Increase monitoring frequency and parameters, add additional monitoring locations, change drilling operations (i.e., drill wells further away from the affected monitoring points prior to drilling wells closer, add additional casing to separate the aquifers), cease installation of geothermal resource confirmation well, cease pump testing of geothermal resource confirmation well, and provide alternative water supply to affected water users. Ormat will also propose thresholds for potential changes for which mitigations will be required.
Transportation System	The EA states that any new roads or two tracks that will be used will be graded to a disturbed width of 20 feet and a travel width of 15 feet. Given the large amount of heavy equipment being transported to each drill site this is unrealistic. A large truck is at least 8 feet wide so a 15 foot travel width is a one lane road with no room to pass.	Ormat has determined that the proposed access road widths, as stated in Final EA Section 2.1.3, would be adequate.
Transportation System	Describe what the actual road widths will be rather than minimize the apparent area of disturbance.	Ormat has determined that the proposed access road widths, as stated in Final EA Section 2.1.3, would be adequate.

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Tribal concerns	Tribal Consultation for this project appears to have been woefully inadequate. Sending two separate letters, one on November 9, 2021 and the second February 7, 2022, does not meet the spirit of meaningful Tribal Consultation. On September 13, 2022, the Department of the Interior released new guidance to improve federal stewardship of public lands, waters and wildlife by strengthening the role of Tribal governments in federal land management. New guidance from the Bureau of Land Management (BLM), (Permanent Instruction Memorandum No. 2022-011) provides direction for implementing provisions of Joint Secretarial Order 3403 - signed by the Secretaries of the Interior and Agriculture during the 2021 White House Tribal Nations Summit - which outlines how the two Departments will strengthen Tribal co-stewardship efforts.	Final EA Section 4.1.1, Government-to-Government Consultation, has been revised to describe additional consultation with Native American Tribes regarding the proposed action.
Visual resources, including night skies	If the Proposed Project Overview is followed without implementation of the BMPs the following worse case scenario would occur in the region. A line-of-sight calculation, based on the earth's curvature, shows fugitive and trespass light is visible from 3 miles away for every 6 feet above the ground a light fixture is placed. Given that rigs are 170 feet tall, at the playa level, the light impacts of "45 degree downward" unshielded lights (which would produce fugitive and trespass light) would be visible for 88 miles, on flat ground. The fugitive and trespass light would be visible for much greater distances if either the rig or the person is above the level of the playa. Based on these same line-of-sight calculations, if the person is not on the level surface of the playa, and instead is utilizing the recreational lands surrounding and above the playa, for every 6 feet in elevation above the playa, they will be impacted by the ORMAT drilling lights for a an additional 3 miles. The distance of these impacts will increase dramatically by atmospheric conditions that increase refraction, produce dust or haze, or produce a cloud layer. The dark sky impacts will differ on each one of these drilling sites depending on where each one of these sites are located (on the playa surface, or above the playa surface), the height of the drilling rig, and the placement of lights on the rig. Impacts of ALAN are not limited to direct line of sight to unshielded light sources; in fact the greater impact on dark skies is the cumulative	The Night Sky Baseline Report (BLM 2022b) modeled night-sky conditions at four well pad locations, and conducted photographic simulations at five key observation points. Using findings from the baseline report, the Final EA reports anticipated minor effects on recreation (see Final EA Section 3.3.3), astrotourism (see Final EA Table 3-2, Socioeconomics), and wildlife (see Final EA Section 3.3.3). The project would include measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations).

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	effect of poorly designed industrial lighting as it contributes to light domes or sky glow that can impact areas like the Massacre Rim Dark Sky Sanctuary from over 100 miles away. Although the impact of project ALAN contributions to sky glow is mentioned in the Baseline Report (5.3.4 ALAN Best Management Practices), the report was limited to estimating sky glow to a narrow zenith angle, eg. straight overhead, and cannot provide "useful information on emissions at [zenith angle] 80-90" degrees, from the perspective of a ground-based observer- 5.4 Report Limitations. This section of the report also clearly states "[e]missions in this range [from the perspective of a ground-based observer] can be particularly deleterious to human night vision response, giving the impression of a much brighter sky than is actually present." Despite the limitations of the Baseline Report to accurately estimate the impacts of sky glow on the experience of the night sky from the ALAN associated with the ORMAT project, section 3.3.1 Astrotourism draws the irrational and unfounded conclusion: "[e]vidence indicates that potential astrotourism impacts from sky glow resulting from the proposed project would be negligible." The impact of the project's sky glow on the natural night sky from the perspective of ground-based observers involved in astrotourism throughout the greater resource area must be analyzed and addressed, instead of being dismissed with an unjustified opinion. ORMAT should follow all of the Baseline Report 5.3.4 ALAN Best Management Practices, by quantifying the existing sky glow in the greater region, and monitoring the skyglow throughout the duration of the project. Doubling the sky glow radiance of Gerlach is not an option for this project. The NPS has long running studies and monitoring of the impacts of sky glow on natural night skies. https://iopscience.iop.org/article/10.1086/512069 The potential dark sky impacts of this project could impact the single most precious natural resource of this portion of Nevada, the deepest and darkest skies in the contiguous United States. This precious resource will be unduly compromised for residents of this area, recreationists, astronomers, astrophotographers, and wildlife. The BLM has failed to address these impacts or to ensure	

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	meaningful mitigation measures would be adopted by Ormat for reducing these impacts. Each and every drilling location will need to have its individual dark sky impacts addressed and mitigated to provide a meaningful environmental impact analysis.	
Visual resources, including night skies	Impacts to Visual Resources According to the EA, Public lands in the project area are classified as VRM II and III. The objective of VRM Class II is to retain the landscape's existing character. The level of change to the characteristic landscape should be low. Management activities may be seen, but they should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the characteristic landscape's predominant natural features. The objective of VRM Class III is to partially retain the landscape's existing character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the characteristic landscape's predominant natural features. "Proposed project elements and equipment would be noticeable from project KOPs; however, they would not dominate the view of the casual observer (see a map of KOPs in Figure A-10 and visual contrast rating worksheets and photographs from KOPs in Appendix D). The proposed project elements would repeat the basic elements present in the landscape character; this is because there are already nonnatural lines and forms, namely CR-34 and SR-447, dirt roads, fences, power lines, and other municipal and commercial developments in and around Gerlach. Access roads, wellheads, and well pad fences would be visible to the casual observer, but they would be below the horizon line and would not attract attention. Wellheads would be painted a color consistent with BLM visual color guidelines; the color would blend with the surrounding landscape to minimize visibility…Following construction, areas of disturbed land no longer required for operations would be reclaimed, and fences would be removed. Taking these measures into account, the degree of contrast and modification imposed on the landscape by the project would be minor." During the Washoe County pre-	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. As described in the Final EA Section 3.3.3 for Visual Resources Management, the project would be within the parameters of the VRM Class II objective to retain the landscape's existing character, and Class III objective to partially retain the landscape's existing character. Accordingly, the project would be in conformance with VRM guidelines and policy (BLM Manual 8400, Manual H-8410-1, and Manual H-8431). The proposed action would be in conformance with the BLM Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area (NCA) and Associated Wilderness, and Other Contiguous Lands in Nevada Record of Decision and RMP (BLM 2004), which permits geothermal leasing on the south playa (see Final EA Section 1.5). The possibility that Congress would designate lands included in the Washoe County/Truckee Meadows Public Lands Bill as new wilderness areas or additional NCAs in the region is not known. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis, including any changes in land designations at that time. The Night Sky Baseline Report (BLM 2022b) modeled night-sky conditions at four well pad locations, and conducted photographic simulations at five key observation points. Using findings from the baseline report, the Final EA reports anticipated minor effects on recreation (see Final EA Section 3.3.3), astrotourism (see Final EA Table 3-2, Socioeconomics), and wildlife (see Final EA Section 3.3.3). The project would include measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations).

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	scoping meeting on July 19, 2022, ORMAT was asked, "...Will ORMAT commit that any geothermal plant and pipelines constructed will be outside of the viewshed of Gerlach?" "No," laughed Scott Nichols.The fact is the Key Observation Points display little development; only a road, a powerline, a vault toilet and one shaded picnic table, and two water tanks. Overall the landscape does not display nonnatural lines and forms such as the new dirt roads, fences, well pads, and drilling rigs that are being proposed by ORMAT. Additionally, the mitigation being proposed, painting new wellheads a color consistent with BLM visual color guidelines, does not result in "minor" impacts to the visual resources in the area. VRM Class II and III do not allow for the type of exploration, pre-production, and production ORMAT is proposing. This proposal will substantially affect the viewshed of Gerlach; a gateway to a National Conservation Area with extensive designated Wilderness as well as the proposed Granite Banjo WIlderness. This area has extremely high value recreation and is one of the darkest night sky locations in the nation. Our Request: Deny ORMAT's Operation Plan.	
Visual resources, including night skies	Impacts to Dark Skies Increasingly, dark skies are recognized across the state, nation, and world as an important natural resource needing protection. Here in Nevada, dark sky legislation (SB52) passed in the 2021 Legislative session. The Massacre Rim Dark Sky Sanctuary, approximately 60 miles north of Gerlach, was recently certified by the International Dark Sky Association. Many small towns, including the town of Gerlach, rely on their dark skies to provide a sustainable source of income while protecting wildlife habitat and recreation values. See PDF for figure Dark Skies over the Granite Range - photo by Bob Wick - Bureau of Land Management	The Night Sky Baseline Report (BLM 2022b) modeled night-sky conditions at four well pad locations, and conducted photographic simulations at five key observation points. Using findings from the baseline report, the Final EA reports anticipated minor effects on recreation (see Final EA Section 3.3.3), astrotourism (see Final EA Table 3-2, Socioeconomics), and wildlife (see Final EA Section 3.3.3). The project would include measures to reduce the amount of light produced would be in effect, including limiting night lighting to the minimum amount needed, and shielding and directing lighting to the immediate work area (see Final EA Table 3-11, BLM-Required Stipulations).

Comment Code Name	Comment Text	Response Text
Water Quality	While we are requesting the Operation Plan be denied, should ORMAT and BLM choose to continue with this proposed project, mitigation based on exploration, pre-production and production and all concerns and potential impacts to water quality and quantity need to be analyzed.	The proposed action in the Final EA would involve exploration to determine if the geothermal resource is sufficient for geothermal production. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. Appropriate measures could include, at a minimum: Increase monitoring frequency and parameters, add additional monitoring locations, change drilling operations (i.e., drill wells further away from the affected monitoring points prior to drilling wells closer, add additional casing to separate the aquifers), cease installation of geothermal resource confirmation well, cease pump testing of geothermal resource confirmation well, and provide alternative water supply to affected water users. Ormat will also propose thresholds for potential changes for which mitigations will be required.

Comment Code Name	Comment Text	Response Text
Water Resources	ORMAT and BLM are required to specifically describe the appropriate mitigation measures they will take if water quality or quantity effects are detected so they can be analyzed in advance. Northern Nevada is undergoing its worst heat wave ever recorded and water is continuing to decline across the state and the west. This operations plan does not take into account the fact that there may not be enough water to support an industrial scale geothermal plant in the future nor does it accurately describe why a scarce resource such as water needs to be redirected to another geothermal plant in Nevada.	The proposed action analyzed in the Final EA (see section 2.1 of the Final EA) includes geothermal exploration only. Geothermal production is not proposed. Should the project proponent propose geothermal production, they would need to submit a new application to the BLM and this would be subject to separate NEPA analysis. Spring discharges and groundwater monitoring wells would be monitored to allow early detection of potential changes, and would indicate level of connectivity between the geothermal reservoir and shallow groundwater aquifer. The hydrological monitoring plan (Broadbent and Associates Inc. 2022; published on the project ePlanning website with the Draft EA) outlining monitoring locations, parameters, frequency, and duration, would be supplemented with additional monitoring requirements outlined in the Final EA revised Table 3-11, BLM-Required Stipulations. Additional monitoring requirements would be approved by the BLM Authorized Officer prior to drilling activities. If water quality or quantity effects are detected, appropriate measures to mitigate the effects, as determined by Ormat in coordination with the BLM Authorized Officer, would be implemented. The plan would include continued evaluation of data trends and change points and determination of thresholds for applicable adaptive management, if needed. Appropriate measures could include, at a minimum: Increase monitoring frequency and parameters, add additional monitoring locations, change drilling operations (i.e., drill wells further away from the affected monitoring points prior to drilling wells closer, add additional casing to separate the aquifers), cease installation of geothermal resource confirmation well, cease pump testing of geothermal resource confirmation well, and provide alternative water supply to affected water users. Ormat will also propose thresholds for potential changes for which mitigations will be required.

