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

BLM

Ioneer Rhyolite Ridge LLC

Rhyolite Ridge Lithium-Boron Project Overview
For
Public Scoping

DOI-BLM-NV-B010-2021-0006-EIS

Preparing Office
Battle Mountain District
Tonopah Field Office
1553 South Main Street
Tonopah, Nevada 89049

December 2022

Table of Contents

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

ACEPM	Applicant Committed Environmental Protection Measure
ATV	All-Terrain Vehicle
BAPC	Bureau of Air Pollution Control

BLM	Bureau of Land Management
BMP	Best Management Practice
CA	Conservation Agreement
CFR	Code of Federal Regulations
EIS	Environmental Impact Statement
ESA	Endangered Species Act of 1973, as Amended
Ioneer	Ioneer Rhyolite Ridge LLC
MSHA	Mine Safety and Health Administration
NAC	Nevada Administrative Code
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NDEP	Nevada Division of Environmental Protection
NEPA	National Environmental Policy Act of 1969
NRS	Nevada Revised Statute
OPA	Operational Project Area
OSF	Overburden Storage Facility
Plan	Plan of Operations
Project	Rhyolite Ridge Lithium-Boron Project
SOSF	Spent Ore Storage Facility
SR	State Route
US	United States
USFWS	United States Fish and Wildlife Service

INTRODUCTION

Ioneer Rhyolite Ridge LLC (Ioneer) proposes to develop a new lithium and boron mine, the Rhyolite Ridge Lithium-Boron Project (Project), in Esmeralda County, Nevada. Lithium is one of the key components for systems used to store energy, foremost of which is for batteries in electric vehicles, utilities, computers, and cellular phones. Boron has a variety of uses, particularly as a critical additive to glass and ceramics to strengthen and prevent cracking, as well as for fiberglass insulation, permanent magnetics used in electric motors, and as a fertilizer to increase crop yields.

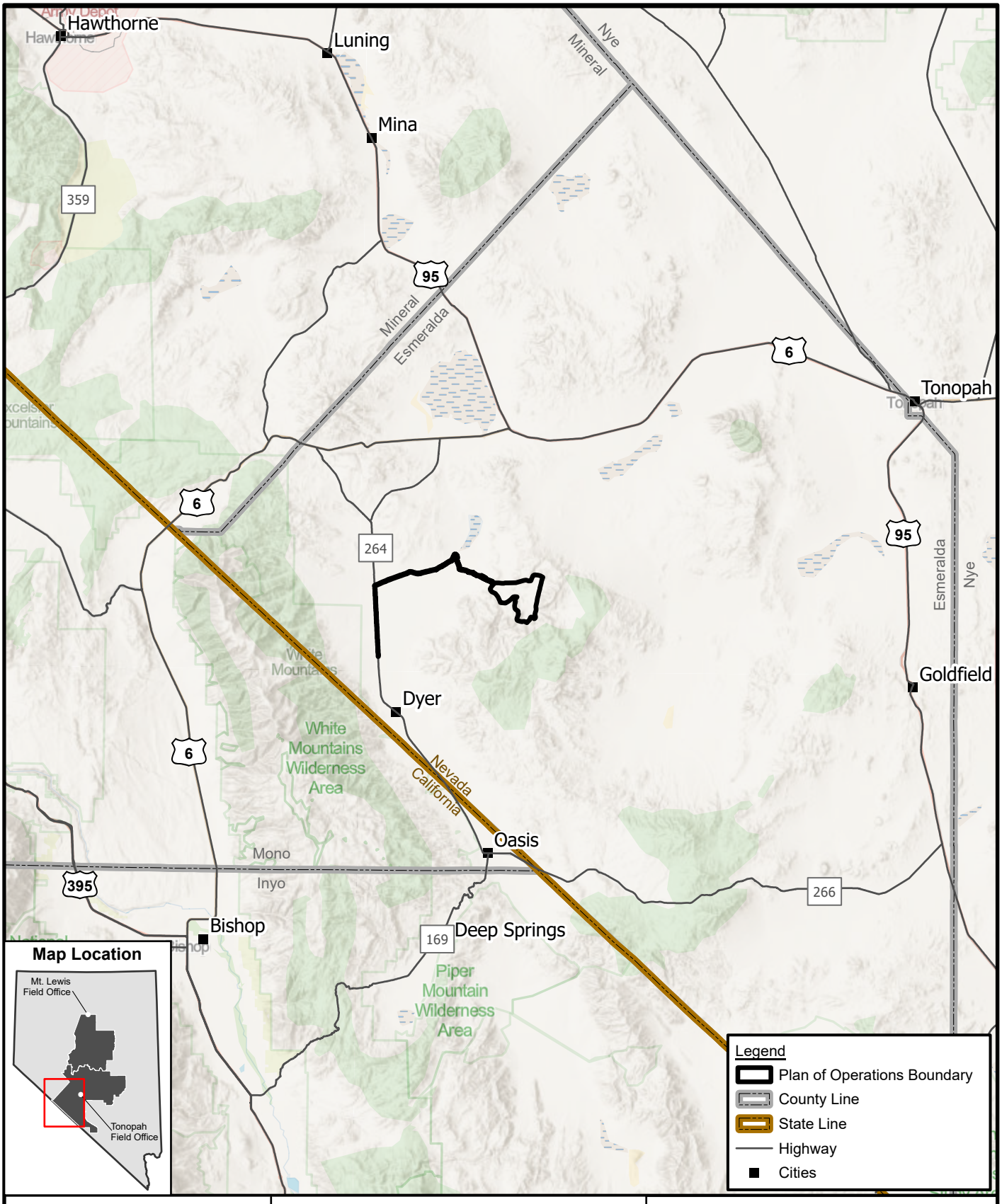
In May 2020, Ioneer submitted a Plan of Operations (Plan) (NVN-098058) and Nevada Reclamation Permit Application for the proposed Project to the Tonopah Field Office of the Battle Mountain District Bureau of Land Management (BLM). Following review by the BLM, revised Plans were submitted in July 2020, August 2020, November 2021, January 2022, and July 2022 (Ioneer 2022). The Plan was submitted to comply with Title 43 Code of Federal Regulations (CFR), subpart 3809 (43 CFR 3809.401 *et seq.*, as amended), State of Nevada regulations governing the reclamation of mined lands (Nevada Administrative Code [NAC] 519A.010-635), and BLM Instruction Memorandum No. NV-2011-004 – Guidance for Permitting 3809 Plans of Operation. The 43 CFR 3809 regulations require that the BLM fulfill its obligation under the National Environmental Policy Act of 1969 (NEPA) by analyzing and disclosing the potential environmental impacts of the Project. The revised Plan was accepted by the BLM in August 2022.

The Project is located approximately 40 air miles southwest of Tonopah and 13 air miles northeast of Dyer (**Figure 1**). The Operational Project Area (OPA) is situated on the west side of the central part of the Silver Peak Range, in a small basin in rolling foothills off the northeast side of Fish Lake Valley.

The proposed Plan boundary is 7,166 acres, which consists of the OPA and access road and infrastructure corridor (**Figure 2**). There are approximately 7,137 acres of land administered by the BLM and approximately 29 acres of private land within the Plan boundary. The access road consists of the existing Hot Ditch Road and Cave Springs Road between State Route (SR) 264 in Fish Lake Valley and the OPA. The infrastructure corridor is adjacent to SR 264 in the Fish Lake Valley. The OPA is located within the Mount Diablo Meridian in Esmeralda County, Nevada, as described in **Table 1**.

