Updated Water Supply Assessment

Castle Mountain Mine Project

Castle Mountain Mine
San Bernardino County, California

Submitted to

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Certification

As California Professional Geologists, a Certified Engineering Geologist, and Certified Hydrogeologists, we certify that the findings and recommendations included in this report are valid in our professional judgement.

This report was prepared in accordance with generally accepted professional hydrogeologic and engineering principles and practices. This report makes no other warranties, either expressed or implied as to the professional advice or data included in it. This report has not been prepared for use by parties or projects other than those named or described herein. It may not contain sufficient information for other parties or purposes.

We appreciate the opportunity to be of service to Equinox Gold Corporation on this project. If you have any questions concerning this report or if we may be of further service, please contact the undersigned.

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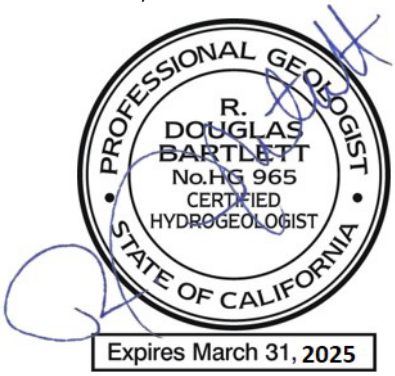


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Acronyms and Abbreviations

Af	Acre-Feet
AFY	Acre-Feet Per Year
bgs	Below Ground Surface
BLM	U.S. Bureau of Land Management
CCA	Clear Creek Associates
CIC	Carbon in Column
CEQA	California Environmental Quality Act CMM Castle Mountain Mine
CMM	Castle Mountain Mine
CMV	Castle Mountain Venture
CWC	California Water Code
DWR	California Department of Water Resources
GLA	Geo-Logic Associates
gpm	Gallons Per Minute
HLP	Heap Leach Pad
MCL	Maximum Contaminant Level
mg/L	Milligrams Per Liter
NPS	U.S. National Park Service
TDS	Total Dissolved Solids
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment

1. Introduction

1.1 Purpose and Applicability

On behalf of Castle Mountain Venture (CMV) (and parent company Equinox Gold Corp), this Updated Water Supply Assessment report (WSA) has been developed to support (CMV's) planned Phase II expanded gold mining operations at the Castle Mountain Mine (CMM) in eastern San Bernardino County, California (**Figure 1**). This WSA revises CMV's earlier WSA (March 10th, 2022) to address and include additional groundwater data that has recently been obtained at CMM. This revised WSA does not propose to make any changes regarding the previously proposed total water use for the CMM, and as presented in the March 2022 WSA. Findings and the conclusion of this revised WSA has also not materially changed from the prior version.

A WSA is required pursuant to California Senate Bill 610 (SB 610) and the requirements of California Water Code Sections 10910-10915, which requires that a WSA be furnished to cities and counties for inclusion in any environmental documentation of a project that is subject to the California Environmental Quality Act (CEQA) and that anticipates water use equivalent to what would be used by five hundred (500) residential units. The stated intent of SB 610 is to strengthen the process by which local agencies determine the adequacy, sufficiency, and quality of current and future water supplies to meet current and future demands, particularly where those demands have not already been accounted for in adopted water management plans.

As described herein, the planned Phase II expanded mining operations at CMM is anticipated to use groundwater supplies in an amount that exceeds the volume typically used by five hundred residential units. Accordingly, CMV's Phase II mining operations are considered a Project as defined in SB 610, and this WSA is presented in accordance with California Water Code Section 10910 et seq., including Section 10910(f).

CEQA applies to projects requiring a public agency to approve a discretionary project. CMV's proposed Phase II Extension project, including amendments to CMV's Mine Plan of Operation and Reclamation Plan ("Mine and Rec Plan"; Ver. 2.0 90M-031), requires discretionary approval by San Bernardino County, a public agency. Therefore, the Project is subject to CEQA. This WSA has been prepared to support the anticipated environmental review by San Bernardino County under CEQA.

CMV is currently authorized to obtain all the water for CMM's current mining operation from existing groundwater wells within the Lanfair Valley Groundwater Basin, and specifically from wells adjacent to the CMM. CMV is currently expanding existing water supply capability at both the Lanfair basin (at CMM) and at an alternative water supply site to the northwest in the adjacent Ivanpah basin. These immediate water system developments will not increase the current amount of water permitted at the CMM, but will provide additional supply options, for current CMM operations. However, the proposed Phase II mine expansion project (which is the focus of this WSA) anticipates increasing groundwater use (over current production) from the aforementioned Ivanpah Valley Groundwater Basin (Northwest Water System ("NWS") to supplement the water currently obtained from the Lanfair Valley Basin (West Well Field [WWF] and East Well Field [EWF]). Since the project will only affect these two groundwater basins, pursuant to Water Code Section 10910, an assessment of groundwater conditions within these two basins is included in this WSA with respect to the ability of these resources to meet CMM's Phase II water demands for approximately 20 years of extended mining operations.

