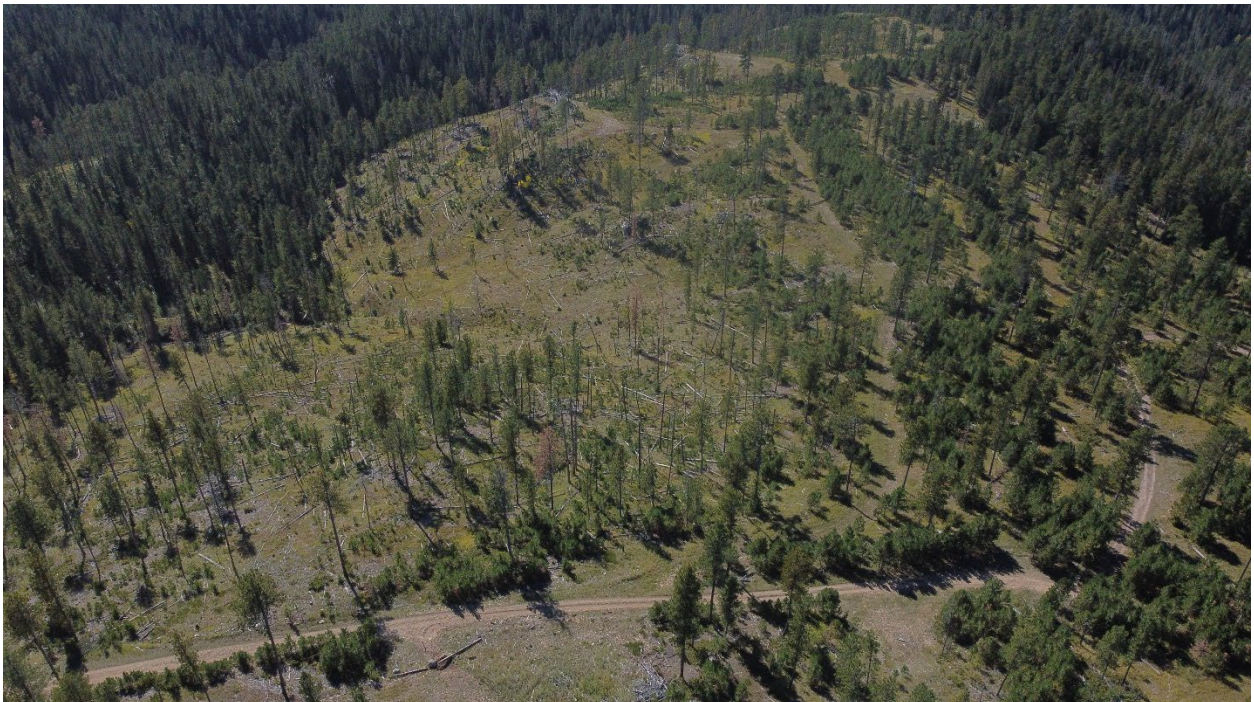


Plan of Operations for Mineral Exploration Activities for National Forest System Lands

**Ponderosa Project,
Northern Hills Ranger
District Black Hills National
Forest
Lawrence County, South Dakota**



Submitted by: Walt Hunt COO 12/13/22
Signature Title Date

Received by: _____
Signature Title Date

I. GENERAL INFORMATION

A. Name of Mine/Project:

Ponderosa Project

B. Type of Operation:

Lode, Exploration

C. Is this a New Operation or Existing Operation:

New Operation

D. Proposed start-up date of operation:

April 2024

E. Expected total duration of this operation:

Up to Four Years following Start-Up Date.

F. If seasonal, expected date of annual reclamation/stabilization close out:

December 15, depending on road conditions.

G. Expected date for completion of all required reclamation:

December 15 after closure of field operations.

II. PRINCIPALS

A. Name, address, and phone number of Operator:

Solitario Zinc Corp. (herein referred to as Solitario or Operator)
Attn: Mr. Todd Christensen
2916 4th Ave., Ste. 100
Spearfish, S.D. 57783
(605) 269 1776

And:

Mr. Walter Hunt
4251 Kipling Street, Suite 390
Wheat Ridge, Colorado 80033
(303) 534-1030

B. Name, address, and phone number of Authorized Field Representative (if other than the Operator):

Mr. Todd Christensen
Project Manager

Solitario Zinc Corp.
3018 10th Avenue
Spearfish, South Dakota 57783
(605) 269-1776

Authorization of field representative to act on behalf of operator is attached.

C. Name, address, and phone number of owners of the claims (if different than the operator):

Not Applicable

D. Name, address, and phone number of other lessees, assigns, agents, etc., and briefly describe their involvement with the operation, if applicable:

Not Applicable

III. PROPERTY OR AREA

The Ponderosa Project comprises 227 unpatented lode claims located in the Northern Black Hills Ranger District of the Black Hills National Forest (BHNF) in Lawrence County, South Dakota. The project area is located in Townships 3 and 4 North, Range 2 East of the Black Hills Meridian. The unpatented claims are listed in Appendix 1.

IV. DESCRIPTION OF THE OPERATION

A. Access.

Figure 1 shows the location of the Ponderosa Project area in Lawrence County South Dakota in relation to existing access roads to the mineral exploration prospect areas where work is proposed. Principal highways are depicted; more detailed Forest Service and other access roads and trails, follow in more comprehensive figures.