Table 1 Legal Description of the Plan Boundary

Township and Range	Sections or Portions of Sections
T1S R35E	13, 21 through 24, 28, and 33
T1S R36E	9, 10, 14 through 19, 23, and 24
T1S R37E	19 through 23, and 26 through 35
T2S R35E	4, 9, 16, 21, and 28
T2S 37E	2 through 4, and 9 through 11



Battle Mountain
BLM District
Tonopah Field Office

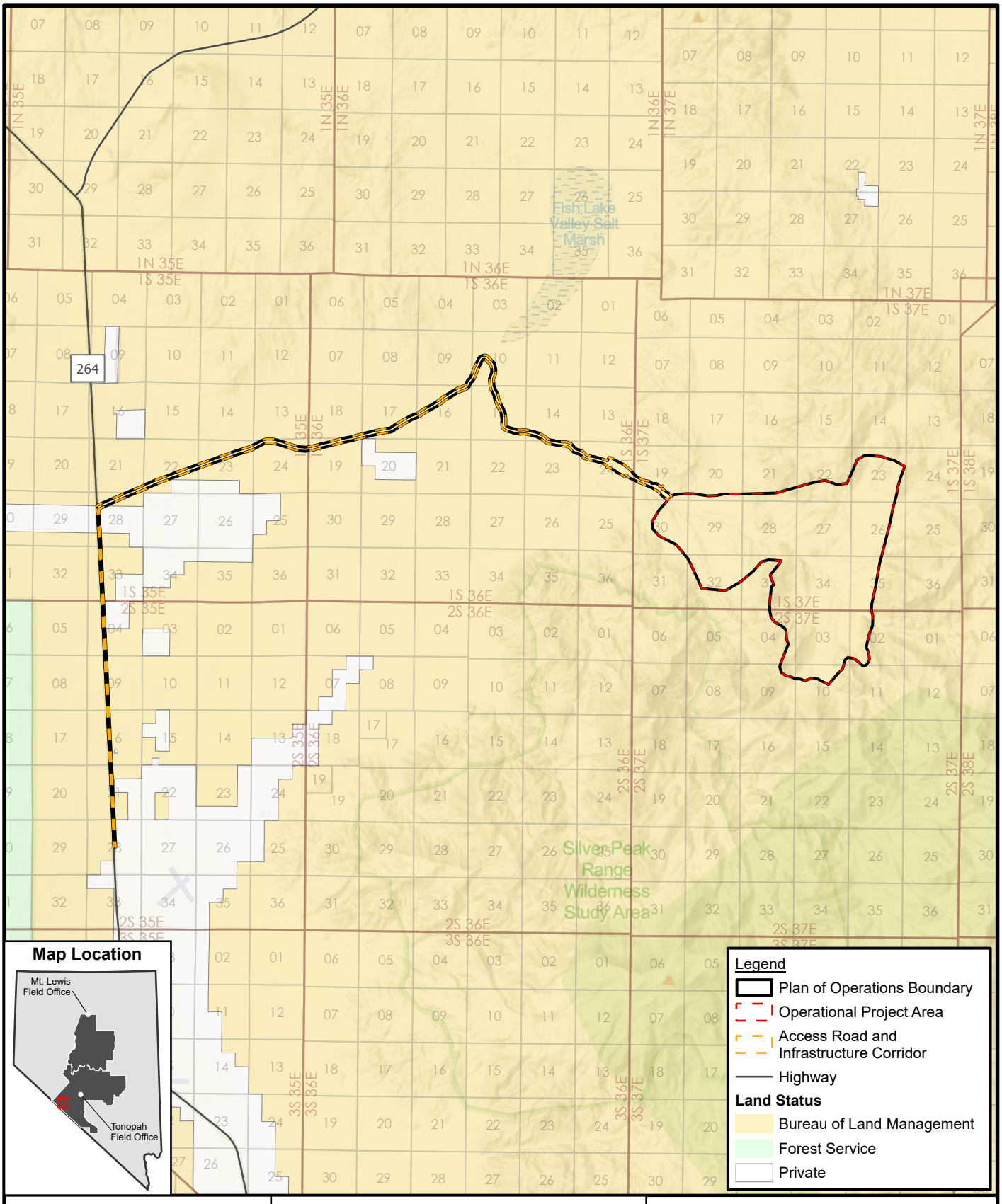
IONEER RHYOLITE RIDGE LLC
RHYOLITE RIDGE PROJECT

0 12 24 Miles
1 in = 12 miles
N

PROJECT LOCATION

FIGURE 1

2022-10-17



Battle Mountain BLM District
Tonopah Field Office

IONEER USA CORPORATION
RHYOLITE RIDGE LITHIUM-BORON PROJECT

PLAN OF OPERATIONS BOUNDARY

0 2.5 5 Miles

1 in = 2.5 miles

N

FIGURE 2

2022-12-15

HISTORY OF THE AREA

The main access routes to the OPA existed prior to January 1, 1981 and are maintained by Esmeralda County.

Several previous mineral exploration projects have been conducted in or near the OPA over previous decades. Exploration activities in the OPA include:

- Two historic adits are known to exist within the OPA; the history of these adits is unknown, but both are believed to date from approximately the 1890s.
- Stauffer Chemicals was reportedly the first company to drill boreholes in the Project vicinity, in 1962, at which time they also possibly dug and sampled several exploration trenches.
- US Borax drilled a total of 16 holes on the property between 1987 and 1992 and excavated and sampled numerous trenches. US Borax continued to hold the claim until sometime after 2000, at which time it was acquired by Gold Summit Corporation.
- In 2010-2011, after acquiring claims from Gold Summit Corporation, the JOGMEC-American Lithium joint venture re-sampled the existing trenches and drilled a total of 21 diamond core HQ-sized core holes (approximately 16,850 feet) and 15 reverse circulation mud rotary holes (approximately 12,000 feet) in the South Basin area, for a total of nearly 29,000 feet of drilling.
- In 2015, Boundary Peak Minerals acquired mineral rights to the OPA prior to its transfer to Paradigm Minerals Company in 2016.
- Global Geoscience/Paradigm Minerals Company (now Ioneer) drilled 28 RC holes (17,330 feet) and three diamond HQ-sized core holes (about 2,800 feet) in 2016 and 2017, for over 20,000 feet of drilling.

Areas disturbed by the current operator include:

- During 2018-2019, Ioneer commissioned additional infill and hydrogeological drilling to further define the mineral resource and characterize the groundwater systems, collecting and testing approximately 29,000 feet of additional core and installing three test wells, three monitoring wells, and 11 vibrating wire piezometers.
- Disturbance resulting from Ioneer's current exploration activity includes exploration access and drill pads associated with core drilling, well installation, and aquifer testing. These activities were acknowledged under Notices NVN-97202 and NVN-97262 which have since been relinquished. However, Ioneer remains responsible for this disturbance and there is bonding associated with this disturbance.