Appendix G

Nevada State Historic Preservation Office Coordination

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NEVADA
STATE HISTORIC PRESERVATION OFFICE

STATE OF NEVADA
Department of Conservation & Natural Resources
Steve Sisolak, *Governor*
James R. Lawrence, *Acting Director*
Rebecca Palmer, *Administrator*

September 16, 2022

Mark E. Hall
Black Rock Field Office Manager
Bureau of Land Management
5100 E. Winnemucca Blvd.
Winnemucca, NV 89445

RE: Preliminary/Draft Environmental Assessment for the Gerlach Geothermal Exploration Project, Washoe County, Nevada; BLM 3260 (NVW030.02), DOI-BLM-NV-W030-2022-001-EA; NVN088151X, SHPO UT 2021-6545; 29619

Dear Mr. Hall:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject documents received August 22, 2022 in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

The Bureau of Land Management – Black Rock Field Office (BLM-BRFO) has submitted a preliminary/draft Environmental Assessment (EA) for the Gerlach Geothermal Exploration Project under 36 CFR § 800.8(c) to coordinate and integrate the Section 106 process with the National Environmental Policy Act (NEPA) process.

Project Description and Area of Potential Effects (APE)
Although our office **agrees** with the APE as defined by the BLM-BRFO, and we have received answers to all our previous questions, our office has the following comments on the Preliminary EA:

1. The BLM-BRFO letter states environmental effects of up to 21 geothermal exploration wells are under analysis. The Preliminary EA discusses 20 geothermal exploration wells. Please clarify this discrepancy.

2. As the Preliminary EA does not include a map illustrating the boundaries of the APE, it is recommended that a map be included within Appendix C for clarity. Alternatively, the map(s) located in Appendix A could be referenced within the written APE discussion as long as all consulting parties and the public clearly understand the defined boundaries of the APE.

3. Section 3.2.6 discusses "direct/indirect" effects. Per the Advisory Council on Historic Preservation (ACHP) 2019 guidance, the effect is considered "direct" regardless of the specific type of effect (physical, visual, auditory, atmospheric). The "indirect" effects are those caused by the undertaking that are at a later date in time or farther removed in the distance, but reasonably foreseeable. This guidance can be found on the ACHP's website.

4. Although the Preliminary EA references the BLM-BRFO's application of Instruction Manual (IM) No. NV-2021-006 and the associated report [*Defining a Visual Area of Potential Effects to Historic Properties on BLM Lands in Nevada (Pay et al, 2020)]*, our office was not aware that this document was used to define the APE.

   The Nevada SHPO does not recommend the use of the report. The conclusions found in the report are not based on an accurate understanding of how effects are determined under 36 CFR Part 800, the report contains significant errors of procedure related to the development of an APE, the report does not appear to have been developed with the assistance of individuals knowledgeable with the built environment or with other visual resource studies where the characterization of such effects are more common, its conclusions are not consistent with accepted literature or with the studies cited in the document, and it contains formulas and other methods for determining potential effects that are likely to be difficult for the public to understand. These issues were identified in a letter from the SHPO dated June 18, 2021 (enclosed) and affirmed by the ACHP on April 28, 2022 (enclosed) and February 14, 2020 (enclosed). To date, there have been no revisions to this document or a response to these advisory documents.

   All the federal agency's districts in Nevada have been informed of the issues with the report and the Nevada SHPO awaits the initiation of consultation and negotiation that will address the flaws and create a useful document that would support a reasonable and good faith identification effort.

   In addition, we have put these statements on our website: https://shpo.nv.gov/visual.

Identification and Evaluation of Historic Properties

The Preliminary EA's Appendix C states that efforts to identify and evaluate historic properties have been previously conducted.

However, the Preliminary EA does not include any mention or documentation of the SHPO's review of the inventory reports or concurrence with eligibility determinations.

As identified on page 45 of the "Attachment C Checklist for Substitution" of the *NEPA and NHPA Handbook for Integrating NEPA and Section 106,* by the Council on Environmental Quality Executive Office of the President and the Advisory Council on Historic Preservation, March 2013 (ACHP Checklist), Appendix C should contain either a statement of the SHPO's concurrence or the SHPO's concurrence letters (April 8, 2022 and September 13, 2021 - copies provided upon request) to provide clarity of this step in the Section 106 process for the public.

Page 3-22 of the Preliminary EA, Paragraph 3 states there are four historic properties eligible for listing in the National Register of Historic Places under Criterion A. The agency resource number and Trinomial numbers are missing for the Historic Railroad Tracks and Transmission Line. These resource numbers should be included in the revised EA.

Native American Consultation
Section 4.1.1 of the Preliminary EA briefly mentions Section 106, specific Native American Tribes that have been contacted to dated, and states "outreach, communication, and coordination will continue throughout the NEPA process".

Compliance with 36 CFR §800.4(c) and 36 CFR §800.4(d) requires the federal agency to consult with the SHPO regarding the National Register eligibility of properties of religious and/or cultural significance identified by Tribes and the manner that such properties could potentially be affected by the undertaking.

Please provide the SHPO with a summary of consultation efforts that includes the dates consultation occurred, comments received, and any additional information. This information will be added to the SHPO administrative record to ensure the record is complete for this undertaking. This summary should also be included in the revised EA.

Consultation with Interested Parties
The public review and comment period on the Preliminary EA began August 19, 2022 and concludes on September 19, 2022.

Per the ACHP Checklist, have the public's concerns regarding historic properties been addressed? Please provide the SHPO with a summary of public consultation regarding historic properties upon availability for our administrative record. This summary should also be included in the revised EA.

Finding of Effect
Page 3-48 of the Preliminary EA appears to assess direct physical effects. Additionally, Page 3.39 appears to assess auditory effects and Pages C-7 and C-8 of Appendix C appear to assess visual effects.

However, the ACHP Checklist recommends that a Finding of Effect pursuant to the Section 106 regulations be stated within the Preliminary EA or the BLM-BRFO's agency letter. We are unable to locate this finding in any of the relevant documents. Please clarify the agency's finding of effect for all the alternatives and provide a Finding of Effect to the SHPO for concurrence. This information should also be shared with all consulting and interested parties.

Page 2 of the BLM-BRFO letter states "comments may be submitted by September 18, 2022". The link (https://eplanning.blm.gov/eplanning-ui/project/2016744/510) for the EA states that public review and comments will be accepted from August 19, 2022 until September 19, 2022.

The SHPO is afforded a 30-day review period under the Section 106 regulations. This 30-day review period begins upon *receipt* of documents for review. The 30-day review period began on August 22 and closes September 20, 2022. Based on the submitted agency letter and public review link above, the SHPO was not afforded a complete 30-day review. In the future, our office may not be able to respond to requests for project review that are less than 30 days.

The SHPO's review of this submission has stopped due to the concerns outline above.

Should you have questions concerning this correspondence, please contact SHPO staff archaeologist Ashley Wiley at (775) 684-3450 or email awiley@shpo.nv.gov.

Sincerely,

Rebecca Lynn Palmer
State Historic Preservation Officer

cc: w/o enclosures. Madeline Ware Van der Voort, BLM Acting State Archaeologist/Deputy Preservation Officer

enc. ACHP September 1, 2022 letter
SHPO June 18, 2021 letter
ACHP April 28, 2022 letter
ACHP February 14, 2020 letter

COPY

September 1, 2022

Kathleen Rehberg, Field Manager
Humboldt River Field Office
Bureau of Land Management
5100 East Winnemucca Blvd.
Winnemucca, NV 89445

Ref: *Marigold Mine Valmy Expansion Project*
Humboldt County, Nevada
ACHP Project Number: 018657

Dear Ms. Rehberg:

On August 18, 2022, the Advisory Council on Historic Preservation (ACHP) received the Bureau of Land Management's (BLM) notification pursuant to Section 800.8(c) of the ACHP's regulations, "Protection of Historic Properties" (36 CFR Part 800). We appreciate receiving your notification that the BLM will use the process and documentation required by the National Environmental Policy Act (NEPA) to comply with Section 106 of the National Historic Preservation Act in lieu of the procedures set forth in 36 CFR §§ 800.3 through 800.7 (commonly known as NEPA "Substitution"). This letter acknowledges receipt of the BLM's submission and provides both undertaking-specific and general guidance for compliance with Section 106 under the requirements of 36 CFR § 800.8(c).

Undertaking-Specific Guidance

In its review of the BLM's submission materials, the ACHP notes that there are several aspects of this Section 106 review that warrant specific feedback, in addition to the general guidance we provide to federal agencies utilizing the NEPA Substitution process, as follows:

- The Section 106 regulations at 36 CFR § 800.8(c) allow agencies to make use of the NEPA Substitution process, provided the agency has notified the ACHP and appropriate State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) *in advance* that it intends to do so. In this case, it appears the Section 106 review has progressed substantially past the initiation stage, and it is not clear that the advance notice criteria have been met. Specifically, it appears that the bulk of the identification process has been completed over the past several years, and significant decisions have been made regarding the undertaking's effects on historic properties and the proposed resolution measures. The ACHP cautions the BLM on the appropriateness of utilizing a Substitution approach in this case, as it may not afford the consulting parties and public full access to the scope of federal decision-making under the Section 106 review.

- The ACHP has concern with the following language included in the e106 submission form: "Since the proponent has decided not to avoid eligible historic properties, this undertaking has an Adverse Effect on historic properties." We remind the BLM that the regulations at 36 CFR § 800.6(a) require that, when adverse effects on historic properties are found, the federal agency must: "develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize or mitigate" these effects in consultation with the consulting parties. These resolution measures must ultimately be determined

by the federal agency, and not dictated by a single consulting party, including applicants for federal assistance or other permits or approvals.

- The ACHP also notes that the BLM has used incorrect terminology to describe the Area of Potential Effects (APEs), falsely associating the terms "direct" with physical effects and "indirect" with non-physical effects. In 2019, the ACHP released clarifying guidance on the correct use of these terms; briefly, that "directly" should refer to the causality, and not the physicality, of the effect to historic properties. This means that if the effect comes from the undertaking at the same time and place with no intervening cause, it is considered "direct" regardless of its specific type (e.g., whether it is visual, physical, auditory, etc.). "Indirect" effects to historic properties are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable. The ACHP acknowledges that many available guidance documents (including BLM Nevada's State Protocol Agreement with the SHPO) utilize outdated terminology to describe these APEs and corresponding effects, which may be confusing to the public and consulting parties until they can be corrected. If the BLM would like further clarification on the appropriate use of these terms, we would be happy to provide additional guidance and training materials, as necessary.