1.2 San Bernardino County Groundwater Ordinance Compliance

In 2002, the County approved San Bernardino County Ordinance No. 3872, which added article 5, section 33.06551 et seq., Desert Groundwater Management, to San Bernardino County Code title 3, division 3, chapter 6. Both the Ivanpah and Lanfair basins are unadjudicated and located in unincorporated desert regions within the county. An official groundwater ordinance map is included as **Figure 2.**

Code Section 33.06552(c) includes a list of activities exempt from the provisions of Ordinance #3872. Mining activity is specifically exempt per section 33.06552(c)(4), which provides that groundwater wells used in conjunction with mining operations for which a currently valid and compliant mining reclamation plan has been established are exempt from the Ordinance.

Water supply by all CMM wells discussed herein would be used to support CMM's valid and permitted mining operation. The current approved CMM reclamation plan is on file with the County Land Use Services Department.

1.3 Water Code Compliance

California Water Code (CWC) Sections 10910(c) and (f) require that the WSAs for projects that will use groundwater address the anticipated 20-year water demand for the project as well as for surrounding properties. Since no Urban Water Management Plan (UWMP) has been prepared for the CMM region, and there is no multi-connection public water supply system in the region

(CMV operates an internal, public water supply system in Lanfair Basin to provide potable water to CMM), the information and evaluations presented in this WSA are based on other publicly available data and documents, and with referenced studies prepared on behalf of CMV. This WSA provides:

- A description of the groundwater basins and groundwater conditions (CWC Section 10910(f)(2)).
- Available information regarding current and future water consumption from groundwater basins from which the project will rely on (CWC Section 10910(f)(3)).
- Discussion of the amount and location of groundwater pumping and recharge that occur throughout the groundwater basins (CWC Section 10910(f)(4)).
- An analysis of the sufficiency of the groundwater basins to meet projected water demand associated with the proposed project (CWC Section 10910(f)(5)).
- A discussion regarding the ability of projected water supplies to meet projected demand over 20-years under various scenarios (CWC Section 10910(c)(4)).

2. CMM Description

2.1 Mine Location

The CMM is located in the eastern Mojave Desert within the Hart Mining District, an area notable for its Miocene, calc-alkaline rhyolite dome field that hosts major gold deposits.

CMM's address is 115575 Hart Mine Road, San Bernardino County, California. CMM is located within T14N, R17E, Sections 13, 14, 22, 23, 24, 25, 26, and 17 and T14N, R18E, Sections 18, 19, and 30 San Bernardino Baseline and Meridian (SBB&M). The latitude and longitude of the site are 35°15'42" N by 115°06'44" W, respectively.

The mine is located near the northwest corner of Lanfair Valley about 17 miles (27 kilometers) southwest of Searchlight, Nevada, in eastern San Bernardino County, California (**Figure 1**). Lanfair Valley is bounded by the New York Mountains to the west, the Castle Mountains to the north, the Piute Range to the east, and the Hackberry Mountains and Vontrigger Hills to the south (**Figure 3**). The Lanfair Valley floor is approximately 20 miles wide from east to west, and about 17 miles wide north to south. The valley floor is relatively flat, and elevations range from about 3,300 feet along its southern margin to over 5,000 feet in the north near the New York Mountains.

Ivanpah Basin is an intermountain valley that abuts Lanfair Valley west of the New York Mountains along the California-Nevada border in northeastern San Bernardino County (**Figure 4**). The basin is bounded by the Clark Mountains on the northwest, the Ivanpah Range on the west, and by the New York Mountains on the southeast. Elevations of the valley floor range from 2,595 feet at Ivanpah (dry) Lake to about 4,000 feet above mean sea level at the southern end of the valley.

2.2 Climate

The climate in the eastern Mojave Desert near the CMM can best be described as warm and arid, with low precipitation, warm temperatures, and high evapotranspiration (Environmental Solutions, Inc. [ESI], 1989). Winter is the wettest period when snow may fall at higher elevations. Spring is generally the driest period and the summer period may bring monsoonal rains.