PURPOSE AND NEED FOR ACTION

The BLM's purpose is to respond to Ioneer's proposal as described in the Plan and to analyze the environmental effects associated with the proponent's Proposed Action and alternatives to the Proposed Action. The NEPA mandates that the BLM evaluate the effects of the Proposed Action and develop alternatives and mitigation, when necessary, to lessen any effects to environmental resources.

The BLM's need for the action is established by the BLM's responsibilities under Section 302 of the Federal Land Policy Management Act and the BLM Surface Management Regulations at 43 CFR 3809, to respond to a request for a Plan for the applicant to exercise their rights under the General Mining Law of 1872 and to prevent unnecessary or undue degradation of public lands as a result of the actions taken to prospect, explore, assess, develop, and process locatable minerals resources on public lands.

DECISION TO BE MADE

The BLM's decision relative to the Environmental Impact Statement (EIS) will consider the following: 1) approval of the Plan to authorize the proposed activities without modifications or additional mitigation measures; 2) approval of the Plan with additional mitigation measures that the BLM deems necessary to prevent unnecessary or undue degradation of public lands; 3) approval of the Plan with one of the alternatives analyzed in the EIS; or 4) denial of the Plan and associated activities if the BLM determines that the proposal does not comply with 43 CFR 3809 and 43 CFR 3715 regulations.

APPLICANT'S OBJECTIVE

Ioneer's purpose is to profitably extract lithium and boron from public lands where Ioneer holds mining claims. Ioneer's need is to meet the prevailing market demand for lithium and boron. The prevailing market demand is regularly adjusted by commodity exchanges throughout the world. This adjustment results from buyers and sellers agreeing on a specific transaction price, which reflects the current supply and demand for the commodity and other factors. A core mission of Ioneer is to develop a United States (US)-based source of lithium and boron that can be efficiently produced and delivered to customers globally. Lithium has been listed by the US Department of Interior as a critical mineral under the definition included in Executive Order 13817 (Federal Register, 83 FR 7065) and is needed to support technologies that would serve to combat climate change and reduce carbon emissions, particularly those associated with transportation and communication.

Lithium is one of the key components for systems used to store energy, most of which is for batteries in electric vehicles, utilities, computers, and cellular phones. Boron has a variety of uses, particularly as a critical additive to glass and ceramics to strengthen and prevent cracking, as well as for fiberglass insulation, permanent magnetics used in electric motors, and as a fertilizer to increase crop yields.

APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES AND PRACTICES

Ioneer has committed to the following applicant-committed environmental protection measures (ACEPMs) for the Proposed Action (Ioneer 2022) to ensure a safe and environmentally sound Project. These measures are outlined by resource or topic below.

Air Quality

Ioneer's products (lithium and boron) would be produced using an energy-neutral process with minimal carbon dioxide emissions from electricity that leverages innovative technologies, resulting in a plant with low emissions of greenhouse gases and minimal hazardous air pollutants. Air Quality operating permits would be obtained from NDEP BAPC prior to Project construction. Air quality protection would include control of stationary source emissions and fugitive dust control per BAPC regulations.

Appropriate emission control equipment would be installed at point (stationary) sources and operated in accordance with the construction and operating air permits. Where required, pollution control devices installed by equipment manufacturers would control combustion emissions. Pollution control equipment would be installed, operated, and maintained in good working order to minimize emissions.

Fugitive dust would be controlled on roadways and other areas of disturbance with water or NDEP/BLM-approved dust suppressants, where appropriate. Fugitive emissions at the crusher and material drop points would be minimized through application of water sprays or other dust control measures as per accepted industry practice and permit stipulation. Disturbed areas would be seeded with an interim seed mix developed in conjunction with the BLM to minimize fugitive dust emissions from exposed, unvegetated surfaces.

Ioneer would use best management practices (BMPs) to operate the ultra-low emission sulfuric acid plan (including low emissions for sulfur dioxide, nitrogen oxides, and sulfuric acid). These measures would include the use of Tier 4 equipment, controlling emissions of hazardous air pollutants, minimizing impacts to the ambient air quality, and ensuring compliance with applicable standards.

Cultural Resources

A Class III cultural resource survey was performed within and near the OPA. The types and locations of cultural resources within this area have been documented and would be avoided, where possible, during all phases of Project implementation. In the event impacts to potentially eligible cultural resources within the Project area are unavoidable, Ioneer would undertake actions in accordance with the applicable Programmatic Agreement or Memorandum of Agreement between the BLM, Nevada State Historic Preservation Office, and the Advisory Council on Historic Preservation. For those potentially eligible cultural resources that cannot be avoided by Project operations, Ioneer would work with the BLM to develop a treatment plan for data recovery, archaeological and architectural documentation, and report preparation that would be based on the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (NPS 1983).

If an unevaluated site cannot be avoided, additional information would be gathered and the site would be evaluated, as applicable. If the site does not meet eligibility criteria as defined by the *National Register Criteria for Evaluation* (NPS 1990), no further cultural work would be performed. If the site meets the eligibility criteria, it would be included in the above-mentioned treatment plan.

If previously unknown cultural resources (including, but not limited to human remains, funerary objects, or items of cultural patrimony) are encountered on BLM-administered land during Project construction or implementation, activities within 100 meters (330 feet) of a discovery would cease and the BLM Authorized Officer would be notified, in accordance with Section VI.B.1. 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* (BLM and SHPO 2014).

The location of the find would not be publicly disclosed, and the remains would be secured and preserved in place. Ioneer or its contractors would also immediately notify the Esmeralda County Sheriff of the discovery. Any discovered Native American human remains, funerary objects, or items of cultural patrimony found on federal land would be handled in accordance with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). Non-Native American human remains would be handled in accordance with Nevada state law. An evaluation of the resource would determine any subsequent actions to be taken. Project activities would not recommence in the isolated area until a Notice to Proceed is issued by the BLM.

Ioneer would inform all field personnel of their responsibilities to protect cultural resources and report inadvertent discoveries. This includes training employees and contractors not to engage in the illegal collection of historic and prehistoric materials, avoidance procedures and avoidance buffer zones to cultural resources, and off-road travel procedures. Ioneer would also inform all field personnel of various regulations and penalties in place to protect these resources, including the Archaeological Resources Protection Act of 1979 and NAGPRA (Public Law 101-601).

Ioneer would not knowingly disturb, alter, injure, or destroy any scientifically important paleontological deposits. In the event that previously undiscovered paleontological resources are encountered, work in the areas would cease and they would be left intact and brought to the attention of the BLM. If significant paleontological resources are encountered, avoidance, recordation, and/or data recovery may be required, as determined by the BLM.

Predicted indirect effects on cultural resources from blasting and equipment use were quantified as part of the Class III Cultural Resources evaluation to identify any potential resources that may be indirectly affected as a result of vibration caused by Project activities. In addition to avoiding areas that would be predicted to impact known cultural resources, Ioneer would perform vibration monitoring at cultural sites throughout Project activities (during construction and operations) in order to collect empirical data, verify predicted

effects, and ensure that valued cultural resources are preserved. Adaptive management strategies would be applied as needed to protect cultural resources.

Erosion and Sediment Control

Erosion and sediment control would be accomplished through the application of BMPs to limit erosion and reduce sediment from precipitation or snowmelt runoff. Surface water would be managed using surface stabilization measures, runoff and run-on control and conveyance systems, and sediment traps and barriers. These practices are detailed in the Project's Stormwater Management Plan (Ioneer 2022) (**Appendix C**).