General Guidance on the NEPA Substitution Process

In addition to notifying the ACHP, the BLM must also notify the Nevada SHPO of the BLM's decision to comply with Section 106 via the NEPA process. During the preparation of NEPA documentation, the BLM must meet the standards in 36 CFR §§ 800.8(c)(1)(i) through (v) and describe its efforts in the resulting environmental document:

- Identify consulting parties either pursuant to 36 CFR § 800.3(f) or through the NEPA scoping process with results consistent with 36 CFR § 800.3(f);

- Identify historic properties and assess the effects of the undertaking on such properties in a manner consistent with the standards and criteria of 36 CFR §§ 800.4 through 800.5. The scope and timing of these steps may be phased to reflect the agency official's consideration of project alternatives in the NEPA process;

- Consult regarding the effects of the undertaking on historic properties with the SHPO/THPO, Indian tribes and Native Hawaiian organizations that might attach religious and cultural significance to the affected historic properties, other consulting parties, and the ACHP, where appropriate, during the NEPA scoping, environmental analysis, and the preparation of NEPA documents;

- Involve the public in accordance with the agency's published NEPA procedures; and

- Develop and fully consider, in consultation with identified consulting parties, alternatives and proposed measures that might avoid, minimize, or mitigate any adverse effects of the undertaking on historic properties and describe them in the appropriate NEPA document.

The regulations at 36 CFR § 800.8(c)(2)(i) require that you submit to the ACHP any draft Environmental Impact Statement (DEIS) or Environmental Impact Statement (EIS) you prepare. Inclusion of your adverse effect determination in both the DEIS/EIS and in your transmittal letter will help ensure a timely response from the ACHP regarding its decision to participate in consultation. Please indicate in your cover letter the schedule for Section 106 consultation and a date by which you require a response from the ACHP.

The regulations do not specifically require that an agency submit an Environmental Assessment (EA) to the ACHP; however, should a consulting party object that the preparation of the EA, DEIS, or EIS has not met the standards described above or that the substantive resolution of the effects on historic properties proposed is inadequate, the BLM must refer the matter to the ACHP. The BLM cannot complete the Section 106 process

without resolving such objections.
We encourage the BLM to review and apply the guidance in the publication, *NEPA and NHPA: A Handbook for Integrating NEPA and Section 106*, published in March 2013, and available at https://www.achp.gov/sites/default/files/2017-02/NEPA_NHPA_Section_106_Handbook_Mar2013_0.pdf. This handbook, prepared jointly by the Council on Environmental Quality and the ACHP, provides a checklist for using the substitution process defined in 36 CFR § 800.8(c) which may be helpful to you in your NEPA/Section 106 consultation.

Thank you for your notification pursuant to 36 CFR § 800.8(c). Should you have any questions or require additional assistance, please contact Mr. Bill Marzella, ACHP Liaison to the BLM, who can be reached at (202) 517-0209 or via email at bmarzella@achp.gov.

Sincerely,

Christopher Koeppel, RPA
Assistant Director
Federal Property Management Section
Office of Federal Agency Programs

April 28, 2022

Mr. Jon K. Raby
State Director
Bureau of Land Management
1340 Financial Blvd.
Reno, NV 89502

Ref: *Guidance for Consultation under the Section 106 Process, State of Nevada*

Dear Director Raby:

On March 17, 2022, the Advisory Council on Historic Preservation (ACHP) met with the Nevada State Historic Preservation Officer (SHPO) to discuss the Bureau of Land Management's (BLM) compliance efforts under Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and its implementing regulations, "Protection of Historic Properties" (36 C.F.R. Part 800). The SHPO reported a number of persistent problems with the manner in which BLM conducts and documents its Section 106 reviews. The ACHP has subsequently met with BLM staff to discuss these problems, and both parties have acknowledged that guidance and clarification from the ACHP on certain matters would be helpful to resolve these issues and reach common ground on the meaning and intent of the Section 106 implementing regulations. This letter is intended to document discussion points raised during these meetings and provide clarification on questions raised by the SHPO regarding the BLM's federal agency responsibilities under Section 106.

1) *What is the BLM's responsibility to consider and respond to "substantive" and "non-substantive" comments provided by the SHPO and other consulting parties?*

In various letters to, and agreement documents negotiated with, the SHPO, the BLM has indicated that it will only respond to—and in some cases only consider—comments made by the SHPO that are "substantive," a term which the BLM defines in its National Environmental Policy Act (NEPA) Handbook (H-1790-1). Examples of comments meeting this definition include those that: question, with reasonable basis, the accuracy of information or methodology for assumptions used in the environmental analysis; present new information relevant to the analysis; or present reasonable alternatives. The BLM has acknowledged to the ACHP that this definition may have not been made explicitly clear to the SHPO in past exchanges, and therefore the use of "substantive" as a NEPA term of art may not have been immediately transparent.

Nevertheless, in a review of a sample of letters from past Section 106 reviews, the ACHP has struggled to find any questions and comments posed by the SHPO that fail to meet this definition. Often, these matters deal with fundamental steps in the Section 106 review, including the appropriate delineation of areas of potential effects (APEs), eligibility of historic properties for listing in the National Register of Historic Places (NRHP), and the results of consultation with Indian tribes regarding historic properties of religious and cultural importance to them. In some cases, they identify clerical or typographic errors. In past letters

to the BLM, the ACHP has observed that even minor typographic and clerical errors in letters and reports may inhibit the ability of a consulting party to accurately interpret an agency's Section 106 findings.

The BLM's position on not responding to comments it deems non-substantive is particularly problematic when it comes to determinations of eligibility for potential historic properties for listing in the National Register. At certain points throughout the Section 106 review, if an agency does not receive a response from a SHPO (or Tribal Historic Preservation Officer [THPO], if applicable) or other consulting party, it may proceed with its initial analysis and determination. Such an action presumes that no responses have been received, which is not the case here. In other key steps in the process, this is not a possibility; namely, in determining which resources are eligible for NRHP listing as historic properties. These are determinations an agency *cannot* make unilaterally but must rather consult with the SHPO/THPO and any Indian tribes that attach religious and cultural significance to the identified properties. If any agency cannot reach agreement on the eligibility of these properties, it must seek determinations of eligibility from the Keeper of the NRHP, as described in 36 CFR §§ 800.4(c)(1) and 63.

Furthermore, the Section 106 implementing regulations do not differentiate between substantive and non-substantive comments, and therefore do not allow agencies to define broad categories of comments that may be considered or dismissed. However, the regulations do provide a clear definition of consultation, which requires "seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the section 106 process."[1] Instead of attempting to consult to resolve these issues on a case-by-case or programmatic basis, the BLM often simply ignores or fails to respond to many of the comments and requests for information raised by the SHPO. The ACHP recognizes the high demands on BLM and SHPO staff time, which can be exacerbated by multiple rounds of document review. For this reason, we recommend that the BLM consult with the SHPO to identify measures to reduce these strains, such as identifying categories of comments that can be accepted with no additional acknowledgement required. Until such time as these approaches can be concurred upon, the ACHP recommends that the BLM avoid the use of "substantive" terminology in its dialogue with SHPO.

2) *What is the BLM's responsibility to consult on the development of APEs under its template visual APE policy?*

Under the Section 106 regulations at 36 CFR §§ 800.4(a)(1) and 800.16(d), the federal agency is required to determine and document the APE in consultation with the SHPO/THPO. The ACHP has previously provided general guidance to the BLM on their obligation to consult with the SHPO to determine the APE and will not repeat that advice here (refer to letter enclosed).

However, the BLM has continued to experience difficulties with the implementation of its visual-APE template, which it adopted as a statewide policy under an Instruction Memorandum in 2020. The SHPO has pointed to procedural flaws in the development of the visual APE methodology that could compromise the APEs being developed for these classes of undertakings; most significantly, that the APEs for visual effects are delineated from the outermost point at which undertakings may *adversely* affect historic properties, rather than merely *affect* historic properties, as required by the regulations. As the SHPO has correctly pointed out in correspondence to the ACHP and BLM, this distinction is important as the APE delineation precedes the identification effort, meaning that the BLM at this point in the process would likely not have sufficient data regarding historic properties within the APE to understand what visual effects on them might be adverse, based on their respective significance criteria and aspects of integrity.

Again, the ACHP recommends that the BLM consult with the SHPO to refine this methodology to reach a

[1] 36 CFR § 800.16(f).

mutually agreeable approach. Doing so, hopefully, will reduce the recurrent comment-and-response cycles that have occurred for undertakings over the past several years. We also encourage the BLM to expand its use of visual aids (maps, keyed photographs, etc.) to illustrate the mathematical principles used to develop APEs against real-world conditions. Doing so will especially help consulting parties and members of the public to understand the underlying analysis that informed the development of these APEs. The ACHP also notes that, unless these template APEs are adopted as part of an applicable program alternative (including potential adoption as an appendix to the existing Nevada State Protocol Agreement), the BLM is still required to consult on the development of APEs on a case-by-case basis with the SHPO/THPO.

3) *What are the documentation standards that federal agencies must meet to document APEs and other deliverables in the Section 106 review?*

The SHPO has stated that submission materials provided by the BLM in initiation packages do not meet the documentation standards that they need to review these materials, especially for APE maps. The SHPO has requested, in general, that APEs be depicted on 7.5' USGS topographic maps provided in hard copy for their review. The documentation standards found in the Section 106 regulations at 36 CFR § 800.11 are not prescriptive when it comes to the specific formats of deliverables; however, they do state that agencies should provide photographs, maps, and drawings as necessary to illustrate the APE and other aspects of the undertaking. The regulations also encourage agencies to take into account applicable local and state standards and guidelines when preparing submissions. Although the ACHP is not aware of any statewide submission guidelines for Section 106 reviews in Nevada, the SHPO has been consistent in requesting submissions at this scale in correspondence to the BLM. For these reasons, we encourage the BLM to accommodate these requests made by the SHPO. If the BLM cannot meet these requests on a consistent basis, we encourage you to consult with the SHPO to reach a mutually agreeable format, recognizing SHPO staff workload and the limitations of their abilities under the Historic Preservation Fund Grant agreements.

The BLM has also stated in discussions with the ACHP that the preliminary nature of these APEs at the initiation stage might not warrant the time and materials necessary to map and print them at the requested scale (i.e., they are not intended to represent final APEs, but rather as starting points to inform the consultation and identification processes). If this continues to be the case, we encourage the BLM to work with SHPO staff to appropriately characterize these submissions as draft or study areas. This is especially true for large undertakings when multiple alternatives are under consideration for analysis in the NEPA document, and APEs are more likely to shift as further design and analysis is conducted. As the BLM expands its use of National Environmental Policy Act (NEPA) processes and documentation to comply with Section 106 in lieu of the procedures set forth in 36 CFR §§ 800.3 through 800.6 (commonly known as NEPA substitution), it is critical that these issues are resolved with the SHPO/THPO, Indian tribes, and other consulting parties. We appreciate the outreach the BLM has made to the ACHP to develop appropriate strategies for NEPA substitution.

Thank you for the opportunity to comment on these issues. As our earlier points recommended, the ACHP feels strongly that these issues should be resolved through consultation between the SHPO and BLM. These efforts may take the form of meetings, mediation sessions, or trainings offered by the ACHP and attended jointly by BLM and SHPO staff. The ACHP is ready and willing to assist both parties in develop such programs or materials to remedy these issues. We will be in touch to facilitate these further discussions. In the meantime, if the ACHP may be of further assistance in this regard, please contact Bill

Marzella, ACHP Liaison to the BLM, at (202) 517-0209, or via e-mail at bmarzella@achp.gov.

Sincerely,

Reid J. Nelson
Director
Office of Federal Agency Programs

Cc Rebecca L. Palmer, Nevada SHPO

Enclosure

NEVADA
STATE HISTORIC PRESERVATION OFFICE

STATE OF NEVADA
Department of Conservation and Natural Resources

Steve Sisolak, *Governor*
Bradley Crowell, *Director*
Rebecca L. Palmer, *Administrator, SHPO*

June 18, 2021

Mr. Jon K. Raby
State Director
United States Department of the Interior
Bureau of Land Management
Nevada State Office
1340 Financial Boulevard
Reno, Nevada 89502-7147

RE: Greenlink West Transmission Line Project (Project) Right-of-Way (ROW) application; SHPO UT # 2021-6755; 28227

Dear Mr. Raby:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject documents received May 20, 2021 in accordance with Section 106 of the National Historic Preservation Act (NRHA) of 1966, as amended.