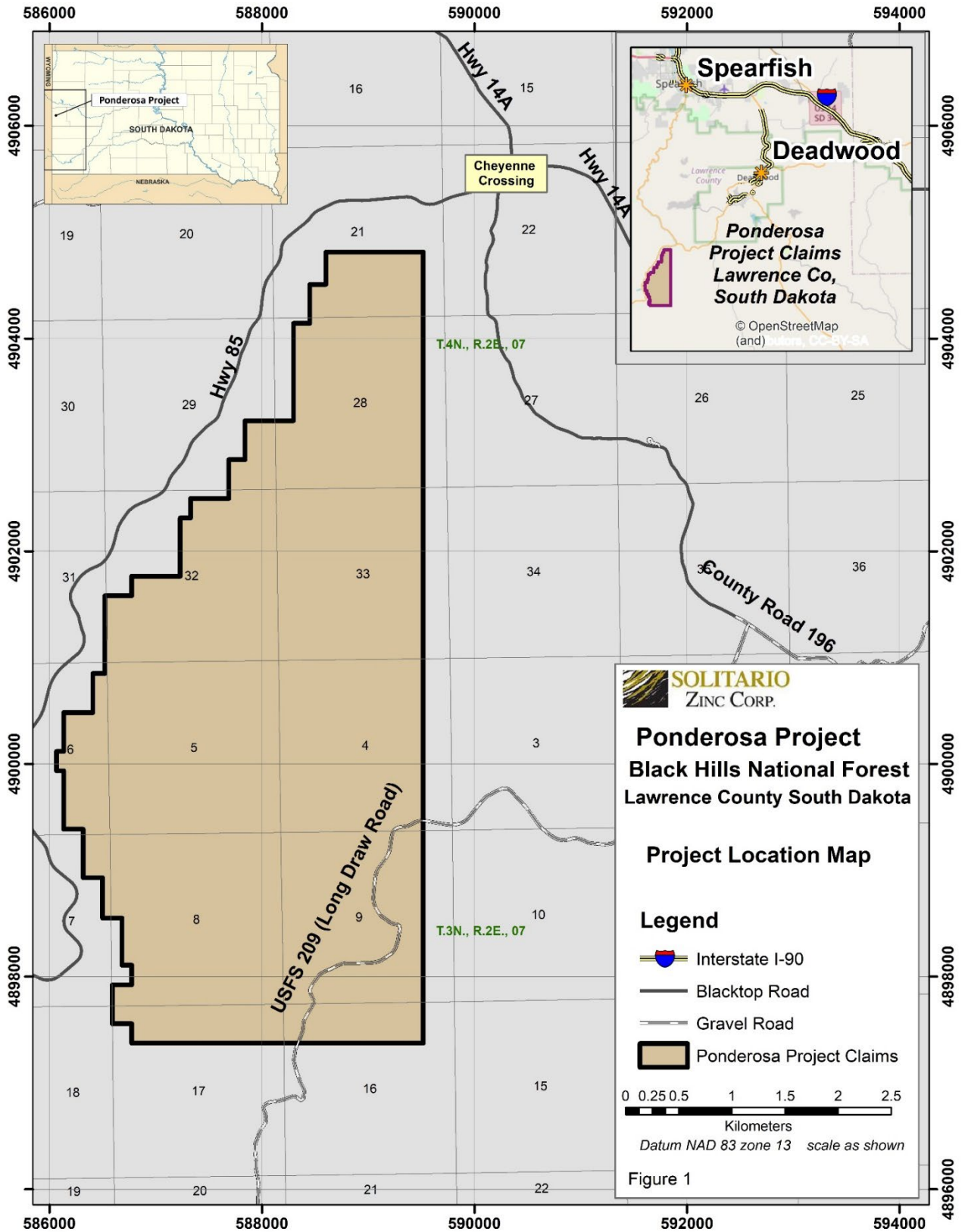


Figure 1. Project Location and Principal Access

Access to the Project Area is provided predominantly by Lawrence County Road 196 and U.S. Forest Service (USFS) Road 209 (Long Draw Road) which run in a northerly-southerly direction through the property. U.S. Highway 85 is located to the west of the property but does not provide access. Various unmaintained, numbered secondary USFS roads affords additional ingress to the proposed drill sites, as shown in Figure 2. Other unnumbered logging roads and trails are also present, some of which are open to motorized travel. All of the existing access roads shown in Figure 2 are adequate for entry to the proposed work areas and do not require construction or modification for use. Locally, berms, boulders or gates have been placed by the Forest Service on certain roads to limit public access, as described in Table 1. Temporary modification of the blockages on specific roads in Table 1 is requested in this Plan of Operations (Plan) to access proposed work areas. Any modifications of berms or gates on restricted roads to provide access would be coordinated with the Northern Hills Ranger District.

Proposed drilling will be limited by seasonal weather conditions during which road closures by the USFS may be implemented to preserve road integrity. The time frame when roads are open on the property typically extends from May 15 to December 15 but seasonal weather during a specific year and local road conditions may require more restrictive time periods.

No routine road maintenance on secondary roads is proposed during operation under this Plan. The USFS provides guidance on road usage to protect the roads from undue degradation depending on weather conditions and Solitario will follow the Forest Service rules and instructions. If use of roads by the Operator were to result in degradation of road conditions, then the Operator commits to performing maintenance as required to restore the road to preoperational condition, with prior notification and consultation with the USFS.

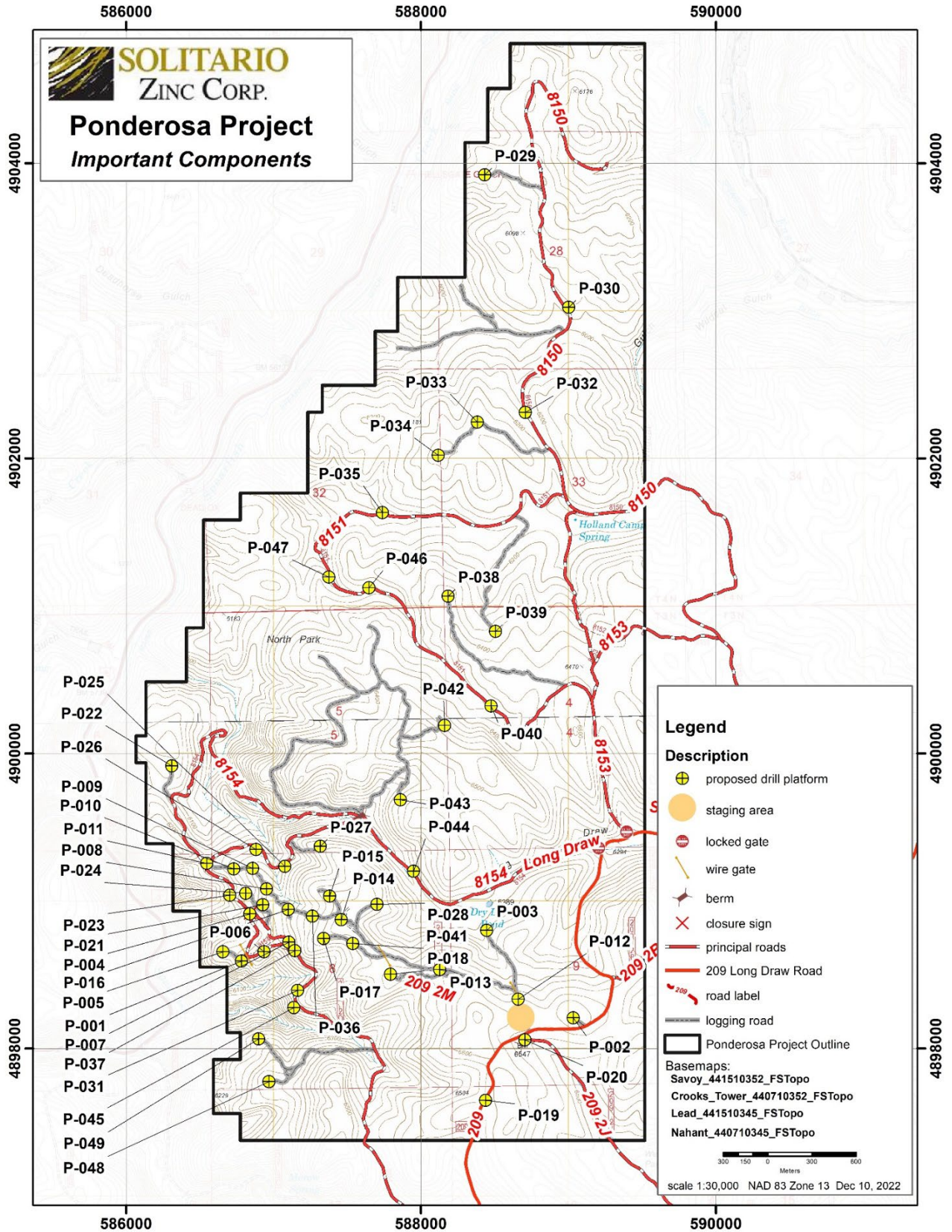


Figure 2. Proposed Drill Sites, Access Roads and other Important Components

Some roads in the general area have published restrictions on vehicle width. Many of the proposed drill sites under this Plan are accessed from USFS Road 8154 which is locally categorized as a Special Designation Trail with width restriction. As part of this Plan, Solitario seeks a temporary waiver of the vehicle width restriction to allow access for drilling and support equipment. Any modification of the width restriction gate on the southern end of this trail will be coordinated with Forest personnel and any changes will be conducted in accordance with USFS instructions. All physical changes to gates or fencing necessary for entry will conform with Forest Service guidelines. Although Road 8154 is currently under width restrictions the roadbed has adequate width for a pickup truck, water truck and the track or skid mounted core drill rig proposed for the Project. No needed modifications to this roadbed are anticipated.