Following construction, areas such as cut-and-fill embankments and growth media stockpiles would be seeded with an interim seed mix developed in conjunction with the BLM to stabilize material, reduce erosion and minimize the establishment of undesirable weeds, and sediment controls would be applied to limit wind and water erosion. Concurrent reclamation would be implemented, to the extent possible, to accelerate stabilization of disturbed areas. All sediment and erosion control measures would be inspected regularly, with any needed repairs performed or additional BMPs implemented.

Water Resources

The Project is located in the Fish Lake Valley Hydrographic Basin (10-117), which is considered endorheic and does not contribute to traditionally navigable waters. No permanent (perennial) streams are present in the OPA.

The Project's water needs would be derived first from groundwater wells located on site and then from existing wells in the Fish Lake Valley. In general, there are few domestic water users in the Fish Lake Valley, with agricultural operations currently holding the majority of groundwater rights within the basin. All necessary water rights have been secured or leased by Ioneer and would be transferred to the appropriate points of diversion and places of use. If impacts to surface water are observed and found to be related to Project activities, such impacts would be addressed.

Process components would be designed, constructed, and operated in accordance with NAC 445A. Water would be recycled to the maximum extent practicable to conserve water resources. Stormwater management would ensure that clean water and contact water are not intermingled. Stormwater monitoring would be completed according to the Stormwater Management Plan (Ioneer 2022) (**Appendix C**) to ensure that all surface water controls are stable and well maintained.

Geology and Minerals

A Quarry Lake Evaluation Report (Ioneer 2022) (**Appendix D**), Geochemical Characterization Report (Ioneer 2022) (**Appendix E**), and Overburden Management Plan (Ioneer 2022) (**Appendix F**) have been prepared in accordance with BLM and NDEP guidance, in addition to a Geology and Minerals Baseline Technical Report for the OPA and vicinity (NewFields 2019). The Geochemical Characterization Report describes the potential for acid rock drainage, metals and metalloids leaching, and salinity generation from overburden, ore, and process residual materials as well as the potential for mobilization of deleterious constituents.

The Quarry Lake Evaluation Report describes the anticipated geochemical and hydrogeological characteristics of a predicted post-closure quarry lake. The Overburden Management Plan includes recommendations, from an environmental geochemistry standpoint, for overburden handling, overburden placement, and Overburden Storage Facility (OSF) design. Objectives of the Overburden Management Plan include: minimizing leaching of metals and metalloids; minimizing sulfide oxidation and development of localized acidic conditions; limiting seepage through overburden materials; and facilitating closure of the OSFs.

Materials and Waste Management

The Project may result in the use and generation of hazardous and non-hazardous waste materials. The management of regulated solid and hazardous wastes that are not considered mine waste or associated with process components would be managed according to BMPs and requirements of regulatory permits. Efforts to find markets for other leached materials would continue during operations as a means to reduce waste quantities. Spill contingency and emergency response measures are included in the Emergency Response and Spill Contingency Plan (Appendix G of Ioneer 2022).

Hazardous Materials and Solid Waste

Hazardous materials would be transported, stored, and used in accordance with federal, state, and local regulations, including regulations identified in Standards Applicable to Generators of Hazardous Waste (40 CFR 262). Management of hazardous materials associated with the Project would comply with all inventory and reporting requirements. Management of hazardous materials associated with the Project would comply with all inventory and reporting requirements. Hazardous materials would be transported by certified carriers. Employees would be trained in the proper transportation, use, and disposal of hazardous materials.

Blasting components would be stored in silos at the explosives storage area away from other Project facilities and a minimum of 700 feet from Cave Springs Road in compliance with the Mine Safety and Health Administration (MSHA), state, and federal requirements. Boosters and detonators would be stored at a separate location nearby.

All liquid petroleum products and reagents used in the process would be stored within the Processing Facility in aboveground tanks within a secondary containment area capable of holding 110 percent of the volume of the largest vessel in a given containment area, as per NAC 445A.436.

Sanitary and Solid Waste Disposal

Employee training plans would address appropriate disposal practices, to include education on which wastes may be placed in a landfill, as well as management of regulated substances. Nonhazardous solid wastes would be disposed of off site in a licensed facility. Used solvent, liquids drained from aerosol cans, accumulations of mercury fluorescent lights, and used antifreeze may be regulated under Resource Conservation and Recovery Act and would be managed accordingly. Ioneer anticipates that the facility would fall in the “conditionally exempt small quantity generator” category. Domestic wastewater would be routed, treated, and disposed of appropriately.

Petroleum-Contaminated Soils

Petroleum-contaminated soils resulting from spills or leaks of hydrocarbons would be addressed immediately and removed from the spill site and stored in appropriate secondary containment areas in accordance with NDEP guidelines. Ioneer would excavate and transport any petroleum-contaminated soils to a licensed off-site disposal facility.

Growth Media Soil Salvage

Suitable growth media/cover material would be salvaged and stockpiled during Project development. Growth media stockpiles would be located such that they would not be disturbed by Project development. The surfaces of the stockpiles would be contoured with slopes at 3 Horizontal (H): 1 Vertical (V) to reduce erosion. To minimize wind and water erosion, growth media stockpiles would be seeded with an interim seed mix developed in conjunction with the BLM to stabilize material, reduce erosion and minimize the establishment of undesirable weeds. Surface water would be diverted around stockpiles as needed to prevent erosion from stormwater runoff. BMPs such as silt fences or staked weed-free straw bales would be applied as necessary to limit wind and water erosion.

Monitoring Plan

Baseline monitoring and characterization were completed at the onset of this Project. These findings would be utilized as a basis for assessing potential impacts to air, water, and biological resources that may result

from the Project. The Monitoring Plan (Ioneer 2022) (**Appendix H**) and other commitments (leak detection, fluid management, etc.) to be included in the Water Pollution Control Permit would serve as a basis for monitoring activities. These plans may be updated as the Project progresses to accommodate changes in conditions and ensure ongoing protection of the environmental integrity of resources on site.

Tiehm's Buckwheat

The US Fish and Wildlife Service, Reno Fish and Wildlife Office (USFWS) received a petition to list Tiehm's buckwheat (*Eriogonum tiehmii*) under the Endangered Species Act of 1973, as amended (ESA) as an endangered or threatened species and to concurrently designate critical habitat on October 7, 2019. On June 4, 2021, the USFWS announced its 12-month finding on a petition to list Tiehm's buckwheat as an endangered or threatened species under the ESA. The USFWS determined, after a review of data that they stated was the best available scientific and commercial information then available to them, that the petitioned action to list Tiehm's buckwheat, a plant species native to Nevada in the US, was warranted. On October 7, 2021, the USFWS issued a proposed rule (RIN 1018-BF94) to list Tiehm's buckwheat as endangered under the ESA. In addition, on February 3, 2022 the USFWS issued a proposed rule for Tiehm's buckwheat critical habitat, which encompasses a 500-meter area around the subpopulations.