The SHPO understands that the Bureau of Land Management (BLM), Nevada State Office (BLM-NSO) is submitting the documents following the procedures outlined in 36 CFR Part 800 as applicable under Section V.H of the *State Protocol Agreement between the Bureau of Land Management, Nevada and the Nevada State Historic Preservation Officer for Implementing the National Historic Preservation Act, 2014* (Protocol).

The BLM-NSO has provided documentation and notification to the SHPO that Section 106 compliance will occur concurrently with the National Environmental Protection Act (NEPA) process. The BLM-NSO has determined that an Environmental Impact Statement (EIS) is the appropriate level of NEPA review for the Greenlink West Transmission Line Project (Project).

At this time, the BLM-NSO is formally requesting information regarding the BLM-NSO's initial determinations of Direct and Visual APE boundaries, as well as the proposed level of effort to identify historic properties within the APEs. The BLM-NSO confirmed via a phone conversation with SHPO staff on June 9, 2021 that the BLM-NSO is requesting the SHPO's review and comment regarding the APE for this undertaking.

Project Description
The federal agency letter states that the Project will include approximately 469 miles of new transmission lines and associated facilities constructed from Reno to Las Vegas. Approximately eighty-two percent of the land will cross land managed by the Carson City, Battle Mountain, and Southern Nevada District Offices. The Project will also cross lands managed by the Department of Defense, the Bureau of Indian Affairs (Las Vegas Paiute Tribe reservation and Walker River Paiute Tribe reservation), and privately owned lands. No construction or design details about the transmission line or its features have been included in the agency letter.

Area of Potential Effects (APE)

Direct Physical APE:
The BLM-NSO has defined the direct physical APE as the preferred transmission line ROW (600 ft wide; 33,951 acres), new microwave and amplifier sites (10 @ 0.75 acres; 7.5 acres), distribution line ROWs (40 ft wide; 151 acres), road improvements (25 ft wide; 1336 acres), and new roads (25 ft wide; 83 acres) plus a 30-meter buffer around the proposed disturbance for a total of 54,806 acres.

Beyond this statement, the BLM-NSO does not include any necessary information about the Project that consulting parties and the public might need to evaluate the federal agency's determination concerning the possible effect of the undertaking. Information such as, but not limited to, whether the transmission line will run continuously above ground the entire distance, a description of the type(s) of transmission line and pole(s) that has been selected for this Project and design information about the new microwave and amplifier sites, the distribution lines, or the existing or proposed new roads. It is also unclear if any other ancillary structures or new substations will be constructed or existing substations will be modified for this undertaking.

Visual APE:
For defining the Visual APE for the current Project, the BLM-NSO has applied the BLM's Instruction Memorandum (IM) No. NV-2021-006 which utilizes the BLM report *Defining a Visual Area of Potential Effects to Historic Properties on BLM Lands in Nevada* (Prepared By: Nicolas Pay, Bryan Hockett, and Tanner Whetstone September 23, 2020).

The SHPO notes that the September 23, 2020 document was not prepared in consultation with the SHPO nor were our comments on the draft incorporated. Therefore, we do not support its use without adequate documentation so that all consulting parties can readily understand the visual effects of an undertaking. Our office reserves the right to ask questions about this document as well as the adequacy of the APE.

To provide background on the consultation efforts between the BLM-NSO and the SHPO, please see the enclosed emails and the SHPO's letter. The BLM-NSO invited the SHPO to review a draft report in the fall 2018 (see Attachment A). The SHPO formally responded with comments in our February 1, 2019 letter which included a table of the SHPO's suggested APE distances based on the published findings of several Argonne Laboratory studies that were presented in the BLM-NSO's draft dated August 24, 2018 (see Attachment B). In general, the SHPO supported the proposal to incorporate suggested minimum distances for the establishment of an APE for certain undertakings that have a potential for visual effects. The SHPO noted, however, that further discussion would need to occur between the SHPO and the BLM-NSO. The BLM-NSO responded on both February 4 and February 8 of 2019 that they would be back in touch after reviewing the SHPO's letter and incorporating additional peer-review comments that they had requested from other federal agencies (See Attachments C and D).

Despite the above statements, no consultation between the BLM-NSO and the SHPO have taken place since February 2019. Instead, the BLM-NSO emailed the new IM and the September 23, 2020 report to the SHPO, the Advisory Council on Historic Preservation, and the National Park Service National Trails Office on November 2, 2020 with a statement that this new BLM Nevada Policy was finalized (See Attachment E).

Per the SHPO's above-mentioned conversation with the BLM-NSO on June 9, 2021, the BLM-NSO stated that although this is a policy document, it is not prescriptive. The BLM-NSO stated that future negotiation on this document could occur with the SHPO but requested to know at this time what the SHPO's concerns are with these documents.

As requested by the BLM-NSO, we are providing some of our concerns regarding the IM and the September 23, 2020 report below. We offer these comments in the spirit of cooperation and with the intent of assisting the agency to ensure that all consulting parties can understand the decisions based on the document. Please note, the SHPO believes this document could be, with additional edits and consultation, an essential tool for the federal agency to establish an adequate area of potential effect (APE) that incorporates all the visual effects of an undertaking.

1. The IM states that the final template Visual APE recommendations are based on the following three items: 1) previous research sponsored by Argonne National Laboratory, 2) BLM's own in-field research on previously constructed facilities in southern Nevada, and on 3) the mathematical principle known as the intercept theorem, or basic proportionality theorem (BPT).

   The SHPO discusses item 1 below in the next section.

   Regarding item 2, the SHPO notes that the photographs (figures 3-43) in the report are not keyed to any maps or aerial photos for the cold reader, and the photos are not annotated to explain what exactly the viewer is looking at in the landscape. In addition, other than the name and location of the facility, there is no written description or site plan illustrating the existing built-facilities in southern Nevada today (e.g. design (one transmission line, multiple transmission lines etc.), height, massing, ancillary structures, lighting etc.) The SHPO also asks if the public and consulting parties would understand the summary data presented in Figures 1 and 2.

   Regarding item 3, the SHPO asks how the public and consulting parties are to interpret and understand the BPT mathematical methodology. Will equations be explained step-by-step and clearly illustrated for every undertaking's administrative record? Or will equations and explanations be inserted into the September 23, 2020 report for every recommended visual APE distance?

   As public documents, the information contained in the IM and September 23, 2020 report needs to be accessible and understood by the public. Had the SHPO been afforded an opportunity to continue negotiations on this document, we would have recommended that

the federal agency prepare an accessible companion document that would be simplified for public consumption and that could be provided to all consulting parties via a link to the BLM website.

2. The BLM concluded that several visual effects studies conducted by Argonne National Laboratory (Argonne) support the BLM's decision to limit an initial APE to the area where the undertaking would strongly attract visual attention. The BLM's September 23, 2020 report states that "BLM Nevada's goal is to define a Section 106-relatable rating scale and correlate distances that do not simply 'catch the eye' of a casual observer. BLM Nevada's position is that simply "catching the eye" of a casual observer should not be used to define reasonable V-APE boundaries nor assume an adverse effect under the NHPA… Distances that correlate with Visibility Level 3 will generally not cause adverse effects and would there constitute an unreasonably large V-APE" The BLM continues with the following statement "Argonne's Visibility Levels 5 or 6, on the other hand, are those that dominate the viewshed, and therefore distances associated with these ratings are most likely to cause adverse effects under the NHPA". Based on this, the BLM has stated that their proposed visual APEs correlate with Argonne's Visibility Rating Level 5/6.

   Our review of the Argonne studies does not appear to support the federal agency's conclusions. In fact, the researchers recommended starting with a more reasonable distance where the project would be noticeable to casual observers as the baseline (see attached abstract [emphasis added by SHPO staff] in Attachment F). The SHPO's February 1, 2019 letter noted that this correlates to Argonne's Visibility Rating Level 3 which is defined by Argonne as "visible after brief glance in general direction of study subject and unlikely to be missed by casual observer".

   It should be noted that the SHPO was able to find numerous similar studies and policy documents (e.g., *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects* Natural Resource Report NPS/ARD/NRR—2014/836) where a similar "noticeable to the casual observer" standard was used as the baseline for establishing a reasonable distance for visual effects. Additionally, it should be noted that BLM state-level protocols from other states (e.g., Wyoming Appendix C *Guidance on The Assessment of Setting*) also employ a similar standard when evaluating visual effects to historic properties with aspects of integrity that could be affected by an undertaking. The Wyoming BLM Protocol requires an assessment of visual effects using the BLM's Visual Contrast Rating (VCR) system (as defined in BLM Manual 8431) to the setting of historic properties "when the undertaking will potentially be seen from the historic property" (Appendix C, page 1 of 6). The Wyoming BLM applies all four established contrast ratings: 1. "No Contrast" (project elements will not be seen) 2. "Weak Contrast" (elements will not attract the attention of the casual observer) 3. "Moderate Contrast" (begins to attract attention and begins to dominate the landscape) 4. "Strong Contrast" (cannot be overlooked and are dominant on the landscape).

The SHPO has previously requested examples of studies from the federal agency and the ACHP that support the establishment of a baseline for visual effects at the "dominate the viewshed" standard implemented by the Bureau of Land Management in the IM. To date, we have not received any study supporting this baseline.

While we support the recommendations made by the Argonne researchers that it is reasonable to begin a visual effects analysis at the Visibility Rating 3 level, it should be noted that a visual effects APE set at this distance would not necessarily translate into a need for the federal agency to conduct any additional field identification. With the exception of properties with traditional religious and cultural significance to Tribes, it is the opinion of SHPO's architectural historians with experience in evaluating visual effects of undertakings that historic properties with aspects of integrity that could be affected by visual intrusions from an undertaking should be readily identifiable in a brief search of historic maps and aerial photos. If resources are identified through this brief desktop effort, field verification and recordation would subsequently follow. The SHPO has previously agreed during the CRINA review process with this approach for identification efforts for above ground resources in the indirect APE for numerous Nevada BLM undertakings reviewed under the Protocol. Taking this broad approach for identification would not be inconsistent with the Section 106 regulations because this action is not connected to initially defining the APE.

3. The distances proposed in the IM are NTE or "Not-To-Exceed" distances. The distances are not standardized recommendations for establishing a minimum distance area where visual effects might occur. By creating these NTEs, the BLM appears to be actively discouraging a consideration of a broader APE, prior to any consultation with consulting parties.

   Beginning January 2021, the SHPO has received several BLM infrastructure projects for review and comment of the APE that utilize the IM. In some cases, the proposed APEs are much narrower than the NTE distances. No additional justification has been provided in these cases to explain how the decision was made to further reduce the NTE distances.

   The SHPO notes that the Advisory Council on Historic Preservation's March 5, 2021 letter regarding the IM and September 23, 2020 report stated that unique physical or environmental conditions within the vicinity of a given undertaking may prompt an expansion or reduction of the distances.

4. The IM employs a process that appears to take the Section 106 process out of order, thereby narrowing an APE prior to identification. Although somewhat limited in the IM, the BLM has begun to refer to the APE for infrastructure in the landscape as "Areas of Potential Adverse Effects." By narrowing the APE to those areas where the BLM believes adverse effects will occur (without identification, no consultation with consulting parties, or any known historic properties) and inserting unsubstantiated statements (such as that found in the September 23, 2020 document, no page number, [emphasis added by SHPO staff] in

Attachment G) that assume an element visible from an historic property will not adversely affect the aspects of integrity it might possess without a clear understanding of the eligibility and integrity of the resource, the BLM is narrowing the area of potential effects and taking the process out of order by inserting a finding of effect (for unknown properties with unknown aspects of integrity) prior to the identification stage. The BLM's methodology has the potential to create an APE that inadequately characterizes the effects of the undertaking. As a result, subsequent identification efforts might fail to adequately identify historic properties sensitive to visual effects (e.g. National Historic Trails and properties of religious and cultural significance to Tribes). The agency may not know at the onset of establishing an APE about historic properties' ability to convey significance and whether setting is a contributing aspect of integrity.