The use of the sites and the access roads for drilling will not restrict access to recreational traffic along USFS roads as the drill sites are situated so as not to block access roads. Care will be taken to avoid obstructing the roads by drilling equipment, water truck or other materials. No new construction of roads, bridges, or culverts will be required for operations under this Plan. Vehicles proposed to be used in the operation of the project are listed in Section IV (D) below.

All of the potential drill sites, the staging area, and USFS roads used for access are listed in Table 1.

Table 1: Proposed Drill Sites, Staging Area, and Existing Access Roads

PLAT_ID	Easting (UTM)	Northing (UTM)	Elevation (m)	USFS Road ID	Remarks
P-001	586783	4898590	1911	8154	Logging Road off 8154
P-002	589033	4898206	2010	209	Logging Road off 209
P-003	588446	4898799	1957	209.2M	Logging Road off 209.2M
P-004	586840	4898911	1908	8154	Road Junction with 8154
P-005	586657	4898654	1903	8154	Logging Road off of 8154
P-006	586937	4898654	1921	8154	Logging Road off of 8154
P-007	587105	4898719	1937	8154	8154 Road
P-008	586953	4899080	1925	8154	Logging Road off 8154
P-009	586859	4899220	1917	8154	Logging Road off 8154
P-010	586731	4899215	1904	8154	Logging Road off 8154
P-011	586547	4899254	1892	8154	Junction on Road 8154
P-012	588660	4898333	2000	209.2M	209.2M
P-013	588128	4898533	2003	209.2M	209.2M
P-014	587459	4898871	1989	209.2M	209.2M
P-015	587381	4899032	1980	209.2M	209.2M
P-016	587101	4898942	1944	8154	Logging Road off 8154
P-017	587340	4898745	1981	209.2M	209.2M near prospect pit
P-018	587793	4898502	1995	209.2M	Logging Road off 209.2M
P-019	588439	4897647	2011	209	209 Road
P-020	588706	4898057	1996	209.2J	209.2J
P-021	586927	4898973	1926	8154	Logging Road off 8154
P-022	586310	4899914	1885	8154	Logging Road off 8154
P-023	586704	4899038	1894	8154	Logging Road off 8154
P-024	586812	4899051	1909	8154	Logging Road off 8154
P-025	587078	4899233	1914	8154	Logging Road off 8154
P-026	586882	4899348	1904	8154	Logging Road off 8154
P-027	587317	4899370	1962	8154	Logging Road off 8154
P-028	587702	4898976	1988	209.2M	Logging Road off 209.2M
P-029	588433	4903922	1877	8150	Logging Road off 8150
P-030	589003	4903024	1838	8150	Road 8150
P-031	587164	4898393	1923	209.2D	Road 209.2D
P-032	588708	4902311	1877	8150	Road 8150
P-033	588383	4902245	1910	8150	Logging Road off 8150
P-034	588118	4902020	1917	8150	Logging Road off 8150
P-035	587740	4901631	1836	8151	Road 8151
P-036	587264	4898896	1970	8154	Logging Road off 8154

P-037	587144	4898662	1940	8154	Road 8154
P-038	588185	4901065	1946	8151	Logging Road off 8151
P-039	588506	4900827	1932	8151	Logging Road off 8151
P-040	588476	4900320	1942	8151	Road 8151
P-041	587538	4898710	1981	209.2M	Logging Road off 209.2M
P-042	588161	4900188	1974	8154	Logging Road off 8154
P-043	587861	4899685	1959	8154	Logging Road off 8154
P-044	587951	4899201	1936	8154	Road 8154
P-045	587138	4898275	1924	209.2D	Road 209.2D
P-046	587647	4901122	1870	8154	Road 8154
P-047	587376	4901194	1843	8154	Road 8154
P-048	586970	4897775	1936	209.2D	Logging Road off 209.2D
P-049	586899	4898064	1911	209.2D	Logging Road off 209.2D
stage area	588680	4898211	2008	209.2M	stage area
wire gate	586815	4898635	1915	8154	wire gate Road 8154 near P-001
wire gate	587752	4898630	1990	209.2M	wire gate Road 209.2M access gate
wire gate	588648	4898379	1995	209.2M	wire gate Road 209.2M near P-012
berm	586558	4899255	1892	8154	berm Road 8154
berm	587122	4898679	1937	8154	berm Road 8154
berm	587587	4899570	1912	8154	berm Road 8154
berm	588703	4898043	1996	209.2J	berm Road 209.2J
closure sign	586842	4898915	1908	8154	closure sign Road 8154
locked gate	588074	4896845	1940	209.2D	locked gate Road 209.2D
locked gate	589207	4899358	1925	8154	locked gate Road 8154
locked gate	589395	4899467	1920	8153	locked gate Road 8153

Solitario plans to suspend drilling operations during certain specific holiday periods in order to reduce traffic congestion on Forest roads. These suspensions will be coordinated with the Forest Service in advance considering the schedule of events and location of active drill sites during those periods.

B. Map, Sketch or Drawing.

Figure 2 shows the proposed drill sites, the staging area and access roads proposed to be used under this Plan. The base map for Figure 2 is National Forest Topo Basemap (FSTopo Base Map 5/18/22). The road and trail alignments on this base map are found to be more accurate than the published Forest Plan and this base was chosen for this reason. The proposed drill sites and access roads will be limited to areas of

existing disturbance that resulted from previous logging operations, most recently the Jester Timber Sale.

Drill sites are positioned in areas of existing surface disturbance adjacent to or accessed by USFS access, all of which are existing roads, many of which were previously constructed for logging activities. The drill sites are commonly located where logging equipment occupied flat, wide areas along existing roads previously utilized for staging and storage of equipment (such as skidders and dozers), turnarounds for logging trucks and light trucks, and laydown areas for storage of equipment and cut timber before being loaded for transport.