Approximately two-thirds of the average annual precipitation in the area occurs in the winter months (November through March) from storms that move in from the Pacific Ocean. Summer precipitation comes as short, intense, localized summer thunderstorms, in the monsoon pattern. Much of this summer rain is lost to evapotranspiration, especially for the smaller storms, although significant runoff can occur during the largest storms. Precipitation exceeds potential evapotranspiration only briefly from December to February and is considered the period when most groundwater recharge occurs (National Park Service [NPS], 1999).

2.3 Amended Project Overview

2.3.1 Original Mining Project

On October 7, 1990, the San Bernardino County Planning Commission approved Viceroy Gold Corporation's March 1988 application for a Conditional Use Permit, as well as Viceroy's Mining Plan of Operation and Reclamation Plan, No. 90M-013, dated August 1990, for the Castle Mountain Mine. The U.S. Department of the Interior, Bureau of Land Management (BLM), California State Office issued a Record of Decision on October 30, 1990, approving Viceroy's Plan of Operations which was submitted to the BLM in March 1988. These original lead agency authorizations[1] and subsequent authorizations, permit current and ongoing mining at the CMM.

2.3.2 Mining Process

Mining at the CMM involves traditional open pit mining techniques including blasting, excavation, ore hauling, crushing, comminution, heap leaching and solution processing. Heap

[1] As amended/revised in 1998, 2013, and 2020.

leach pad (HLP) operations involve placement of ore on a dual liner system and application of a leaching water and sodium cyanide solution to the stacked ore pile. After percolating through the ore material, the pregnant leach solution is collected and delivered to CMM's processing facility where it passes through a series of cascading Carbon-in-Column (or CIC) tanks where the carbon attracts and binds the gold ion. Gold is then stripped from the carbon and put through an electrowinning process where the gold is plated onto steel wool. This combination is forged and the steel wool is burned off, with the remaining gold poured into a bar or dore. The carbon gets regenerated and reused again. After passing through the CIC tanks, the barren solution (now devoid of gold) is amended by additional water and sodium cyanide and is recirculated back to the HLP for the process to repeat.

2.3.3 Existing and Planned Mining Operations

Active and idled gold mining has been permitted at the CMM from 1990 to the present. The current schedule of mining and reclamation extends to 2035, but in parallel with this WSA, CMV has also submitted plans to extend mining and reclamation to 2058.

2.4 Water Supply Components

2.4.1 General

CMM is currently authorized by the project lead agencies[2] to use 625 acre-feet of groundwater per year (AFY). Water is currently obtained using wells located near the mine in the Lanfair Valley Basin. CMV plans to use wells within both Lanfair Valley and Ivanpah Valley to support current and proposed future operations, with increased water use from both basins to support proposed expanded mining ("Phase II" mining). Both the Lanfair Valley Basin and Ivanpah Basin are non-adjudicated groundwater basins.

The expected water demand for the Phase II project is approximately 2,250 AFY. CMV anticipates that up to 1,340 AFY will be obtained locally within Lanfair Valley using the wells listed below and depicted on **Figure 5**. Seven new dewatering wells are proposed for the East Well Field. Field observations and groundwater modeling (Appendix A) indicate that these wells can supply the water needed for CMM through its active life.

[2] U.S. Bureau of Land Management (federal agency) and County of San Bernardino, California (state agency)

Lanfair Valley Production Wells

Well No.	Comment
W-14P	WWF well used historically to support mining operations, including potable use.
W-18P	WWF well used historically to support mining operations, including potable use.
W-45P	WWF well used historically to support mining operations.
CMM-W-01	EWF well that supports current mining and pit dewatering
CMM-W-02	EWF well that supports current mining and pit dewatering
CMM-03	EWF well planned to support current mining
DW-1	EWF well proposed to support mine pit dewatering
DW-2	EWF well proposed to support mine pit dewatering
DW-3	EWF well proposed to support mine pit dewatering
DW-4	EWF well proposed to support mine pit dewatering
DW-5	EWF well proposed to support mine pit dewatering
DW-6	EWF well proposed to support mine pit dewatering
DW-7	EWF well proposed to support mine pit dewatering

CMV anticipates that approximately 825 to 1,325 AFY of water will be obtained from newly constructed Ivanpah well IV-1TW (or potentially balanced across one or more wells) located on private land near Nipton, California, approximately 16 miles northwest of CMM (**Figure 6**). Field observations and groundwater modeling (Appendix B, GLA, 2022d) indicate that well IV-1TW is capable of supplying the water needed for CMM through its active life. Groundwater extracted from the Ivanpah Basin will be delivered to CMM via a proposed pipeline that would be installed within existing Rights-of-Way and easements, including the CMM access road leading south to the mine from Route 164 (**Figure 6**).