The SHPO does not agree that the APE should be defined based on whether historic properties will be adversely affected by an undertaking. The APE should be developed according to the nature and extent of all potential effects on historic properties, including physical, visual, auditory, atmospheric, and cumulative effects. Pursuant to the Section 106 regulations, an APE is defined first, followed by the identification and evaluation of historic properties, and afterwards a finding of effect.

To suggest that this is unreasonable is not consistent with other BLM state offices. The Wyoming BLM Protocol Appendix C considers all potential effects on historic properties which are determined after application of Standard Treatment Measure s/ Best Management Practices by using the BLM's Visual Contrast Ratings (VCR) system. As mentioned previously in this letter, the Wyoming BLM applies all four established contrast ratings to Section 106 projects and their findings of effects, ranging from "No Contrast" (proposed project elements will not be seen equates to a No Historic Properties Affected finding) to "Weak Contrast" (project elements can be seen but will not dominate the setting or attract the attention of the casual observer equates to a No Adverse Effect finding) to "Strong Contrast" (elements tend to dominant the setting equates to an Adverse Effect finding).

The SHPO notes that when our office asked the BLM-NSO about the Wyoming BLM Protocol Appendix C's approach, they indicated they would look into this, but did not follow up on this with the SHPO (see enclosed August 29, 2018 email).

The ACHP's March 5, 2021 letter stated that 36 CFR § 800.4(c)(1) acknowledges that Indian tribes "...possess special expertise in assessing the eligibility of historic properties that may possess religious and cultural significance to them," which reasonably extends to what aspects of historic integrity effects may be diminished by a subject undertaking, resulting in adverse effects. Federal agencies and agency officials do not possess this special expertise, and therefore may not be qualified to automatically exclude properties of cultural and religious importance of Indian tribes from the Section 106 consultation process, even if they fall outside of the standard visual APE. As recommended previously,

the ACHP encourages the BLM to consider such variances on a case-by-case basis through a consultative process.

While the ACHP appears to be focused on tribal consultation, the SHPO notes that this statement could also be applicable to all historic properties during consultation with the public and consulting parties.

5. The IM does not provide guidance on what is adequate documentation needed to provide to consulting parties to support the agency's initial discussion of visual effects. The SHPO is receiving submissions that do not contain adequate maps, photos, visual assessments, or visual simulations.

6. It would be helpful if all peer review comments would be shared with all parties mentioned on the acknowledgements page of the September 23, 2020 report. As the federal agency submitted this document to our office for review but did not include our comments and edits, we recommend that the SHPO be removed from the acknowledgements page. We wish to avoid confusing any member of the public who can find, read, and understand the document as to the nature of our contribution to the development of the current document.

To support the BLM-NSO's agreement that future negotiations on the IM and the September 23, 2020 report should occur, the SHPO has reached out to Nate Thomas, BLM's Acting Federal Preservation Officer and Bill Marzella of the ACHP to facilitate a discussion of the IM and the September 23, 2020 report. We look forward to negotiating a document that will serve to streamline the process of APE identification and review on the part of all consulting parties.

For the current undertaking, the BLM-NSO has defined the Visual Effects APE as a 3-mile buffer of the preferred transmission line route, for a total 6-mile-wide corridor (1,625,347 acres). The BLM-NSO states that the "Visual Effects APE boundary is based on the proposed Project description, local terrain characteristics, and past field research and mathematical principles detailed in Pay et al. (2020), "Defining a Visual Area of Potential Effects to Historic Properties on BLM Lands in Nevada.""

Beyond this single sentence containing a brief reference to Project description, terrain, and mathematical principles, the submission does not include any other information and does not adequately justify the decision made.

While the BLM-NSO's methodology may assist the agency to reach a sound visual effects APE for this undertaking, providing only a brief notation of the methodology used with no supporting narrative or visual documentation is not an adequately justified submission that consultation parties and the public are able to understand.

Therefore, the SHPO requires the following information from the BLM-NSO to aid in our understanding of the APE for this proposed undertaking:

1. The SHPO notes that the maps provided do not adequately or legibly display the APE in relation to the surrounding topographic and built environment. Please submit 1:24 k scale – 7.5' USGS topographic maps that display the APE. The SHPO anticipates that several maps will need to be generated to sufficiently display the entire APE.

2. Regarding the BLM-NSO's statement that the visual APE has been developed based on the Project description, the submitted documents do not describe the Project nor state if the transmission line will be below or above ground the length of the transmission line. Additionally, the submitted maps do not legibly display the location of the proposed transmission line, the proposed access roads, the proposed equipment layout, or proposed ancillary facilities such as substations. Please submit this information for the SHPO's review.

3. Regarding the BLM-NSO's statement that the visual APE has been developed based on the local terrain characteristics, please explain and illustrate how topography may affect this Project and the visual APE.

4. To aid the SHPO and the public in understanding the extent of the visual APE, please provide our office with photographs (keyed to a map) that are taken at various distances and different perspectives from the proposed Project. If the proposed Project will be visible from greater viewpoints, the SHPO recommends enlarging the visual APE to account for any potential visual effects the proposed Project may introduce. Additionally, the BLM-NSO may provide maps that display a GIS viewshed analysis with aerial imagery to enhance the SHPO and public understanding of the visual APE.

5. If a NEPA Visual Resource Assessment will be prepared, the SHPO requests that this information be forwarded to our office to support and justify the APE. It is our understanding that KOPs, existing conditions photos, and visual simulations of proposed installations are typically included in such assessments, so the public has a clear understanding of the topography and unique conditions of a proposed Project site. If this documentation will not be prepared for this undertaking, please let the SHPO know.

6. The SHPO notes that the BLM-NSO does not discuss potential auditory, atmospheric, or cumulative effects that the proposed Project may introduce.

Without photographs and adequate maps justifying and supporting the BLM-NSO's determination for potential visual effects, the SHPO is unable to evaluate if the visual APE will adequately account for all the potential effects that may result from this undertaking in keeping with 36 CFR § 800.4(a)(l) and 36 CFR § 800.16(d) and is reasonably broad enough to capture the full geographic extent of the undertaking's potential effects. The SHPO notes that the BLM-NSO also needs to provide discussion and justification regarding auditory, atmospheric, and cumulative effects for this undertaking.

Regarding visual effects, the BLM-NSO states that cultural resources within the visual effects APE that have the potential to be adversely affected will be subject to further analysis such as visual simulations to determine the precise nature of those effects. The SHPO notes that the APE should be established for all potential effects on historic properties prior to identification and evaluation efforts and making a finding of effect.

As Section 106 is a process law, the SHPO's review of this undertaking has stopped pending receipt of the required information requested above.

If you have any questions concerning this correspondence, please contact me at (775-684-3443) or by email at rlpalmer@shpo.nv.gov.

Sincerely,

Rebecca Lynn Palmer
State Historic Preservation Officer

cc. Reid Nelson, Advisory Council on Historic Preservation
Bill Marzella, Advisory Council on Historic Preservation

enc. Attachments A-G

SHPO letter to Mr. Jon K. Raby
June 18, 2021

Attachment A

Robin Reed

From: Pay, Nicholas <npay@blm.gov>
Sent: Tuesday, September 4, 2018 4:21 PM
To: Rebecca Palmer
Cc: Bryan Hockett; Robin Reed; Kristen Brown; Ashley Wiley; Jessica Axsom
Subject: Re: [EXTERNAL] RE: Indirect Effects Analysis
Attachments: image002.png; BLM_NV_2018_Indirect_Effects_Analysis_Report_2018-08-24.pdf

Rebecca,

Yes, I can be available for that discussion.

I would like to note that the first intent of the report is document the methodology, intent and results of this project. If this discussion is going to be as productive as possible, it would be very helpful if you and any of your staff participating in the discussion would read the report beforehand. One of my primary goals in reaching out to you and your staff, was to have some readers who haven't been working on this document with me review it and see if there are any holes that need filled. I have been so involved in this project for awhile now that I may just be reading my thoughts and not the actual words on the page.

With this in mind, I propose that we meet on September 21 from 1-4 for a short presentation on this project, our intent here at NSO and a discussion on the future of the use of the document. This would give you and your staff two and half weeks to read the document. It would also be good to get some of your high level review comments on things that should be discussed in more detail. If anyone has specific questions that come up as you read through the report I would welcome getting those prior to the presentation and I can make sure to answer them during that time!

As far as the implementation of the intent that we have here at NSO, that is open for discussion. There are a number of potential possibilities that each have pros and cons associated with them.

Thanks, I am looking forward to the feedback from your office.

NICHOLAS PAY | *ARCHAEOLOGIST*

NEVADA STATE OFFICE | RENO NV 89502 | 775.861-6470 (W)

BLM Nevada Cultural Resources Webpage

Absence of Evidence does not equal Evidence of Absence

On Tue, Sep 4, 2018 at 10:35 AM Rebecca Palmer <rlpalmer@shpo.nv.gov> wrote:

Nick,

The best approach for initiating our review of the Bureau of Land Management's proposal would be a presentation to my staff and a discussion about the intent of the document. Would you be available to present your findings to my staff in the next few weeks? In looking at the calendar, I see that the following dates appear to be available to staff, would you be available to present your methodology, intent, and implementation strategy here in Carson City:

September 18, in the afternoon

September 21, in the afternoon

September 25 between 9:30-4:00pm

September 28 between 9:30-4:00pm

I look forward to hearing from you.

Best Regards,

Rebecca Lynn Palmer

State Historic Preservation Officer

901 South Stewart Street, Suite 5004

Carson City NV 89701

(phone) 775.684.3443

From: Pay, Nicholas [mailto:npay@blm.gov]
Sent: Wednesday, August 29, 2018 12:05 PM
To: Rebecca Palmer
Cc: Bryan Hockett
Subject: Re: [EXTERNAL] RE: Indirect Effects Analysis

Rebecca,

After some discussion with Bryan, we are willing to take a reasonable amount of time to do what needs to be done to finalize this document. I would still like to get review comments by the end of September or mid-October. If it takes us longer to work through some issues to address comments that we receive in order to finalize the document then that's fine.

I have seen the Wyoming Protocol attachment that you suggested but I will look into it again and see if there is anything that stands out to me. If you have specific ideas of what should be incorporated please include those in your comments on the document. I have also spent a fair amount of time looking through other analysis that have occurred in the past few years to see what kinds of impacts have occurred or were anticipated. I did not cite all of those because it was more of just a basic review of the documents to see what the APE was set at. My goal while this draft is in its review stage is to look at some of those analyses documents a little closer and see what, if any, adverse effects, were identified.

We are attempting to get this report, its assumptions and the conclusions made in it reviewed as broadly as possible. One of those reviews is leveraging our partnership with your office by providing your staff with the opportunity to comment on this draft report.

As far as the processes that we have used to get to this point, we followed the documentation standards found in 36 CFR § 800. We have included all of the information necessary to help the reader track our thought processes for this project.

If your office disagrees with any assumptions or the findings of this report, please make note of those during your review, and provide your written comments to me. I am looking forward to having more discussions on this topic.

I would echo your comment that this effort on the front end will help us get to a much better place!