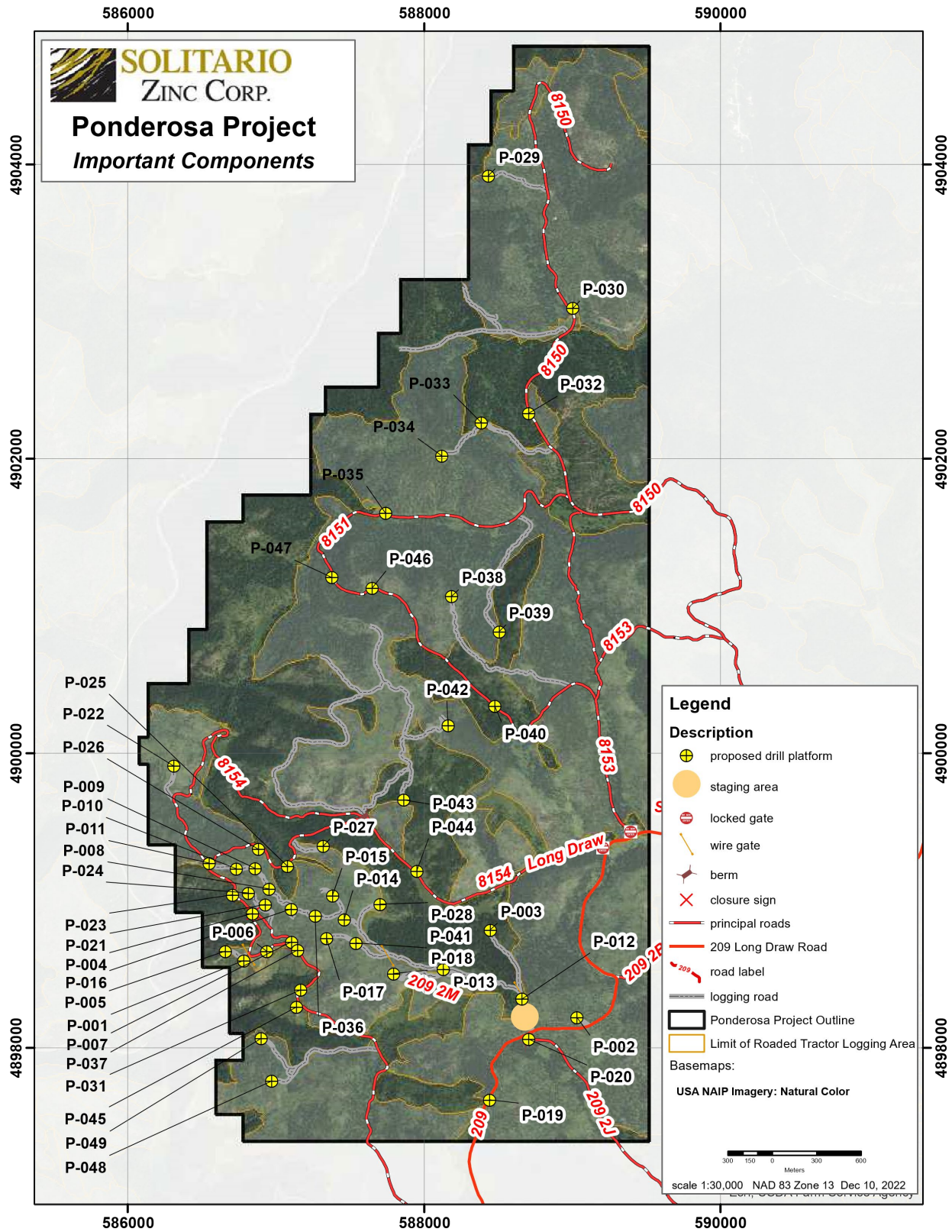


Figure 2a. NAIP Imagery of Project Area Showing Project Components and Roaded Tractor Logging Areas

Figure 2a shows the current surface status after the latest commercial logging activity, most recently impacted by the Jester Timber Sale. Logging was conducted primarily using the Roded Tractor Logging method as classified by the USFS. Figure 2a shows the impacted areas, recorded by the Forest Service (fsveg20211103_4public), illustrating the coincidence of drill site and access road locations in relation to areas of previous disturbance associated with logging areas.

Figures 3 and 3a show enlargements of the principal area of drill sites and access roads with topography and superimposed on satellite imagery.

After drilling is completed at a drill site, the pad will be recontoured (if needed), seeded, and mulched during final reclamation, as described in Section V(I).

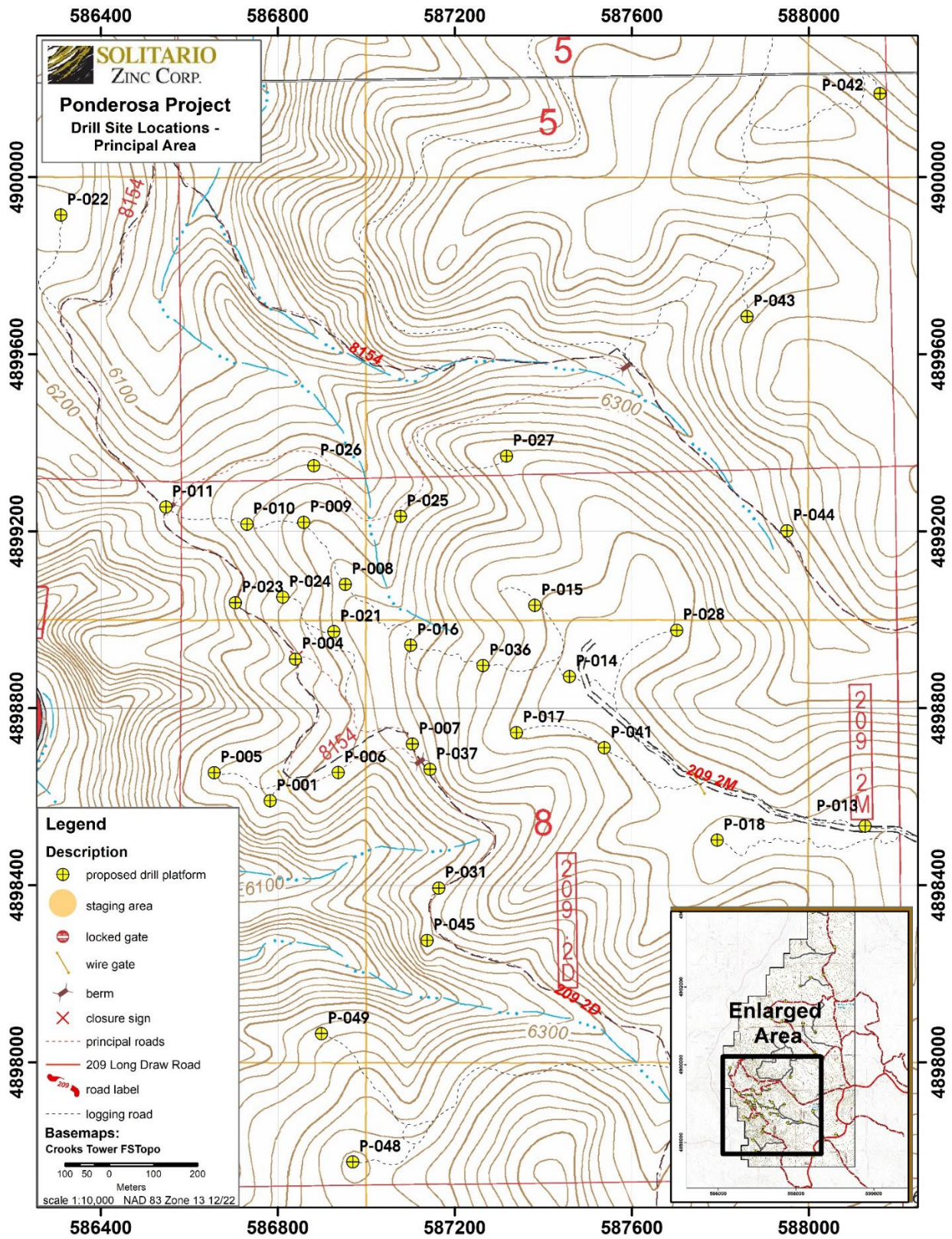


Figure 3. Detail of Principal Area Showing Drill Site Locations, Access, and Topography.