The Nevada Division of Forestry received a petition to add Tiehm's buckwheat to the State list of fully protected species of native flora in NAC 527.010, also on October 7, 2019. The Nevada Division of Forestry is currently in the process of reviewing the species for listing under their state regulations. Eight subpopulations of Tiehm's buckwheat were mapped and extensively studied within the OPA. None of Ioneer's exploration activities have disturbed any of these subpopulations. Extensive surveys have been performed both within and outside of the OPA. The total number of plants was estimated to be approximately 44,000 in 2019. Many plants were killed or damaged by herbivores in 2020. The most recent population estimate by EMS in May 2021 was 24,174 plants . Collectively, the subpopulations occupy approximately 10 acres (Ioneer 2022).

Ioneer has been engaged with the BLM and the USFWS regarding the protection of Tiehm's buckwheat and measures to ensure the long-term viability of the species. As a result of these discussions a draft Conservation Agreement (CA) was developed and a number of the measures in the CA have been used in the development of the Tiehm's Buckwheat Protection Plan (Ioneer 2022) (**Appendix I**). Information regarding the plant and the means Ioneer would protect the plant, include: establishing disturbance buffers around the subpopulations; installing fencing around known populations as soon as a continuous Project related presence is on site; implementing a propagation and transplant program for plants at new locations; and constructing growth media area on the reclaimed OSF that reflects the geochemical and physical characteristics of the occupied Tiehm's buckwheat habitat. Specifics of these measures are provided in the Tiehm's Buckwheat Protection Plan, which has been developed by Ioneer to conserve and expand the species (Ioneer 2022) (**Appendix I**). The size and shape of the buffer areas were developed based on the specific topographic characteristics at each subpopulation and designed to avoid direct effects to the subpopulations from the Project. It should be noted that these ACEPMs for Tiehm's buckwheat are designed to only address potential threats to the species for Project related activities. Protection measures to address potential threats to the species that are not related to Project activities are being addressed in the ongoing discussions regarding the CA. In addition, all activities, including mining, have been designed to avoid any surface disturbance within the Buckwheat Exclusion Area, and thus the subpopulations. The Buckwheat Exclusion Area would be fenced and the distance of the fence from the subpopulation would vary from 13 to 127 feet.

Noxious Weeds and Invasive Non-native Species

Ioneer has developed a Noxious and Invasive Weed Management Plan (Ioneer 2022, Appendix J) for the Project. Prevention, detection, containment, and removal would be priority strategies for weed control. Weeds on site would be physically removed or treated with approved herbicides by certified applicators. Weed treatment activities within the Tiehm's buckwheat avoidance area and the subpopulations would be limited. Monitoring would include creation of an occurrence and treatment database including geographic locations of sites. The results from annual monitoring and treatment would be reported to the BLM and shall serve as the basis for updating the plan and developing ongoing annual treatment programs.

Wildlife and Avian Protection

Ioneer is committed to protecting wildlife and avian species and their supporting habitat as much as possible. The following conservation measures would be implemented by Ioneer to reduce or preclude risks to raptors, birds, bats, grazing animals, and other species that may interact with Project activities or facilities.

Land-clearing or other surface disturbance associated with the Project would be conducted outside of the avian breeding season, whenever feasible, to avoid potential destruction of active nests or young birds in the area. When surface disturbance must occur during the avian breeding season (March 1 through July 31), a BLM-qualified biologist would survey the area prior to land clearing activities in accordance with current BLM protocols. Survey results would be submitted to BLM before surface disturbance occurs.

Avian, bat, and eagle protection measures would be developed as required.

The open adit adjacent to the Project haul road would be fenced to exclude public access and may be closed in coordination with NDOW and BLM.

The Processing Plant Area, the Quarry, Explosive Storage Area, and contact water ponds would be fenced to specifications outlined in the BLM Handbook 1741-1, as applicable. All fences would include double swing gates to allow for human access. Ioneer would also coordinate with NDOW on fencing specifications. Avian and wildlife protection measures would be in compliance with Industrial Artificial Pond Permit measures.

Primary pond liners would consist of 80-mil high density polyethylene single-sided textured geomembrane with the textured side up to facilitate wildlife egress.

Operators would be trained to monitor the OPA for the presence of larger wildlife such as deer, antelope, and sheep. Mortality information would be collected and reported, as necessary.

Ioneer would establish wildlife protection policies that prohibit feeding or harassment of wildlife within the OPA boundary.

Following Project construction, areas of disturbed land no longer required for operations would be reclaimed as required by the BLM to promote the reestablishment of native plant and wildlife habitat.

Public Safety and Accessibility

Public safety would be maintained throughout the life of the Project by excluding unauthorized access to sensitive Project facilities through installation of fencing and security features (including cameras and personnel) as well as installation of traffic-control measures. The latter would include establishment of speed limits (to be strictly enforced) for Project-related traffic on public and haul roads, installation of a rail-road type crossing guard (plus stop signs) at the intersection of the haul road and Cave Springs Road near the Processing Plant, and installation of stop signs at the intersection of Cave Springs Road and the service road to the Explosives Storage Area from the Quarry area (Ioneer 2022) (**Appendix K**). These measures would also provide for continued accessibility of the public to and through the OPA. All equipment and facilities associated with the Project would be maintained in a safe and orderly manner as another measure to provide for the safety of the public. In addition, all activities would be conducted in conformance with applicable federal and state health and safety requirements; site visitors would be properly instructed in site safety procedures prior to admittance.

Transportation and Access

Ioneer's Transportation and Access Plan (Ioneer 2022) (**Appendix K**) outlines safe procedures and mandatory practices for Project-related personnel travel and material transport to and from the Project. The plan includes a description of how safe public access would continue to be accommodated through the Plan boundary, in coordination with Esmeralda County and other existing road users. In addition, Ioneer realizes that certain road engineering upgrades and maintenance activities must be implemented in order to safely accommodate the increased traffic that would result from proposed Project activities. Accordingly,

an Access Road Improvement and Maintenance Plan (Ioneer 2022) (**Appendix L**) has been produced. Together, the Transportation and Access Plan (Ioneer 2022) (**Appendix K**) and the Access Road Improvement and Maintenance Plan (Ioneer 2022) (**Appendix L**) outline the various commitments Ioneer has made related to road improvement, management, and maintenance.

Visual Resources and Night Skies

A Visual Resources Technical Report was prepared to characterize existing conditions associated with visual aspects in and around the Project area (NewFields 2022). Ioneer would seek to minimize the visual impact of activities and structures to viewers along publicly accessible roadways, public use areas, and within the Wilderness Study Area in consideration of guidance included in Appendix 3 of BLM's Visual Resource Contrast Rating Manual 8431 (BLM 1986). Dark sky lighting best practices would also minimize the effects of lighting on wildlife that may be present in the area, including bats. Several examples of measures Ioneer intends to implement include:

- Careful placement and blending of stored materials to minimize contrast;
- Selection of building sites and new roads such that they would be hidden from view behind topographical features, where possible; and
- Consultation with BLM on choice of colors of machinery, fencing, and powerlines; lighting design and color; and design, color, and surface texture treatments for the Processing Plant structures.

To minimize the effects from lighting, Ioneer would utilize hooded stationary lights and lighting plants. Lighting would be directed onto the pertinent site only and away from adjacent areas not in use, with safety and proper lighting of the active work areas being a priority.

Fire Protection and Emergency Response

The Emergency Response and Spill Contingency Plan (Ioneer 2022) (**Appendix G**) details procedures for responding to emergency incidents including fire, accidents, and spills. Fire protection equipment would be secured and a fire protection plan would be established for the Project in accordance with National Fire Codes for Fire Protection and State Fire Marshal. The Project would operate in conformance with all applicable MSHA and Occupational Safety and Health Administration safety regulations (30 CFR 1-199).