NICHOLAS PAY | *ARCHAEOLOGIST*

NEVADA STATE OFFICE | RENO NV 89502 | 775.861-6470 (W)

BLM Nevada Cultural Resources Webpage

Absence of Evidence does not equal Evidence of Absence

On Tue, Aug 28, 2018 at 11:59 AM Rebecca Palmer <rlpalmer@shpo.nv.gov> wrote:

Nick,

We have received your document and have a couple of questions that will help us to understand the Bureau of Land Management's creation and implementation process.

How did the Bureau of Land Management ensure that qualified professionals from all appropriate disciplines (architectural history, historical landscape architecture, and archaeology) assisted in the creation and/or review of this document since it is likely that Bureau of Land Management will want to employ its recommendations for undertakings in Nevada?

> While we want to assist in this effort to create a document useful for understanding and creating an APE that takes into account effects to the broadest range of resources currently known, my architectural historians do not have sufficient time to conduct the necessary field evaluations of the statements in the document for architectural resources and landscape architectural resources that must occur in the time to meet the deadline laid out for finalization.

Did the Bureau of Land Management hire an architectural historian or landscape architect or is this planned during review of the document?

> In recent years, it has been our experience that visual effects have been most frequently assessed for architectural and landscape architectural resources, and much less frequently for archaeological resources, so it is reasonable that the Bureau of Land Management would want to ensure that the creation and review of the document employed an appropriate balance between all three disciplines. This effort on the front end would go a long way to making this document as robust as possible for specific undertakings and to create a document that ensures the BLM addresses visual effects to the broadest range of resources possible. I do not know if the document attached to the Wyoming Protocol (appendix C) addressing effects to setting employed that approach or not, but it might be worth inquiring.

Best Regards,

Rebecca Lynn Palmer

State Historic Preservation Officer

901 South Stewart Street, Suite 5004

Carson City NV 89701

(phone) 775.684.3443

From: Pay, Nicholas [mailto:npay@blm.gov]
Sent: Monday, August 27, 2018 12:21 PM
To: Rebecca Palmer
Cc: Bryan Hockett
Subject: Indirect Effects Analysis

Rebecca and Bryan,

I just wanted to take this opportunity to provide you with my most recent draft of *Defining Areas of Potential Effect: Indirect Visual Effects to Historic Properties*.

I am providing this two you both because I know that there are discussions going on regarding the inclusion of recommendations for indirect effects APEs in the State Protocol Agreement. Keep in mind that this is still a draft report so I would welcome any discussion on it. This has been a fun project to work on and I look forward to finalizing it. My plan is to have it finalized and ready for inclusion in the BLM Nevada's Technical Report Series before the end of September.

I have attached a copy of the actual report to this e-mail however the supporting files that go with it are larger than I can email. Rebecca, what would be the easiest way to send you these supporting files?

NICHOLAS PAY | *ARCHAEOLOGIST*

NEVADA STATE OFFICE | RENO NV 89502 | 775.861-6470 (W)

BLM Nevada Cultural Resources Webpage

SHPO letter to Mr. Jon K. Raby
June 18, 2021

Attachment B

NEVADA
STATE HISTORIC PRESERVATION OFFICE

Department of Conservation and Natural Resources

Steve Sisolak, Governor
Bradley Crowell, Director
Rebecca L. Palmer, Administrator, SHPO

February 1, 2019

Dr. Bryan Hockett
Deputy Preservation Officer
Bureau of Land Management
Nevada State Office
1340 Financial Blvd.
Reno, NV 89502

RE: SHPO Review of Bureau of Land Management Minimum Distances for Establishing an Area of Potential Effects (APE) for Undertakings with Potential Visual Effects.

Dear Dr. Hockett:

The Nevada State Historic Preservation Office (SHPO) has reviewed the Bureau of Land Management's proposal to incorporate suggested minimum distances for the establishment of an APE for certain undertakings that have a potential for visual effects into the document titled *State Protocol Agreement between The Bureau of Land Management, Nevada and The Nevada State Historic Preservation Officer for Implementing the National Historic Preservation Act* (Protocol; Revised December 22, 2014).

The SHPO enthusiastically supports this effort and believes that by providing these mutually agreed minimum distance guidelines to the Bureau of Land Management and the public through the Protocol, the time and effort required to develop and justify an APE for certain undertakings will be reduced and more consistent between similar undertakings in similar landscapes.

After reviewing the Bureau of Land Management's draft document titled *Defining Areas of Potential Effect, Indirect Effects to Historic Properties* (Pay, 2018) and consistent with past Bureau of Land Management efforts to characterize visual effects to specific historic properties (NV IM-2004-004; 8100 (NV-930) P) and current guidance provided in other Bureau of Land Management Protocol documents (Wyoming State Protocol, Appendix C), the SHPO has attached an initial proposal for minimum distances for APEs that would address potential visual effects from specific undertakings.

Please note that the SHPO briefly contacted the author of the three Argonne Research Laboratory reports cited in Pay's bibliography for some clarification. A copy of our email discussion is attached for the BLM's information. Some further discussion regarding the identification of APEs will need to occur concerning the visual contrast and visibility factors outlined in the *2013 Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands*

and the 2014 National Park Service's *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects* as well as *The Secretary of the Interior's Standards for the Treatment of Historic Properties* in terms of scale, proportion, and massing.

The SHPO looks forward to a fruitful discussion about this proposal and the incorporation of mutually agreed distance guidance into the Protocol in the near future.

If you have any questions, please do not hesitate to contact me at 775.684.3443 or by email at rlpalmer@shpo.nv.gov.

Sincerely,

Rebecca Lynn Palmer
State Historic Preservation Officer

w/ attachments

These comments are in response to the proposed Table on Page 34 of Pay's report –

The table below is based on the three Argonne National Laboratory's (Argonne) research papers referenced in Pay's bibliography. Argonne recommends in all three papers that the "limit of visibility for casual observers be used as a minimum distance for visual impact assessments." This appears to translate to Argonne's Visibility Rating Level 3 (see Table 2 on page 17 of their transmission line report). Argonne indicates their 1-6 rating scale is based on the BLM's VRM system and Visual Contrast Ratings. Their Level 3 rating correlates to where potential indirect effects to historic resources may occur. Please note that Argonne indicated in their 11-27-2018 email they do have any data for the heights of the facilities in their examples. Argonne also does not appear to discuss design features (e.g. circuit types of the transmission lines - single vs. double may affect massing and proportion) in their reports and whether any of their examples might feature parallel facilities (e.g. 2 transmission lines running parallel).

Undertaking Type	**Argonne Recommended Minimum Distances for Visual Impact Assessments – Indirect APE**
230kv monopole tower electric transmission line	2.5 miles (see page 26)
230kv H-frame tower electric transmission line	3.5 miles (see page 26)
500kv monopole tower electric transmission line (note contradictory statements)	5 miles (page 1) 8 miles (see page 26)
500kv lattice tower electric transmission line	10 miles (see page 26)
Solar Energy Fields (Parabolic Trough)	"easily visible" at 14 miles (includes both day and night conditions)
Solar Energy Fields (PV facility)	"easily visible" at 22 miles (daytime conditions)
Wind Energy Fields (turbines 300-400 feet in height)	Suggested visual impact analysis radius due to movement of turbine blades: 30 miles during day – more for night due to lighting
Concentrated Solar Power Towers (5-20 MW)	"easily visible" at 20 miles

Please note that indirect effects may have the potential to extend beyond the direct effects APE for a "Vertical Structure less than 10 feet". Therefore, a site visit is recommended to determine visibility of the casual observer for those undertakings. As width and massing of new structures are unique to each undertaking and setting, a visual impact analysis could help define the APE and be based on "viewshed limiting factors" such as topography, vegetation, manmade structures, viewer height, target height, earth curvature, atmospheric refraction etc. (list of factors courtesy the Wyoming BLM's *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands 2013*).

Robin K. Reed

From: Sullivan, Robert G. [sullivan@anl.gov]
Sent: Wednesday, November 28, 2018 8:06 AM
To: Robin K. Reed
Cc: Rebecca Palmer
Subject: RE: electric transmission visibility study - heights of tower facilities ?

Hi Robin,

The 46-page report is all there is for this study.

I am happy to try to identify the line, but it may take a little while, because I no longer work in the office and will have to get someone else to take a look.

I do not think that Argonne will be doing similar work in the future. Right now, I am writing a book for BLM on protection of night skies and naturally dark environments. I am also revising a book I wrote on mitigation of visual impacts for renewable energy facilities. Very shortly, I will have a paper coming out on explaining the difference between visual impact assessment under Section 106 vs. NEPA.

If these publications are of interest to you, let me know. The books are a ways off, but the VIA paper should be out in the next month or so.

Robert Sullivan
Argonne National Laboratory
630-252-6182

From: Robin K. Reed <rreed@shpo.nv.gov>
Sent: Tuesday, November 27, 2018 7:15 PM
To: Sullivan, Robert G. <sullivan@anl.gov>
Cc: Rebecca Palmer <rlpalmer@shpo.nv.gov>
Subject: RE: electric transmission visibility study - heights of tower facilities ?

Robert:

Thank you for your email.

As our office only has a copy of the 46 page report, would it be possible to obtain a copy of the full report of this study?

Regarding the Southern Nevada 500kv facility listed in Table 1, would you let me know which company this line is associated with and any other details you may have including its length etc.? Is there a substation in North Las Vegas?

Will Argonne be conducting more studies similar to this one? We have also been reading your reports regarding visibility for solar energy facilities and wind turbines.

Our office appreciates your assistance and valuable research.

Robin K. Reed
Deputy State Historic Preservation Officer

Nevada State Historic Preservation Office
Nevada Department of Conservation and Natural Resources
901 S. Stewart Street, Suite 5004 | Carson City, NV 89701
775-684-3437 | rreed@shpo.nv.gov
shpo.nv.gov

Your opinion matters, take our second preservation plan survey **here**

From: Sullivan, Robert G. [mailto:sullivan@anl.gov]
Sent: Tuesday, November 27, 2018 10:10 AM
To: Robin K. Reed
Subject: RE: electric transmission visibility study - heights of tower facilities ?

Hi Robin,

I appreciate your interest in the transmission visibility study, and am glad you're finding it useful. Unfortunately, and can't be of too much help regarding tower heights. I am sure that that whoever constructed/maintains a particular line has that info somewhere, but it isn't available on the Web any place I could find, and as far as I know, it is not included even in the proprietary GIS data sets (e.g. Platts – just checked that with our GIS specialists). As far as I have been able to determine, there are no standard heights

It is definitely the case that tower heights and even types will vary within a line. All I can suggest is looking at the vehicles and people in the photos I included to use them as scale figures to approximate the height. Or look up the companies that own the lines mentioned and call them to see if they have and will share that information.

Sorry I can't be of more help.

Robert Sullivan
Argonne National Laboratory
630-252-6182

From: Robin K. Reed <rreed@shpo.nv.gov>
Sent: Wednesday, November 21, 2018 7:52 PM
To: Sullivan, Robert G. <sullivan@anl.gov>
Subject: electric transmission visibility study - heights of tower facilities ?

Mr. Sullivan:

Regarding your 2014 study of electric transmission visibility, would you let me know the heights of the various tower facilities that are mentioned?
http://visualimpact.anl.gov/transvctd/

Your studies are very very helpful for our office.

Looking forward to hearing from you,

Robin K. Reed
Deputy State Historic Preservation Officer
Nevada State Historic Preservation Office
Nevada Department of Conservation and Natural Resources

901 S. Stewart Street, Suite 5004 | Carson City, NV 89701
775-684-3437 | rreed@shpo.nv.gov
shpo.nv.gov

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SHPO letter to Mr. Jon K. Raby
June 18, 2021

Attachment C

Rebecca Palmer

From: Hockett, Bryan <b50hocke@blm.gov>
Sent: Monday, February 4, 2019 8:35 AM
To: Rebecca Palmer
Cc: npay@blm.gov; Robin Reed; Jessica Axsom; Kristen Brown; Ashley Wiley; Karyn de Dufour
Subject: Re: [EXTERNAL] Establishing an Area of Potential Effects (APE) for Undertakings with Potential Visual Effects.