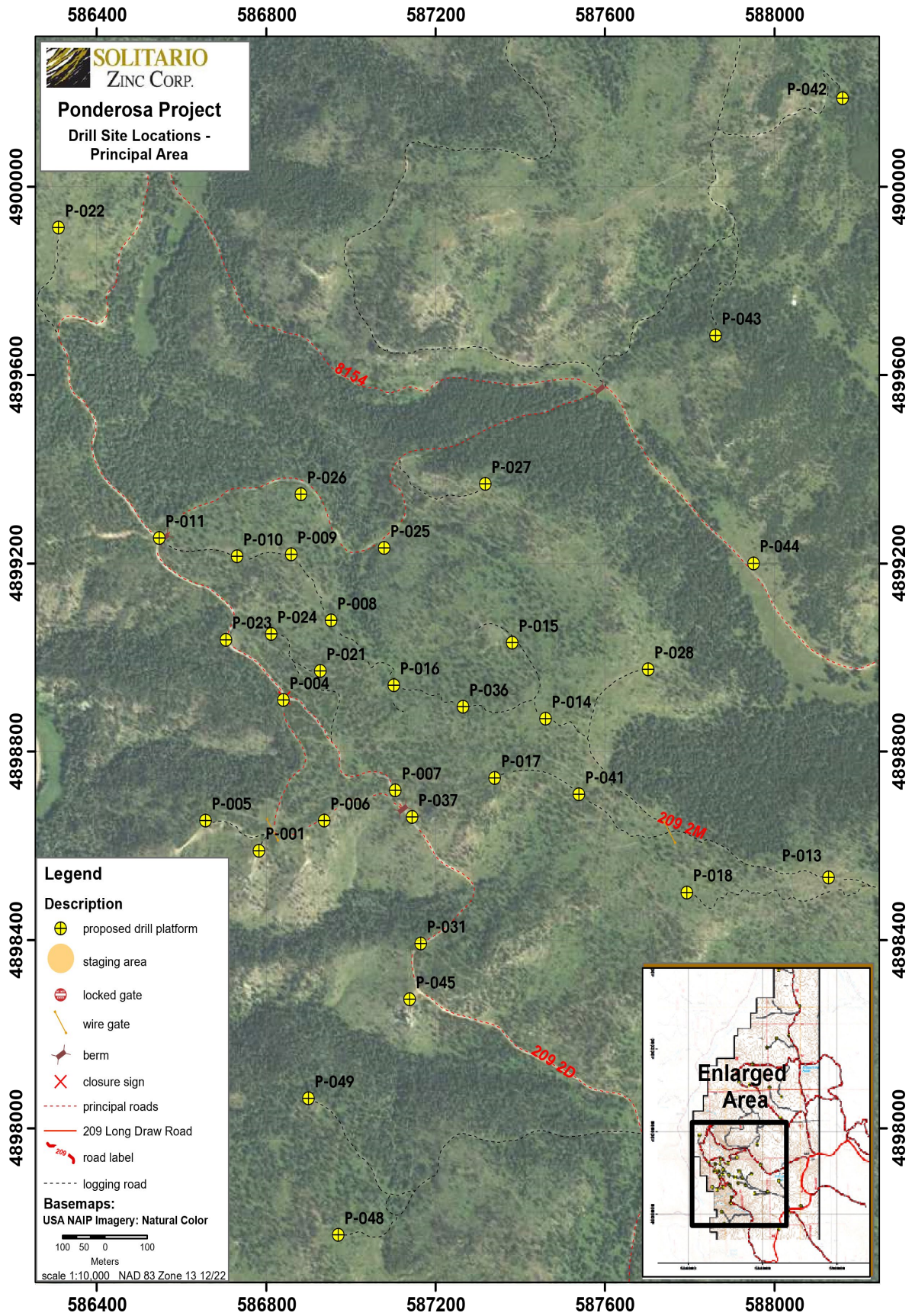


Figure 3a. Principal Area Showing NAIP Imagery and Surface Impacts.

A. Project Description:

Describe all aspects of the operation including mining, milling, and exploration methods, materials, equipment, workforce, construction and operation schedule, power requirements, how clearing will be accomplished, topsoil stockpile, waste rock placement, tailings disposal, proposed number of drillholes and depth, depth of proposed suction dredging, and how gravels will be replaced, etc. Calculate production rates of ore. Include justification and calculations for settling pond capacities, and the size of runoff diversion channels.

The primary purpose of this Plan is to provide documentation and support for a request for authorization of a program of core drilling to test for subsurface gold mineralization on the Ponderosa Project. No mining, milling, waste or tailings disposal, dredging or other mine site related activities are proposed under this Plan. The locations of up to forty-nine potential drill sites and one staging area are shown on Figure 2.

Prior to initiation of activities under this Plan, ongoing geologic studies will be conducted including geologic mapping, geochemical sampling and geophysical surveys under the provisions of 36 CFR Part 228.4 to help assess which drill sites will be selected for drill testing. Geologic studies and drill results conducted during the drilling program will further inform drill site selection.

It is very unlikely that drilling would occur at all of the proposed drill sites. The initial phase of drilling will consist of six to ten holes; further drilling will be determined based on results of initial drill tests. It is not possible to assess in advance which drill sites are most suitable until this geologic information has been acquired.

One to two track or skid mounted drill rigs, are planned to be used for drill testing. A photo of a typical track mounted drill is shown in Appendix 2.

No subsurface information is currently available within the project area, so exact depths of drill holes are unknown until initial drilling occurs. An estimate of the average required depth of drill holes is 300 to 400 m, based on surface geology and knowledge of local stratigraphy. However, depending on the geology encountered in each hole, the Operator will have equipment on hand to drill to a maximum depth of 600 m. If mineralization is found in an initial drill hole on a drill site, additional offset holes may be drilled from the same site to better define the geometry of subsurface geologic features. The drill may temporarily move from the site while analytical results of core samples are awaited. The drill may return to drill a new hole if results are positive.

The general geologic stratigraphy of the area is provided in Figure 4. The

sedimentary rocks of the prominent cliff-forming Pahasapa Formation of Mississippian age (regionally known as parts of the Madison Formation) underlie much of the area and consist predominantly of limestones or sandy limestone.

The surface at the project is located at stratigraphic positions varying from the upper to lower Pahasapa Formation. Below the Pahasapa Formation is a sequence of thinner carbonates, siltstones, and shales of Ordovician age. The lowermost sedimentary formation is the Cambrian Deadwood Formation that comprises mixed limestones, shales, and sandstones. The thickness of the entire sedimentary sequence is estimated to be between 350 and 400 m. Intrusive, nearly horizontal Tertiary age intrusive sills are also known in the region but their thickness and location, if present, are unknown within the project boundary.