Smoking would only be permitted in designated areas that are free of flammable materials and only if allowed by state law or federal regulations. Ioneer would immediately contact the appropriate dispatch or coordination center in the event of a fire and report all wildland fires to BLM and other relevant agencies.

Project vehicles would be equipped with radios and/or cellular telephones for fire preparedness and prevention, suppression operations, and emergency response purposes. Crew vehicles and equipment would also be supplied with an emergency communication list that would include emergency contact information for administering agencies.

RECLAMATION

Reclamation of disturbed areas resulting from activities outlined in the Plan would be completed in accordance with the BLM and NDEP regulations. The purpose of Title 43 CFR Part 3800 Subpart 3809 – Surface Management is to prevent unnecessary or undue degradation of public lands by activities authorized under the mining laws. This subpart establishes procedures and standards to ensure that operators and mining claimants meet this responsibility and provide for the maximum possible coordination with appropriate state agencies to avoid duplication and to ensure that operators prevent unnecessary or undue degradation. In addition, the State of Nevada requires that a reclamation plan be developed and approved for new mining projects and for expansions of existing operations (Nevada Revised Statute [NRS] and NAC 519A). The sections below provide a description of closure and reclamation activities for the Project.

The Project schedule includes approximately four years of construction, a concurrent 17 years of operation, a period of closure to be determined based on site conditions, and a minimum of six years (total) of phased reclamation (including three years prior to revegetation release of the main facilities, followed by three years of regrading and revegetation of the sediment ponds and diversion channels) after Project facilities are closed, or until the reclamation of the site or component has been accepted by both the BLM and NDEP. Additional environmental monitoring (including the quarry lake) is expected to extend beyond the date of revegetation release, as guided by final closure plans.

During the life of the Project, concurrent and interim reclamation would be completed whenever possible and would occur as soon as possible after disturbance activities are complete. Concurrent reclamation of some facilities, such as the OSFs, would be ongoing until the final configuration is achieved. Reclamation of the OSFs would be started in Year 1 of operations when final build-out is expected to be completed on a portion of the facility. Closure of the spent ore storage facility (SOSF) would commence in the 17th year of operations. Closure and reclamation of the processing facility and ancillary facilities would begin around the same time, after the completion of processing and leaching.

Suitable growth media would be required to reclaim the Operational Area in support of concurrent reclamation activities and at closure. Salvageable growth media from construction and stripping activities would be stockpiled at central locations for this purpose, such that the native material is readily accessible and would not be disturbed by ongoing operations. Additional growth media would be stripped from within the quarry footprint during operations, as needed to meet reclamation requirements. All reclaimed surfaces would be revegetated with a BLM approved seed mix.

All reclaimed surfaces would be revegetated to control runoff, reduce erosion, provide forage for wildlife and livestock, and reduce visual impacts. On slopes that are less than 33 percent, the seedbed would be prepared along the contour, utilizing a chisel-plow, disc, harrow, or other appropriate equipment to break up the surface. On slopes that are steeper than 33 percent (and not benched), too narrow to operate equipment, or where organic debris has been re-spread, the surface would be left in a roughened condition to help retain seed. Seedbed preparation and seeding would take place when possible in the fall after regrading reclaimed areas. Broadcast seeding would be completed using conventional methods utilizing broadcast drop seeders or comparable equipment, manually operated cyclone-type bucket spreaders, or a mechanical seed blower. Seed would be mixed frequently in the seed boxes to discourage settling. Where possible and practical, broadcast-seeded areas would be chained or harrowed to cover the seed. Where slope conditions allow, broadcast-seeded areas may be dozer-tracked perpendicular to the slope. On small or inaccessible sites, hand raking may be used to cover seed.

Closure activities would be conducted to standards required by the State of Nevada (NAC 445A.433) and NRS 519A. While final reclamation and closure of each of each primary Project component would be based on location, contact with the ore body, and function, general regrading and reshaping activities would include the following:

- A recontouring plan that provides for resistance to erosion, geotechnical stability, and a naturally appearing landform. The quarry, SOSF, and OSFs would become permanent landforms and hence would change the appearance of the area. To accommodate the reconfiguration of the land, closure activities would allow for a configuration that mimics the pre-Project condition to reduce visual impacts, to the extent possible.

- Facilities would be covered with native materials that are capable of generating unimpacted runoff or storing water during the colder times of the year and removing it through evaporation and evapotranspiration during the warmer months.

- Upstream drainages would be diverted away from reclaimed facilities to prevent potential erosion, where practicable.

All buildings, concrete slabs and footers, and other ancillary features would be buried or removed from the Processing Facility. Temporary ore stockpiles would be depleted and the underlying areas disposed of.

Waste would be disposed of properly, and confirmation testing would occur, as necessary. The contact water pond would be drained and regraded. Disturbed areas would be regraded and revegetated.

A safety berm would remain in place around the perimeter of the quarry and warning signs would be constructed prior to decommissioning of the quarry fence at the end of operations. A single quarry access point would remain to allow for periodic quarry lake monitoring, with a gate installed to restrict access and prevent public entry. An overland all-terrain vehicle (ATV) trail from the public road to the quarry would remain for monitoring of water in the quarry by Project personnel as long as is required. The ATV trail to the quarry would be bermed and signed for safety and to prevent public access. A diversion feature would continue to re-direct stormwater run-on from upgradient of the quarry into natural drainages, to the extent practical. Stormwater diversions would be designed to withstand a 500-year, 24-hour storm event. This would promote long-term stability of the quarry by controlling run-on into these areas.

During final mine closure, all buildings, tanks, communication towers, and materials would be decommissioned and removed from the Operational Area, with the exception of Communication Tower 3 which would remain to continue to provide cellular service to the area should a new owner be identified. Concrete footers and slabs would be broken in-place and buried by a minimum of three feet of growth media. Areas will be regraded to blend into the surrounding area and revegetated.

Four of the five communication towers would be decommissioned, disassembled, and removed completely from site. All parts would be recycled or reused to the extent practicable. Communication Tower 3 would remain in place to continue to provide cellular service to the area. Ownership of this tower would be transferred completely to a major cellular service provider after Project closure.

All reagents, chemicals, and fuel would be completely removed and disposed of appropriately, in accordance with their specific handling procedures and disposal requirements. Chemical storage containers would also be cleaned/neutralized properly, per their specific characteristics, during decommissioning.

Prior to closure, sulfuric acid holding tanks would be depleted to the extent possible and would therefore not be filled to maximum capacity at the time of closure. Any remaining acid would be put into appropriate containers, transported by approved carriers, and re-sold in the sulfuric acid market for reuse or recycling. Acid tanks would be neutralized and cleaned during the decommissioning process.

Benign waste materials would be shipped off site by an approved solid waste transport vendor and hazardous wastes would be taken to an appropriate off-site, licensed hazardous waste facility. Buried water/septic lines and/or other piping would be disconnected, capped, and left in place. If implemented, the septic system would be decommissioned and reclaimed in accordance with WTS-20 (NDEP 2017). All traffic control devices would be removed from the site and any disturbed land would be regraded and revegetated, as necessary.