Thanks Rebecca -

I really appreciate you taking the time to review and comment on the draft guidance report. Nick and I will look over your comments and discuss, and get back with you on a mutually agreeable time to talk further. In the short term, we are all trying to play catch up after the furlough, and getting highest priority work accomplished over the next two weeks in case there is another shut down.

In the interim, Nick and I have discussed whether it is best to include the final draft in the Protocol or more simply issue it as a BLM Nevada IB guidance document - not an instruction IM (e.g., thou shalt use the distances listed in the document),

On Fri, Feb 1, 2019 at 4:02 PM Rebecca Palmer <rlpalmer@shpo.nv.gov> wrote:

Good Afternoon Bryan,

I hope this email finds you well.

To prepare this letter we have reviewed a number of references and consulted with several knowledgeable individuals. I look forward to a fruitful discussion with the Bureau of Land Management that will result in a mutually acceptable solution to assist field staff in the identification of an area of potential effects.

There is a hard copy going out in the mail today.

Best Regards,

Rebecca Lynn Palmer

Administrator/State Historic Preservation Officer

Nevada State Historic Preservation Office

Department of Conservation and Natural Resources

901 South Stewart Street, Suite 5004

(O): 775-684-3443 I (F) 775-684-3442

rlpalmer@shpo.nv.gov

SHPO letter to Mr. Jon K. Raby
June 18, 2021

Attachment D

Rebecca Palmer

From: Hockett, Bryan <b50hocke@blm.gov>
Sent: Friday, February 8, 2019 9:25 AM
To: Rebecca Palmer
Subject: BLM Nevada's Indirect Effects APE Development Guidance

Rebecca -

I wanted to provide you with a quick update on our plans for the guidance document we are working on here at the Nevada State Office regarding the development of Indirect Effects APEs on BLM-managed lands in Nevada.

We have requested additional peer-review of the draft document that you recently commented on from a broad spectrum of federal agencies. We are particularly interested in receiving additional feedback on the following perspectives developed in our draft: (1) Argonne's VRM analysis was for visual contrast ratings under the VRM program, not for determining reasonable distances for analyzing potential adverse indirect effects under cultural resources laws/regulations; (2) however, Argonne's VRM research has value for putting together 'best management practices' guidance under the cultural program even though VRM contrast rating distances are not 1:1 correspondences to potential for adverse indirect effect under the cultural program; (3) comments on Nick Pay's empirical research on existing built infrastructure projects and correlating reasonable indirect effects APEs with this empirical research; and (4) the value of providing maximum distance parameters, rather than minimum distance parameters, in the development of indirect effect APE guidance.

To this end, the following individuals have agreed to read and comment on our draft document:

BLM's Federal Preservation Officer, Washington, D.C.
4 BLM Deputy Preservation Officers outside of Nevada
Deputy Keeper of the National Register, National Park Service
Architectural Historian, Fish & Wildlife Service
Chief Landscape Architect and VRM Lead, BLM, Washington Office
2 BLM field archaeologist

We think this will provide us with a broad spectrum of comments on the empirical approach to the development of reasonable indirect effect APEs on BLM Nevada lands. Once we receive back all comments, which we anticipate within 30-45 days, we will adjust the draft document based on all comments received, including NV SHPO's. Following that, we will send you an updated draft, and then I will reach out to you to schedule a face-to-face meeting to discuss this issue further with you.

Thanks again for taking the time to comment on the draft document.

Bryan Hockett
Deputy Preservation Officer
Bureau of Land Management
Nevada State Office

SHPO letter to Mr. Jon K. Raby
June 18, 2021

Attachment E

Robin Reed

From: Hockett, Bryan S <b50hocke@blm.gov>
Sent: Monday, November 2, 2020 2:40 PM
To: Bill Marzella; Rebecca Palmer; Robin Reed; Jensen, Jill L
Subject: Fw: Instruction Memorandum No NV-2021-006 BLM NV Template Visual Area of Potential Effect Policy
Attachments: IM No NV-2021-006.pdf; Visual Effects Analysis Report Sept 25 2020 Pay Hockett Whetstone (1).docx

Follow Up Flag: Follow up
Flag Status: Flagged

All -

Please find attached a new BLM Nevada Policy that assists BLM Nevada Managers on determining reasonable Visual APEs.

Bryan Hockett
Lead Archaeologist
Bureau of Land management
Nevada State Office

From: Vocelka, Cheryl (Cheri) J <cvocelka@blm.gov>
Sent: Monday, November 2, 2020 2:33 PM
To: BLM_NV_ALL_DM <BLM_NV_ALL_DM@blm.gov>; BLM_NV_ALL_FM <BLM_NV_ALL_FM@blm.gov>
Cc: Hockett, Bryan S <b50hocke@blm.gov>; Fennel, Marina L <mfennel@blm.gov>; Shepherd, Alan B <ashepher@blm.gov>; Swickard, Joan N <jswickard@blm.gov>; Davis, Kristianna <kristiannadavis@blm.gov>
Subject: Instruction Memorandum No NV-2021-006 BLM NV Template Visual Area of Potential Effect Policy

Attached is BLM Nevada IM No. NV-2021-006. This IM serves as the policy for meeting the reasonable and good faith standard in developing a Visual Areal of Potential Effect in consultation with SHPO, interested parties, tribes, and members of the public. If you have any questions, please contact Bryan Hockett at b50hocke@blm.gov.

Cheri

Cheri Vocelka
Executive Assistant
Bureau of Land Management
Nevada State Office
1340 Financial Boulevard
Reno, Nevada 89502

775-861-6590

SHPO letter to Mr. Jon K. Raby
June 18, 2021

Attachment F

ELECTRIC TRANSMISSION VISIBILITY AND VISUAL CONTRAST THRESHOLD DISTANCES IN WESTERN LANDSCAPES

Robert G. Sullivan, Jennifer M. Abplanalp, Sherry Lahti,
Kevin J. Beckman, Brian L. Cantwell, and Pamela Richmond[1,2]

ABSTRACT

The advent of large-scale renewable energy development in the western United States requires the construction of new high-voltage electric transmission facilities to transport electricity from renewable energy generation facilities to load centers. Electric transmission facilities may cause substantial visual impacts to high-value scenic resources. The visibility and potential visual contrasts associated with electric transmission facilities are dependent on complex interactions of a variety of visibility factors, but little systematic study of visibility in real landscape settings has been conducted. In a study sponsored by the U.S. Department of Interior's Bureau of Land Management, field observations of 11 transmission facilities in Idaho, Nevada, and California were made. Study objectives included identifying the maximum distances at which the facilities could be seen and assessing the effect of distance on the visual contrast associated with the facilities. Observed facilities included three 500 kV lattice tower facilities, two 500-kV monopole facilities, five 230-kV H-frame facilities, and one 230-kV monopole facility. A total of 232 observations from 123 study observation points were made in a variety of lighting and weather conditions during 14 days of observations. Skylined facilities with 500-kV lattice towers were visible to the unaided eye at a maximum distance of approximately 17 mi (27 km), and 500-kV lattice tower facilities were visible at or beyond 10 mi (16 km) in 16 observations. The 500-kV lattice tower facilities were judged to be noticeable to casual observers at distances of up to 10 mi (16 km). They also were judged to strongly attract visual attention at distances of up to 3 mi (5 km). The 500-kV monopole facilities were visible at distances up to 11 mi (18 km), with two observations beyond 10 mi (16 km). The facilities were judged to be noticeable to casual observers at 5 mi (8 km), and a major attractant of visual attention at 2.5 mi (4.0 km). Skylined 230-kV H-frame tower facilities were observed at distances up to 8 mi (13 km). Facilities with 230-kV H-frame towers were judged to be noticeable to casual observers at distances of up to 3.5 mi (5.6 km). They were judged to strongly attract visual attention at distances of up to 1.5 mi (2.4 km). The results of this study have important implications for determining appropriate distances from transmission facilities for visual impact assessments, and for the siting of transmission facilities to reduce visual impacts on visually sensitive lands. The authors recommend that the limit of visibility for casual

[1] *Affiliation of authors:* Robert G. Sullivan, Jennifer Abplanalp, Kevin Beckman, Brian Cantwell, and Pamela Richmond, Environmental Science Division, Argonne National Laboratory, Argonne, IL; Sherry Lahti, U.S. Bureau of Land Management.

Address correspondence to: Robert G. Sullivan, Cultural and Visual Resources Team Leader, Environmental Science Division, Argonne National Laboratory, 9700 South Cass Avenue, EVS/240, Argonne, IL 60439; (phone) 630-252-6182; (fax) 630-252-6090; (e-mail) Sullivan@anl.gov.

[2] Argonne National Laboratory's work was supported by the U.S. Department of the Interior Bureau of Land Management, under interagency agreement, through U.S. Department of Energy contract DEAC02-06CH11357.

observers be used as a minimum distance for visual impact assessments. The recommended minimum distance from the project for visual impact analysis for 500 kV lattice tower facilities is 10 mi (16 km), and a more conservative distance would be 12–13 mi (19–21 km). The recommended minimum distance for impact analysis for 230 kV H-frame tower facilities is 3.5 mi (5.6 km), and a more conservative distance would be 4–5 mi (6–8 km). Beyond the minimum distances specified, the facilities would not likely be noticed by casual viewers. Beyond the more conservative distances specified, the facilities would not likely be seen, except in unusual circumstances.

SHPO letter to Mr. Jon K. Raby
June 18, 2021

Attachment G

DEFINING A VISUAL AREA OF POTENTIAL EFFECTS TO HISTORIC PROPERTIES ON BLM LANDS IN NEVADA

PREPARED BY:

Nicholas B. Pay

Pahrump Field Manager, BLM Southern Nevada District Office

Bryan Hockett

Deputy Preservation Officer, BLM Nevada State Office

Tanner Whetstone

Archaeologist, BLM Nevada Winnemucca District Office

Nevada State Office

Bureau of Land Management

1340 Financial Blvd

Reno, NV 89502

9/23/2020

ASSESSING VISUAL EFFECTS

One of the difficulties in defining a V-APE comes from disagreements between consulting parties regarding the distance from a Historic Property at which structural additions to the landscape begin to diminish the visual integrity of a property's significant features. Most of the time these arguments are based on differences of experience in working with different types of projects, as well as the subjectivity and opinions of what constitutes an adverse visual addition to the landscape between individuals. These disagreements can therefore lead to "erring on the side of caution" and developing unreasonably large APEs for assessing visual effects.

The simple fact that an addition may be seen does not mean that it has the potential to cause adverse visual effects to Historic Properties. An adverse visual effect to a Historic Property would need to be acute to the point that a visual element introduced into the viewshed of the property diminishes the property's ability to convey its significance. In other words, if a property is eligible because the viewshed is a major contribution to its significance and an introduced element obstructed the view in such a way that the view's integrity was acutely compromised, that likely constitutes an adverse visual effect to a Historic Property.

VISIBILITY DOES NOT EQUAL ADVERSE EFFECT

What characteristics of a Historic Property are sensitive enough that a visual addition into the viewshed can diminish a property's ability to convey its significance? To answer this question BLM Nevada reviewed each of the 7 Aspects (or Qualities) of Integrity, and then evaluated the potential effects of a visual element introduced into the viewshed of a Historic Property. Table 1 reflects the results of this assessment.