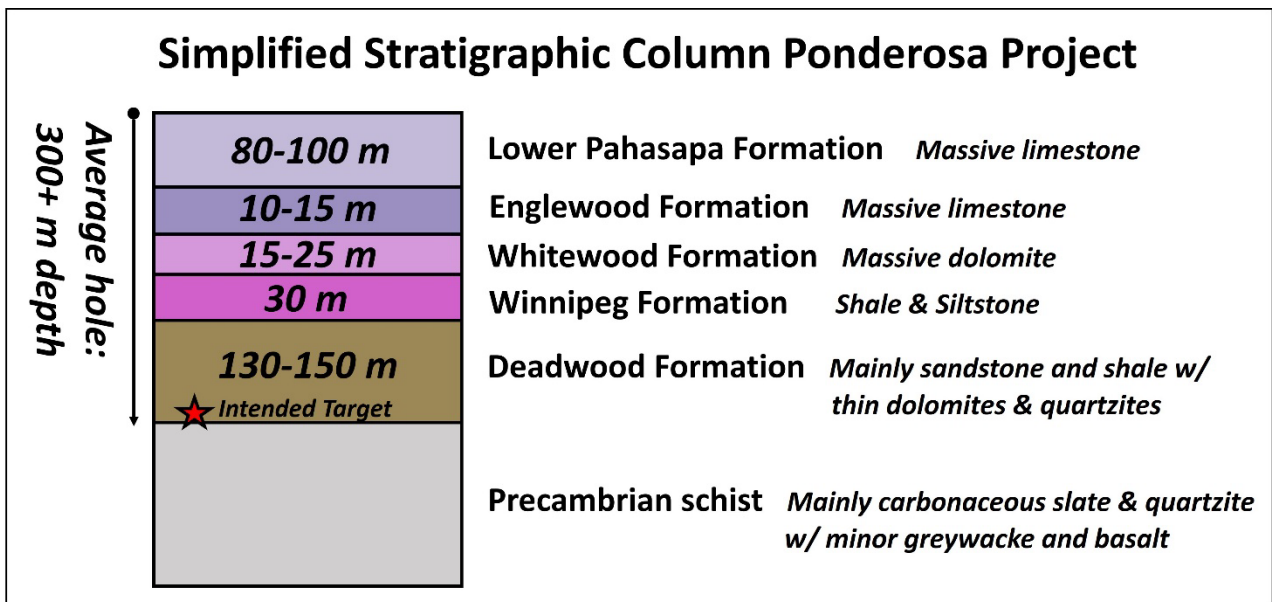


Figure 4. Stratigraphic Column of the Rocks at the Ponderosa Project

The Pahasapa and Cambrian Deadwood Formations and the Precambrian rocks are known to be aquifers at some locations in the region. Compliance with final state-mandated drill hole closure requirements will prevent any potential cross-aquifer mixing of groundwater. Based on drill hole logs of water wells in the area, the hydrostatic water level is below all of the proposed drill collar elevations.

No petroleum is known to be present in the rocks expected to be encountered on the property.

Core holes will typically be “H” size which is nominally 3 inches in diameter. If necessary reduced core sizes will be used.

All of the proposed drill holes and access routes are located within recent logging

projects in the area. Construction of new access roads or drill sites on previously undisturbed land will not be required nor will clearing of trees. Solitario requests to move or modify berms and/or large boulders that are used to block access to some roads as noted in Table 1. Drill sites have been located to take advantage of gentle topography within areas of previous disturbance at each site. The choice of sites with gentle topography was prioritized to reduce the need for drainage control and reclamation complexity. The drill sites will require only minor modification of the general topography of the previously disturbed surface to accommodate access for the drill rig, water truck, and fresh water and recirculation tanks. However, sumps will be installed for the settling and burial of particulates which are separated from drill water. Final closure and reclamation of the site is described in Section V(I).

The previous commercial logging operations were conducted under timber sales granted by the Forest Service. Numerous logging roads, skid paths, staging areas and laydown sites were constructed during logging by dozers and skidders. Photographs of typical drill sites and existing topography and previous disturbance are provided in Appendix 2.

Little or no formal recontouring or revegetation of the existing logging related disturbance is assumed to have been performed after logging was complete. However, natural propagation of grass and other ground cover has occurred since logging activities were completed. In order to encourage further growth of ground cover it is not proposed to systematic remove existing plant matter at drill sites, but instead to leave it in place to the extent possible. Driving across existing vegetation at a drill site, rather than removing it, whenever feasible, will promote quicker revegetation. Typically, an individual drill site will be used for a period of several days to a week for a drill hole so planned removal of organic rich topsoil is not beneficial from a reclamation standpoint.

This Plan proposes to exclusively use the unreclaimed areas of constructed logging access for the proposed drill sites. After completion of the use of drilling at a location, this Plan proposes to recontour the drill site, where beneficial, and mulch and reseed these areas to improve the revegetation success, as described in the following paragraphs and in Section V(I). This recontouring is designed to enhance the locations' natural conditions in comparison to the current status of the land.

The condition of the current surface in many of the proposed sites is currently rough because of previous mechanical disturbance by dozers, skidders, and logging trucks as well as the lack of recontouring. Less disturbed sites may not benefit from recontouring. After drilling, all of the sites used under this Plan will be assessed individually in cooperation with USFS personnel and recontoured as recommended

before mulching and reseeding with native plant species.

Most of the topsoil on the proposed drill sites has been disturbed by previous operations. If significant remnants of organic rich topsoil remain that can be selectively reclaimed within the drill sites, then the topsoil may be segregated and stockpiled for use at the instruction of Forest Service personnel in final closure as described in Section V(I).

The proposed drill sites have been chosen based specifically on both geologic potential and on minimal visual and operational impacts. The drill site locations along the logging roads will not interfere with traffic on maintained primary USFS roads and will have minimal impact to Forest visitors using off-road vehicles. Visual impacts will be minimized by selection of drill sites that are not visible from paved roads or permanent structures, as discussed in Section V 5(C). Other alternate sites were evaluated during selection of the proposed sites. The location of these other sites and analysis of suitability will be discussed in a separate document assessing impacts as required under NEPA.

Drilling will occur during one or two shifts per day, 5 to 7 days per week. If drilling is conducted after dark, two portable generator-powered light plants will be used to supply adequate lighting for the work site, as described in Section V5(D). Drilling will be scheduled to avoid peak tourism usage periods such as July 4th, Labor Day and the Sturgis Rally. The scheduled work pauses will be coordinated with Forest personnel taking into account the location of the work site during those periods.

Water required for core drilling will be sourced from either municipal or privately owned water supplies in the Lead/Deadwood area or, if approved, from one or more existing water wells on USFS property. Water will be transported to and stored in a free-standing or wheeled; surface tank or bladder at or near drill sites and may be pumped or gravity fed to the point of use. Water from distant sources, such as a municipal well, will be delivered by water truck to the storage tank.

Drill water will be stored and recirculated from a series of two to three free-standing holding tanks at the drill sites or a compartmentalized sump where drill solids will be separated by gravitational settling before reuse of the water. Upon a drill site closure, the drill solids will be buried in the sump, mulched, and seeded, as described in Section V(I) below.

Both core drilling and water haulage will be performed by contractors.

Drill core will be transported as necessary from the Drill Site by pickup truck to the

Solitario office in Spearfish, South Dakota, where the samples can be logged and prepared for analysis.

Personnel required at a drill site will include the following employees or contactors during one or two shifts:

- Driller
- One to three drill helpers
- Geologist
- Water truck driver (part time, as required)
- Consultant to conduct geologic, engineering, or surveying studies on drill holes (as required)
- Drilling and/or Operator supervisor (occasional).
- DANR Compliance Personnel

Solitario commits to follow all South Dakota laws and statues concerning drill hole plugging and abandonment and would install full grout or cement backfill of the drill holes where needed, such as in any instance where aquifer cross mixing is possible. All of the exploration drill holes will be plugged in accordance with Administrative Rules of South Dakota (ARSD) 74:11:08 and South Dakota Codified Law (SDCL) 45-6C-28 through 45-6C-30. The drill holes are planned to penetrate the Pahasapa (Madison) and Cambrian Deadwood sedimentary formations and the older Precambrian rocks, which are water-bearing units or aquifers in some locations of the Black Hills. If an aquifer is penetrated, the completed exploration drill holes will be plugged from bottom to top using, at a minimum, bentonite grout, which complies with the requirements of ARSD 74:11:08:05 and ARSD 74:11:08:05:01 (i.e., requirements for plugging exploration drill holes that penetrate single unconfined aquifers and confined or multiple aquifers).

If a confined aquifer is penetrated, the weight of the bentonite grout column would be either sufficient to overcome formation pressure or the hole will be plugged using cement grout. The collar elevations of the planned holes are higher than the static water level to be encountered in the exploration holes; therefore, no natural artesian discharge from drill holes is anticipated.

Solitario will coordinate with the South Dakota Department of Agriculture and Natural Resources (DANR) in advance of hole plugging so that a DANR representative can be

present during closure to ensure compliance with state regulations.