Facilities that would remain following reclamation include the following:

- Access to the quarry, quarry berm, associated quarry lake, SOSF, and OSF;
- Quarry and associated Quarry Lake;
- Communication Tower 3 (if ownership is transferred completely to a major cellular service provider after Project completion) and unmaintained overland ATV trails to access Communication Tower 3;
- Cave Springs Road Wash Berm;
- Cave Springs Road including the Realignment;
- Argentite Canyon Road Realignment; and
- Stormwater controls.

Existing unmaintained and county-maintained roads would also remain, including the realigned portion of the county-maintained public road. As determined appropriate by the BLM and Esmeralda County, any roads on public lands suitable for or providing public access consistent with pre-operational conditions would not be reclaimed at Project closure.

PROPOSED ACTION

Ioneer is proposing to construct, operate, and close a new lithium-boron mine in the Silver Peak Range in Esmeralda County, Nevada. The life of the Project is approximately 23 years, and includes the construction phase of approximately four years (Years 1 through 4), the mining phase of approximately 17 years (Years 1 through 17), the processing phase of 13 years (Years 4 through 17), and the reclamation and closure phase of 6 years (Years 18 through 23). Monitoring would continue, as necessary. Project facilities include the following:

- Quarry;
- Processing Facility;
- OSF;
- SOSF;
- Contact Water Ponds;
- Haul Road, Service Roads, and Dewatering Pipeline;
- Stockpiles;
- Explosives Storage Area;
- Sewage System;
- Public Road Realignment;
- Communication Towers and ATV Trails;
- Proposed Monitoring Locations and Access;
- Proposed Water Supply Testing and Facilities; and
- Resource Exploration Drilling and Dewatering Wells.

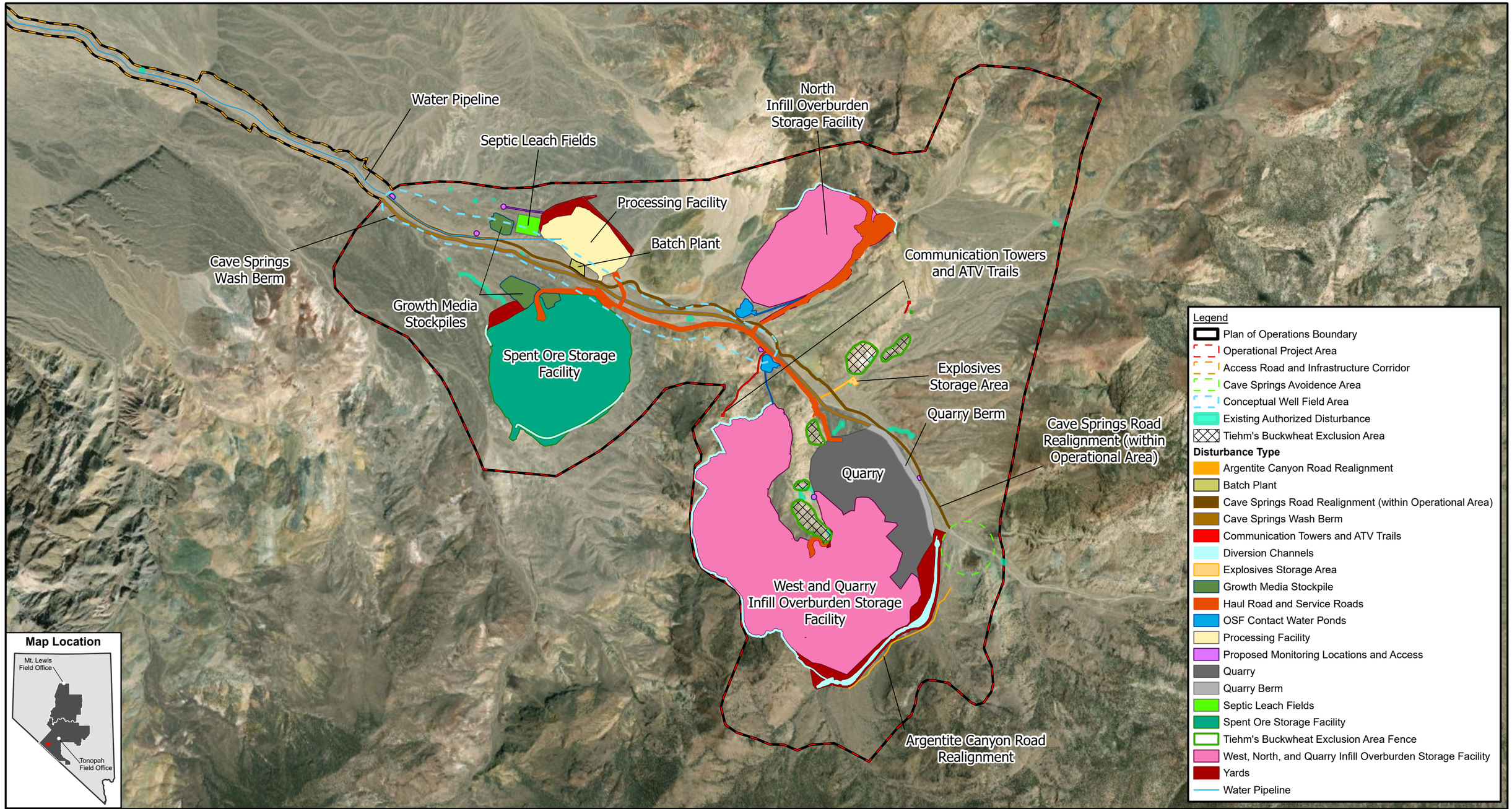
The Proposed Action would create an additional 2,299 acres of surface disturbance on public land administered by the BLM and private land. Approximately 35 acres of exploration would occur anywhere within the OPA, 30 acres of disturbance could occur anywhere within the conceptual wellfield area for dewatering facilities, 20 acres of disturbance could occur anywhere within the Plan boundary. In addition, approximately three acres of existing authorized exploration-related disturbance would be included as part of the Proposed Action. Therefore, the total surface disturbance associated with the Proposed Action would be 2,302 acres.

The location of Project components are illustrated on **Figure 3**, and proposed surface disturbance by facility type is provided in **Table 2**.