Preserving America's Heritage

February 14, 2020

Bryan Hockett
Deputy Preservation Officer
Bureau of Land Management
Nevada State Office
1340 Financial Blvd.
Reno, NV 89502

REF: *Guidance for Historic Property Identification and Evaluation under the Section 106 Process, State of Nevada*

Dear Mr. Hockett:

On December 20, 2019, the Advisory Council on Historic Preservation (ACHP) hosted a teleconference with representatives from the Bureau of Land Management (BLM), Nevada State Office, and the Nevada State Historic Preservation Office (SHPO) to provide guidance concerning ongoing questions regarding federal agency responsibilities under Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and its implementing regulations, "Protection of Historic Properties" (36 C.F.R. Part 800). The ACHP initiated this meeting at the request of the Nevada SHPO, following earlier discussions and extensive email correspondence among ACHP, BLM, and SHPO staff, which also included a conference call with these parties and the National Park Service (NPS), National Register of Historic Places (NRHP) staff. This letter is intended to document discussion points raised during these meetings and provide clarification on questions raised by the BLM regarding its federal agency responsibilities under Section 106.

1) *In advance of the December meeting, the BLM raised questions regarding its responsibility to consider consulting party comments as it develops and delineates areas of potential effects (APEs). These included: "Are federal agencies required to inventory and assess eligibility and effect to resources that lie outside the established APEs if the undertaking has no potential to cause adverse effects outside of those APEs?" and "Are federal agencies required to establish APEs and levels of effort to identify historic properties multiple times throughout the Section 106 process?"*

The Section 106 implementing regulations *do not* require federal agencies to identify historic properties falling outside of a properly delineated APE, or evaluate potential effects an undertaking may have on them. However, these questions suggest that some consulting parties believe APEs are not being adequately sized and documented at the outset of a Section 106 consultation to consider the full range of potential effects on historic properties, as the regulations *do* require. The number of incidents where such disagreements occur within Nevada lead the ACHP to recommend that BLM reassess how it is delineating this geographical area and further consider whether it is reasonable to take a more expansive approach to defining them.

Under the regulations, the federal agency is responsible for determining and documenting the APE in consultation with the appropriate SHPO and/or Tribal Historic Preservation Officer (THPO) where tribal lands are involved. Although concurrence from a SHPO/THPO on an APE's boundaries *is not* required under the regulations, consideration of their feedback on this process *is* required. Therefore, finalizing an APE without consideration of such feedback is not consistent with the regulations and should be reevaluated and clearly documented in the administrative record for the undertaking's Section 106 review. The ACHP's online archaeology guidance (at https://www.achp.gov/Protecting-Historic-Properties/Section_106_Archaeology_Guidance) provides much more detailed guidance on these issues.

Once an APE has been adequately determined and documented, it should not remain static, but rather can be or should be adjusted as a federal agency further develops the details of the undertaking and learns more about potential historic properties and how they may be affected. Again, the input of consulting parties, including continued feedback from the SHPO/THPO, is crucial to this informed revision and refinement of the APE throughout Section 106 review. The ACHP recommends that the federal agency make this information available to the appropriate parties in advance of the identification effort, to allow for timely responses to inform the scope of any anticipated fieldwork.[1] In order to avoid multiple or duplicative identification efforts, the ACHP also recommends starting out with an APE that is reasonably broad enough to capture the full geographic extent of the undertaking's potential effects, and reassess it as more information is gathered.

To expedite this process and minimize future disputes regarding the adequacy of an APE's boundaries, the BLM may, in consultation with the SHPO, consider establishing standardized APEs for routine undertakings or classes of undertakings where the potential effects on historic properties may be reasonably certain. Such an approach could be consulted upon and agreed to through the State Protocol Agreement between the BLM and Nevada SHPO, which the ACHP understands is currently being amended. Alternately, if a federal agency feels it cannot meet these identification obligations before an undertaking must be approved due to time, budget, or other restrictions, the Section 106 process provides flexibility to phase identification efforts through the development and implementation of a memorandum of agreement or programmatic agreement.

2) *Regarding the identification effort, the BLM also asked: "Are federal agencies required to analyze all cultural resources under all 5 Property Types for every undertaking, regardless of size/scope of the undertaking, level of federal involvement and control over the resources involved, and potential to adversely affect historic properties?"*

The NRHP recognizes five types of historic properties: districts, sites, buildings, structures, and objects. During the December meeting, the BLM requested clarification on its requirements under law or regulation to evaluate all cultural resources under all five property types for every undertaking, versus what might be considered a best practice or standard approach. Strictly speaking, neither the NRHP nor Section 106 implementing regulations require an agency to assess properties under all five property types for every evaluation effort, but they do require an approach that considers guidance from other knowledgeable parties and past planning and studies, as described further below.

Once an APE is has been developed and the federal agency has reviewed existing information about the area and sought information from consulting parties regarding the any known potential historic properties and the undertaking's potential effect on them, if present, it then proceeds to the identification process and implements procedures to meet the "reasonable and good faith" standard as required by the regulations. A

[1] Conversely, the SHPO/THPO and other consulting parties must provide feedback in a timely manner to support responsible federal agency decision making. Consulting parties who do not provide feedback to agencies within a reasonable timeframe potentially forsake their ability to do so at a later date.

federal agency's identification effort can be considered reasonable in scope and carried out in good faith when, in consultation with the SHPO/THPO and others as appropriate, it has considered the factors specified in the Section 106 regulations at 36 CFR 800.4(b)(1) that are used to determine the level of effort it will make: the magnitude and nature of the undertaking, degree of federal involvement, nature and extent of potential effects on historic properties, and likely nature and location of historic properties within the APE (again, our online guidance discusses these factors in detail). Ultimately, it is up to the federal agency to consider and weigh these factors in developing an effective and reasonable approach to the identification of historic properties in Section 106 review.

In conducting its identification effort, federal agencies *are required* to consult with the SHPO/THPO to determine the scope of identification efforts, including the factors described above. Therefore, if the SHPO/THPO provides guidance or feedback as to the nature and potential of historic properties that may exist within a given area, the federal agency *is required* to consider this feedback in the development of its identification strategy. The federal agency *must also* acknowledge the special expertise of Indian tribes and Native Hawaiian organizations in assessing the eligibility of historic properties that may possess religious and cultural significance to them. The agency may ultimately not reach the same conclusion or eligibility determination as suggested by the SHPO/THPO, Indian tribes, and other consulting parties, but it nevertheless must clearly document its decision-making process, both relative to the findings of its investigations and the reasonable and good faith standards. Similarly, as described in 36 CFR 800.4(b)(1), the agency *must* "...take into account past planning, research and studies" to identify historic properties; accordingly, if previous studies have identified, for example, a preponderance of eligible properties within a geographic area falling within a certain property type, the agency *must* consider this evidence and factor it into its own evaluation effort. National Register Bulletin *How to Apply the National Register Criteria for Evaluation* provides additional guidance on how these categories should be considered and selected.

As stated during the December meeting, the ACHP regularly encourages federal agencies to seek the advice, guidance, and assistance of the ACHP in resolving disputes with other consulting parties on its level of effort to identify and evaluate historic properties [36 CFR § 800.2(b)(2)]. Because the ACHP established this standard, its views on what constitutes an appropriate level of effort to identify eligible historic properties deserve careful consideration in the Section 106 process. In the end, however, the ACHP's views are advisory and the federal agency makes the final decision regarding what level of identification is appropriate. Similarly, disputes regarding the eligibility of a historic property may be resolved by requesting a determination of eligibility from the Keeper of the NRHP pursuant to the process referenced in 36 CFR 800.4(c)(2) and described fully in 36 CFR 63. In such cases, determinations made by the Keeper are final and binding upon an agency and SHPO. The NPS has confirmed that such disputes can include a review of the appropriateness of the selected property type versus another.

3) *In advance of the meeting, the SHPO provided examples of correspondence from the BLM in which they refused to respond to technical or typographical errors in reports, characterizing such edits as "non-substantive" in nature and not "meet[ing] the intent of consultation."*

During the December call, the participants discussed the Section 106 case in question that led to the correspondence quoted above. In that case, the preparer of the materials had transposed data which resulted in the presence of historic properties within an APE being factually incorrect, as follows: "... SHPO states that there are discrepancies between the BLM transmittal letter and the report text. Specifically, the transmittal letter transposed the site numbers of those sites *inside* the report's Project Area with those sites *outside* of the Project Area" (emphasis added).[2] Characterizing such comments as "non-substantive," the same letter went on to conclude: "In the future, if the [BLM] does not receive

[2] Douglas W. Furtado, District Manager, Battle Mountain District Office to Rebecca L. Palmer, State Historic Preservation Officer, July 20, 2018.

substantive comments from the SHPO within the 35-day period specified, we will assume SHPO concurrence with any determinations requested by the BLM per Section III.A.2 [of the Nevada State Protocol Agreement]." The ACHP finds the spirit of this response troubling, as it both diminishes the expertise of the SHPO and subverts its consultative role in the Section 106 process. The ACHP acknowledges that such human-generated errors are perhaps unavoidable, especially in lengthy archaeological survey reports, and we encourage all parties to exercise flexibility in how such errors are addressed. We also observe that it is *not* a SHPO/THPO's responsibility to proofread federal agency reports.

During the meeting, the BLM acknowledged this approach as problematic and stated it is not a statewide policy. The meeting participants discussed possible strategies for addressing these comments in future, with a general consensus for the following approach. Any errors in submission documents prepared by the BLM—whether they are typographical or otherwise—that inhibit a SHPO/THPO or consulting party's ability to accurately interpret, and form conclusions from, the identification of historic properties or an undertaking's potential effects on them, should be considered substantive in nature and potentially meriting a request for correction or additional information from the BLM. Those that do not prohibit such an understanding can be noted for correction but should not inhibit a formal response from the SHPO to further the Section 106 process. Under no circumstances should a federal agency "assume concurrence" where a SHPO has indicated it needs additional information to draw a reasonable conclusion from the submission materials.

The ACHP recognizes that many SHPOs and THPOs continue to face rising workloads without significant new resources, so it urges federal agencies to work with them to ensure they have adequate time, and the proper documentation, to respond to agency requests to consult. The ACHP encourages the BLM to explore other ways they might assist SHPOs and THPOs in addressing heavy Section 106 review workloads by providing them assistance and flexibility where possible.

4) *The ACHP understands that the Nevada State Protocol Agreement is currently being amended, and we hope that this document can be a tool to reconcile these disputes and reach consensus on productive approaches moving forward.*

State-specific protocols between the BLM and SHPOs provide for the implementation of the BLM's National Programmatic Agreement on a state-by-state basis and establish how consultation will occur under this alternative approach to Section 106 compliance. The Nevada State Protocol Agreement deviates from the standard Section 106 process somewhat in that it requires SHPO concurrence at several decision points not required by the regulations. The BLM has indicated that it might consider utilizing the regulations versus the Protocol approach for individual undertakings on a case-by-case basis to circumvent these additional SHPO authorities and realize greater efficiencies in their reviews. Although the ACHP recognizes the BLM's authority to do so, we also share the SHPO's concerns that this approach diminishes the effectiveness and consistency of the Protocol by allowing BLM to utilize an ad hoc approach for when it may suit only its own interests and timelines. We stress the importance of the mutually beneficial efficiencies the Protocol provides as the foundation of the SHPO-BLM relationship. We also understand from the BLM that this ad hoc approach is being addressed in the ongoing Protocol amendment process. We look forward to continuing to be a participant in that process and ensuring the best possible vehicle for fostering this relationship.

Thank you for the opportunity to comment on these issues. As stated during the meeting and previously in this letter, the ACHP is available to provide assistance and guidance—both formally and informally—to the BLM, SHPO/THPO, and other consulting parties at each stage of the Section 106 process. If we may be of further assistance, or you would like to discuss this matter, please contact Bill Marzella, ACHP Liaison to the BLM, at (202) 517-0209, or via e-mail at bmarzella@achp.gov.

Sincerely,

Reid J. Nelson
Director
Office of Federal Agency Programs

cc: Rebecca L. Palmer, Nevada State Historic Preservation Officer