Records regarding aquifers encountered during drilling and the plugging methods used will be recorded and retained for each exploration hole and those records will be provided to the DANR periodically. All exploration drill holes are planned to be plugged immediately upon completion while the drill rig is still on the site. If a drill hole is required to temporarily remain open, a temporary surface plug will be emplaced. If a hole needs to remain open for more than 30 days, Solitario will apply to the DANR for an alternate plugging schedule to temporarily keep the hole open.

D. Equipment and Vehicles.

Each Drill Site may require a maximum of the following equipment during active operation:

Motorized:

- One core drilling rig
- Up to Two pickup trucks
- One water truck
- One backhoe or skid steer for repositioning of drill rig (if needed), excavation of sump(s), moving of drill steel and other supplies.
- One or two Utility Task Vehicles (UTV).

Stationary:

- Portable toilet
- Drill steel
- Drill rod rack storage
- Parts Trailer
- Water tank or bladder for water storage
- Two to three water recirculation tanks or sumps
- Water line and pumps
- Mud pump and tank for mixing drill mud, grout, and cement for drill hole reclamation

- Waste receptacles labeled for trash and recyclables
 - Erosion control logs (straw wattles) for use on site.
 - Drilling Consumables:
 - Diesel fuel used by the drilling rigs will be transported to the drill site in a fuel tank mounted on a pickup truck and transferred to the fuel tank on the drill rig on site. Pickup trucks may use either diesel fuel or gasoline that will be stored in mounted tanks.
 - Gasoline will be used to power water pumps and a generator, if used, at the drill site. Gasoline may be stored in portable containers.
 - Drill mud will be used as a high-density additive to drill fluid, which increases viscosity and density of the fluid for increased efficiency of the drilling process and improved recirculation of drill water. The primary constituent of drill mud is bentonite clay which will be mixed with water on site in a mud tank.
 - Grout will be used as a high-viscosity or cemented material used to prevent drill water from penetrating the adjacent rock, to fix the drill casing into the hole or to reclaim drill holes upon completion.
 - Absorbent wipes for cleanup will be used for spill confinement.
 - Fuel or other hazardous materials stored at either the staging area or drill rig will be stored in permanent fuel tanks or, if in portable tanks, placed on a flat impermeable platform with a raised containment barrier or a berm around the perimeter lined with a geomembrane to prevent a spill or leakage event. The containment area will be sufficiently sized to accommodate a 100 percent spill. The staging area may also be used for storage of drill rods, bits, tools, and other consumables as may be required for drilling.
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E. Structures

No permanent fixed structures are proposed under this plan. Stationary mobile equipment is described in Section IV(D).

V. ENVIRONMENTAL PROTECTION MEASURES (SEE 36 CFR 228.8)

A. Air Quality

The maximum anticipated daily vehicle trips to and from the drill site are eight per shift; however, the estimated average is three per shift. To minimize fugitive dust from vehicle travel on primary and secondary USFS roads on the project, vehicles will be required to observe a speed limit of 25 miles per hour (mph) or such speed as directed by the Forest Service. Minimizing the number of trips to the project area will also lower the generation of dust.

No open burning is proposed in this Plan.

Operation of all of the equipment, including vehicles, drill rig, generators, and pumps, will be conducted in accordance with manufacturer's operating specifications. No modifications of any equipment will be made that will alter the emissions of equipment used on site.

B. Water Quality. *State how applicable state and federal water quality standards will be met. Describe measures or management practices to be used to minimize water quality impacts and meet applicable standards. State whether water is to be used in the operation, and describe the quantity, source, methods and design of diversions, storage, use, disposal, and treatment facilities. Include assumptions for sizing water conveyance or storage facilities.*

Water will be used in drilling as a drill lubricant and coolant as well as to evacuate drill cuttings from the drill face. The amount of water to be used will be determined by the permeability of the geologic formations encountered in a drill hole. Water will be recirculated to the extent possible.

Water will be transported to the site from private or public sources depending on availability, either from a local water well or public source. A water truck will transport water to the site and deposit the water into an on-site tank or bladder for storage. Water usage is estimated to range from 5,000 to 10,000 gallons per day; however, if circulation of drill water is lost, larger quantities may be required until circulation can be reestablished, if possible.

Water will be recirculated during drilling whenever possible and placed in either a lined compartmentalized sump or a series of two to three contained water settling tanks so that drill cuttings can be segregated by gravity from the liquid and the fluid can be

reused.

Upon completion of each drill hole, the hole will be plugged in accordance with state standards as prescribed in Section V(I) to prevent cross aquifer contamination.

Surface water will be controlled to prevent erosion, as described in Section V(B)(2). No active or intermittent streams exist near any of the drill sites into which uncontrolled surface water can enter; however, in areas of gentle to moderate slopes near the drill holes, surface water will be controlled, as described in Section V(B)(2).

2. Describe methods to control erosion and surface water runoff from all disturbed areas, including waste and tailings dumps.

Most of the planned drill sites are located on relatively flat ground (less than 5 degree slope) with permeable sandy soils. No mitigation for erosion control is proposed for these flat sites where permeable soils and lack of slopes will naturally control runoff. However, if erosion is observed at a drill site or judged to be a risk, diversion ditches or erosion control logs will be emplaced to eliminate onflow of rainwater and uncontrolled runoff.

Drill water will be controlled using sumps; drainage at the drill rig will be directed to the sumps by diversion.

Natural erosion along access roads may occur on unmaintained roads. However, Solitario will minimize rutting in roads during periods of standing water wherever practical and runoff will be controlled by water bars or erosion control logs as required.

3. Describe proposed surface water and groundwater quality monitoring, if required, to demonstrate compliance with federal or state water quality standards.

No perennial streams or other natural water bodies are present at or near any of the drill sites; therefore, no surface water compliance sampling is planned.

Drill sites will be promptly reclaimed after drilling has been completed. However, if additional drill holes are planned at a site based on analytical results of previously drilled core, then drill sites will be temporarily stabilized by use of diversion structures and maintenance of temporary sumps until final reclamation is completed at a site.

No water monitor wells are located in the project area, therefore, no groundwater monitoring is planned.

Upon completion of a drill hole, plugging will be by backfilling, grouting, or cementing in accordance with state regulations South Dakota Legislative Research Council (SDLRC) – Rule 74:11:08.

4. Describe the measures to be used to minimize potential water quality impacts during seasonal closures or for a temporary cessation of operations.

During seasonal or temporary closures, the surface water hydrology of the drill site will revert to preoperational conditions where no surface water is present near the work areas. However, temporary mitigation measures such as erosion control logs, wattles or diversion structures may be left in place during short-term closures as needed.

Immediately upon final reclamation and completion of a drill pad's use, the sites will be inspected, and all tools, supplies, and other foreign materials will be removed. The sites will be monitored throughout the drill program and any unsightly ruts or irregularities in the surface may be modified to minimize erosion. Final closure and reclamation of the drill sites is described in Section V(I).

5. If land application is proposed for wastewater disposal, the location and operation of the land application system must be described. Also describe how vegetation, soil, and surface and groundwater quality will be protected if land application is used.

No land application of wastewater is part of this Plan; however, recirculated water from the drill holes will be settled in tanks or a lined sump, as described in Section V(B)(1). The recirculated water will be reused in drilling after solids are separated by settling in holding tanks. A skid steer or backhoe will be maintained on site to ensure that excavation of sumps and diversion structures can be completed in a timely manner if needed.

C. Solid Wastes.

All of the solid wastes generated on site will be transported, as needed, to approved solid waste facilities for disposal except for the drill cuttings recovered by gravity separation in settling tanks or sumps. These cuttings consist of crushed/pulverized rock from the drill hole with a consistency of mud or sand. When separated from the drill water by settling, these solids will reside in a lined sump at site and will be buried, mulched, and seeded during final reclamation.