Table 2 Proposed Surface Disturbance

Project Component	Area (acres)[1]	Comments
Quarry[2]	201.5	Includes fence and water storage tanks.
Quarry Berm	19.1	200-foot wide berm between the Quarry and the wash.
Processing Facility	82.6	Includes contact water pond, minimum 20-foot disturbance buffer, and diversion channels.
West, North, and Quarry Infill OSFs	947.3	Includes contact water pond, minimum 20-foot disturbance buffer, and diversion channels.
SOSF	373.9	Includes underdrain pond, minimum 20-foot disturbance buffer, and diversion channels.
Ponds	11.9	The North and West OSFs contact water ponds, drainage, and access.
Haul Road and Service Roads	101.7	Includes all haul roads and service roads with 20-foot disturbance buffer.
Stockpiles	30.0	Includes growth media stockpiles with minimum 20-foot disturbance buffer.
Explosives Storage Area	2.6	Explosive storage and area access road including 20-foot disturbance buffer.
Septic Leach Fields	10.0	Includes primary and reserve leach field for septic sewage management (if selected as preferred alternative).
Communication Towers and ATV Trails[3]	3.0	Includes Towers 3 and 4, and 40-foot-wide disturbance buffer for access to monitoring locations.
Proposed Monitoring Locations and Access	3.8	Includes 5 proposed monitoring wells (0.5 acres each) and associated 40-foot-wide access routes.
Project Area Exploration	35	Includes phased exploration activities (access routes, drill sites with sumps)
Water Supply Facilities	20	Includes access routes, wells, power and pipelines.
Dewatering Facilities	30	Includes access routes, drill sites with sumps, wells, power and pipelines.
Cave Springs Road Realignment (within OPA)[4]	46.8	Existing alignment: includes 28-foot width plus 60-foot disturbance buffer for 24,691 feet.
Argentite Canyon road realignment	1.6	Includes a 15-foot wide road for the 4,789 feet.
Buckwheat Exclusion Area and Critical Habitat Fence	4.6	Assumes a 30-foot disturbance width for the 13,569 linear feet of fencing.
Yards	80.8	General surface disturbance that does not require grading.
Fencing	0.0	All fencing is located on other facility footprints, so 0.0 acres of disturbance assumed. Also, assumed 18,427 linear feet of fencing for reclamation bond calculation purposed.
Cave Springs Wash Berm	37.1	Assumes a 100-foot disturbance width for the 17,747 linear feet of berm.
Diversion Ditches	60.0	Assumes a 60-foot disturbance width for the 34,618 linear feet of ditches.
Access Road and Infrastructure (within the Access Road and Infrastructure Corridor Area)	192.7	Maximum of 100 feet wide along the access road for 67,531 feet and 50 feet wide along SR 264 for 32,842 feet.
Batch Plant	3.2	To be constructed and used during the construction phase.
Proposed Action Disturbance	2,299.2	**--**
Existing Disturbance	3	**Existing Disturbance not within the Proposed Action footprint.**
Total Project Disturbance	2,302	**Including Proposed Action and Existing Disturbance**

[1] All areas include a minimum 20-foot buffer around the feature unless otherwise specified.
[2] The Quarry's full area will be 473.7 acres; however, 272.2 acres above the quarry rim will be occupied by the Quarry Infill OSF. Thus, leaving 201.5 acres of the Quarry remaining at the end of the mine life.
[3] Towers 1, 2, and 5 are included within the surface disturbance footprint of other facilities.
[4] Includes existing and realigned segments within Operational Area only. Access Road is included as a separate line item.



Battle Mountain
BLM District
Tonopah Field Office

IONEER USA CORPORATION
RHYOLITE RIDGE LITHIUM-BORON PROJECT

0 3,000 6,000 Feet

1 in = 3,000 feet

N

PROPOSED ACTION PROJECT FACILITIES

FIGURE 3

2022-12-15

The area at the quarry would be dewatered during mining. When mining is complete and operational dewatering ceases, the groundwater system would recover, and a terminal quarry lake is predicted to remain. Three existing test wells would be converted to dewatering wells, and an additional network of dewatering wells is also anticipated to be installed adjacent to or near the quarry. Activities associated with dewatering would include access routes, drill sites with sumps, dewatering wells, pipelines, and powerlines or generators. Water derived from dewatering wells and sumps at the quarry would be stored in one or more tanks around the quarry perimeter. Dewatering water would be pumped from the storage tank(s) into water trucks and used for dust suppression within the quarry or on other Project roads. Water derived from dewatering wells in the periphery of the quarry would be supplemented with water from on-site water supply wells for the first seven years of operations. From years seven to 20, water from existing wells would continue to be used, and a new pump station would be used. The new pump station would be located on private land in the Fish Lake Valley and within the Access Road and Infrastructure Corridor, and water would be pumped to the OPA via a pipeline adjacent to SR 264 and the access road to the processing facility. Ioneer has acquired all necessary water rights, for which the points of use and/or diversion will be transferred to the appropriate locations within the Plan boundary.

The Cave Springs Road (aka Cave Springs Road-Coyote Summit) portion of the access road is a public road currently maintained by Esmeralda County that bisects the OPA. Approximately 4.7 miles of Cave Springs Road would be realigned to provide safe public access through the OPA, as well as create separation of Project components from public use (**Figure 3**). A road improvement, management, and maintenance agreement between Ioneer and Esmeralda County would be implemented prior to the construction of the Project. Additionally, approximately 0.9 miles of the Argentite Canyon Road would be realigned around proposed Project features.

Power during the construction phase of the Project would be supplied by diesel-powered generators, which would meet approved emissions guidelines and permit requirements. Once construction is complete, Ioneer intends to generate its own power for the Project with a steam turbine generator at the sulfuric acid plant. Heat and steam created as a byproduct at the sulfuric acid plant would generate power for operations. The power plant would contain a steam turbine generator, a water-cooled condenser, condenser transfer pumps, condensate booster pumps, steam bypass stations, and a let-down station. A backup diesel generator and diesel boiler would be used to power the steam turbine's mechanical parts in the event of power failure.

Personnel requirements for the approximately two-year construction period would be expected to range between approximately 400 and 500 workers, including both Ioneer staff and contracted personnel. Currently, approximately six 10-hour construction shifts are anticipated per week. Up to approximately 350 workers would be required during the operational phase of the Project, staggered in shifts. Personnel would include a mix of skilled workers plus several management staff. Operation is scheduled to be continuous, 365 days per year, 24 hours per day. In addition, a limited number of contractors would be on site to complete specified activities, such as exploration and water well drilling, and other tasks.

REFERENCES

Bureau of Land Management (BLM). 1986. Manual H-8431 – Visual Resource Contrast Rating Manual.

Bureau of Land Management Nevada (BLM) and Nevada State Historic Preservation Office (SHPO). 2014. State Protocol Agreement between the Bureau of Land Management, Nevada and the Nevada State Historic Preservation Officer for Implementing the National Historic Preservation Act. Revised December 22, 2014. Available online at: https://www.blm.gov/sites/blm.gov/files/NV%20Protocol.pdf

Ioneer Rhyolite Ridge LLC. 2022. Mine Plan of Operations/Nevada Reclamation Permit Application, Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada. RR30-0006-00-EN-REP-00018 REV 6. May 2020, Revised July 2020, August 2020, November 2021, January 2022, and July 2022.

National Park Service (NPS). 1983. Archaeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines. 48 Federal Register 44716. September 29, 1983. Amended.

National Park Service (NPS). 1990. National Register Bulletin. Technical Information on the National Register of Historic Places: Survey, Evaluation, Registration, and Preservation of Cultural Resources; How to Apply the National Register Criteria for Evaluation. Revised 1991, 1995, and 1997.

Nevada Division of Environmental Protection (NDEP). 2017. Facility Abandonment Closure Plans WTS-20. Nevada Division of Environmental Protection Bureau of Water Pollution Control. Revised May 2017.

NewFields Companies LLC. 2019. Geology and Minerals Resource Baseline Technical Report. Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada. Prepared for Ioneer USA Corporation. Document No. RR30-0006-00-EN-REP-00002 Rev 3. December 2019.

NewFields Companies LLC. 2020. Visual Resources Technical Report. Rhyolite Ridge Lithium-Boron Project, Esmeralda County, Nevada. Prepared for Ioneer USA Corporation. Document No. RR30-0006-00-EN-REP-00007. January 2020.