Human waste will be managed by using portable toilets under contract with a commercial provider. The disposal of this waste will be undertaken by the contractor at a licensed and permitted facility.

D. Scenic Values. *Describe protection of scenic values such as screening, slash disposal, or timely reclamation.*

Proposed drill sites and the staging area are located to avoid visibility from paved roads, permanent structures, dwellings, or developed campgrounds.

If drilling occurs during nighttime hours, then portable light plants will be required for work to safely proceed. To minimize stray light and light pollution, a maximum of two directional light plants will be used on a drill site. Directional lighting will generally minimize unnecessary glare by focusing the light downward on the worksite and away from populated areas to reduce stray light. Shielding of the sides and upward will reduce scattered light skyward and laterally.

F. Fish and Wildlife. *Describe measures to maintain and protect fisheries and wildlife, and their habitat (includes threatened, endangered, and sensitive species) affected by the operations.*

- Fisheries: No fisheries exist on the property covered by this Plan. Erosion controls and mitigation of potential runoff into streams is addressed in Sections V(B)(2) and V(B)(4).
- Wildlife: A desktop evaluation of threatened, endangered, or sensitive wildlife that are potentially present on site will be prepared by a third-party contractor. The need for field studies will be assessed during scoping. Mitigation of potential impacts may be recommended.
- Threatened and Endangered (T&E) Species: Desktop biological surveys that include wildlife and botanical studies will be prepared in collaboration with the Forest Service and South Dakota Department of Game, Fish, and Parks (SDGFP) to identify potential T&E species that may occur in the area as well as potential impacts. Based on the results of these studies, the scoping during NEPA will require consultation with the SDGFP and USFS to assess potential impacts and determine if further studies or recommended mitigations are warranted.

G. Cultural Resources. *Describe measures for protecting known historical and archeological values, or new sites in the project area.*

During NEPA review the Forest Service will develop a plan to assess cultural resources known on the property to identify any potential archaeological or other cultural

resources requiring protection and to develop field studies and operational protocols to ensure that work under this Plan will be conducted in compliance with federal and state guidelines. The field protocols should address measures to identify and mitigate any cultural resources encountered during the conduct of exploration activities. Solitario shall avoid bones, artifacts, foundation remains, or other evidence of previously unrecorded past human use. If any artifacts or other archaeological or cultural resources are discovered during exploration, activities shall be temporarily halted and the state archaeologist and Forest Service will be notified.

It is anticipated that Tribal consultations required under the National Historic Preservation Act will be required to address known, or the potential discovery of, Traditional Cultural Properties. Such consultations will occur in compliance with the National Environmental Policy Act (NEPA) and will be initiated by the USFS.

H. Hazardous Substances.

- 1. Identify the type and volume of all hazardous materials and toxic substances which will be used or generated in the operations including cyanide, solvents, petroleum products, mill, process and laboratory reagents.*
- 2. For each material or substance, describe the methods, volume, and frequency of transport (include type of containers and vehicles), procedures for use of materials or substances, methods, volume, and containers for disposal of materials and substances, security (fencing), identification (signing/labeling), or other special operations requirements necessary to conduct the proposed operations.*
- 3. Describe the measures to be taken for release of a reportable quantity of a hazardous material or the release of a toxic substance. This includes plans for spill prevention, containment, notification, and cleanup.*

Solitario will prepare a spill prevention control plan that will describe protocols for avoiding and controlling any spills that could occur on site under this Plan. This Plan will incorporate any pertinent elements of a Spill Prevention Control and Countermeasure (SPCC) Plan of the BHNF, if such a plan is in place. Training of on-site personnel in the response protocols will be mandatory. The Plan will include a list of quantities and locations of any hazardous materials that will be on site. This list will be submitted to the USFS so that potential impacts of the use of such materials can be identified and assessed under NEPA.

I. Reclamation.

Describe the annual and final reclamation standards based on the anticipated schedule for construction, operations, and project closure. Include such items as the removal of structures and facilities including bridges and culverts, a revegetation plan, permanent containment of mine tailings, waste, or sludges which pose a threat of a release into the environment, closing ponds and eliminating standing water, a final surface shaping plan, and post operations monitoring and maintenance plans.

Seasonal (annual) closures will be preceded by stabilization that is designed to prevent erosion at working sites, as described in Section V(B)(4).

The proposed drill sites are located on lands that have been previously disturbed by logging and other activities. Final reclamation of the drill sites and staging area will include the following elements:

- Drill holes will be sealed and reclaimed in accordance with ARSD 74:11:08 and SDCL 45-6C-28 through 45-6C-30.
- Drill sites will be recontoured as necessary to eliminate excessive rutting regardless of the pre-project condition.
- Secondary road areas occupied by the drill sites or staging area will be modified by installing water bars or diversion structures, as necessary and depending on the slope of the existing topography, so that post-use erosion is not promoted.
- Drill fluids will be contained in recirculation tanks or a lined sump on the Drill Site to allow solids to settle. The solids will ultimately be disposed of in a buried lined sump before final reclamation.
- Overly compacted areas at the drill sites, turnarounds, and staging area that are not located on an active roadbed will be roughed either manually or mechanically to enhance seeding viability and minimize erosion.
- Areas to be enhanced by reseeding will initially be mulched with locally derived, stockpiled organic-rich amendments or with commercially available certified weed-free mulch. Seeding will be applied in accordance with USFS guidance. The proposed seed mix is provided in Table 2 and is compatible with existing habitat and USFS recommendations.

Table 2. Reclamation Seed Mix Table: Recommended by USFS Northern Hills District, BHNH

Species	North Zone
Annual rye (<i>Lolium multiflorum</i>)	10%
Slender wheatgrass (<i>Elymus trachycaulus</i>)	25%
Prairie junegrass (<i>Koeleria macrantha</i>)	5%
Western wheatgrass (<i>Pascopyrum smithii</i>)	30%
Canada wildrye (<i>Elymus canadensis</i>)	30%

Application Rate: 20 Pounds Live Seed/Acre

Noxious weeds will be managed by Solitario in adherence with the USFS’s current Noxious Weed Control Plan (NWCP). Solitario will prepare a plan in coordination with the Forest Service that will include site inspections for noxious weeds and control measures as defined in the NWCP. This Plan will include spraying for weeds 1 year after final reclamation or as directed by the Forest Service.

APPENDIX I

Ponderosa Project Area LD Claims List					
Claim Name	County	Case Disposition	Claim Type	Date Of Location	Township-Range
LD 1	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 10	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 100	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 101	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 102	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 103	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 104	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 105	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 106	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 107	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 108	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 109	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 11	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 110	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 111	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 112	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 113	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 114	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 115	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 116	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 117	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 118	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 119	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 12	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 120	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 121	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 122	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 123	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 124	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 125	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 126	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 127	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 128	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 129	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 13	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 130	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 131	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 132	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E
LD 133	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0040N 0020E

LD 93	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 94	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 95	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 96	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 97	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 98	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E
LD 99	LAWRENCE	SUBMITTED	LODE CLAIM	9/1/2022	0030N 0020E

APPENDIX II

Photographs of Typical Proposed Drill Sites and Roads



P-001 Site. Note Orange Flagging



Drill Site P-005.



Drill P-006 Site to the Left of Fallen Tree.



USFS 8154 Road with P-007 to the Right of Parked Vehicle



P-008. Broad Open Area, Old Log Deck Location



P-014. Old Laydown Area



P-016



Typical Track Mounted Core Drill