2.4.2 Ivanpah Basin Water Rights

Ivanpah basin is an unadjudicated water basin located in unincorporated San Bernardino County. All current and proposed water wells that may be used by CMV are located on private land either owned outright by CMV or leased to CMV through private lease agreements. Therefore, CMV retains an overlying right for the beneficial use of groundwater. CMV currently owns or leases over 200 acres of land throughout the Ivanpah basin. Specific to water use from the Ivanpah basin, and because water would be conveyed via pipeline for beneficial use at the CMM site in the Lanfair basin, CMV will therefore develop an appropriative right as well.

2.4.3 Lanfair Basin Water Rights

Lanfair basin is an unadjudicated water basin located in unincorporated San Bernardino County. All current and proposed water wells are located on either private (patented) land or developed on unpatented mill site claims which bestow a possessory-in-interest right to the valid claim holder. Location and use of a water well in support of an authorized mining operation is a recognized valid use of a mill site claim. CMV currently owns over 1,300 acres of private (patented or fee land) holdings throughout the Lanfair basin as well as approximately 12,000 acres of unpatented mine claims that bestow possessory rights to the claim holder. The cumulative CMV private and possessory-in-interest holdings throughout the Lanfair basin represent a significant overlying right for the beneficial use of percolating groundwater at the CMM operation.

3. Lanfair Valley Basin

3.1 Basin Description

Lanfair Valley is a semi-enclosed drainage basin with a total drainage area of 348 square miles. Several small surface runoff outlets are present on the western and southern edges of the basin (**Figure 7**). These include Cedar Wash, Woods Wash, "South Wash" (officially unnamed), Sacramento Wash, and Piute Spring Canyon. The entire valley floor slopes towards the southeast at gradients ranging from about 0.14 ft/ft (northeastern portion) to 0.23 ft/ft (southwestern portion) due to the generally higher topographic relief in the mountains along the western side of the valley. Ground surface elevation in the basin ranges from about 7,320 ft amsl in the New York Mountains to about 2,890 ft amsl at Piute Spring (**Figure 7**). The basin is filled with alluvial sediments at elevations ranging from about 5,250 to 2,950 ft amsl except for scattered areas where bedrock outcrops. The Lanfair Valley floor is topographically higher than the surrounding basins of Ivanpah to the northwest, Piute Valley to the north and east, and Fenner Valley to the south. Near CMM, the topography slopes gently from northwest to southeast at gradients between 0.5% and 2%, with an average of about 1%. The ground surface in the area is defined by multiple dry washes and incised drainages that flow to the southeast.

3.2 Lanfair Valley Area Geology

Geologic conditions within the Castle Mountains have been detailed by Linder (1988), Capps and Moore (1991, 1997, 1998) and by Nielson and Turner (1999). A good summary of these findings is available in the U.S. Geological Survey's On-Line Mineral Resources publication (Hill,

R.L [2006] and Schruben, P.G. [ed. 2008].

Lanfair Valley is located near the western margin of the Colorado River extensional corridor, a major regional tectonic feature that, in the Castle Mountains area, is associated with synvolcanic gold mineralization within a calc-alkaline rhyolite dome field.

Like ranges to the east and west, the Castle Mountains contain a Proterozoic metamorphic-plutonic basement complex composed mostly of well-foliated gneiss and leucocratic granitoids. The basement complex is intruded and overlain by Miocene-age, intermediate to felsic volcanic units including the Peach Spring rhyolite tuff, andesite flows and epiclastic sedimentary units of the Jacks Well Formation, as well as rhyolitic flows, domes, and tuffs of the Linder Peak and subsequent Hart Peak Formations. As shown in **Figure 8**, geologic units in the area include:

- Qal – Holocene Alluvium within active drainages and as overbank deposits. These clay, sand, and gravels reflect weathering of granites, gneiss and volcanic rock;
- Qc – Pleistocene Older Alluvium found along the margins of drainages. These highly dissected units expose clast- and matrix-supported gravel deposits, and contain coarse sand, gravel, and cobbles that are locally caliche-cemented;
- Qc – Pleistocene to Pliocene Gravels that are poorly exposed. These materials consist of light-colored sandstone, siltstone, and rounded to angular pebble- and cobble-size clasts; and
- Qc – Miocene Post-Volcanic Gravels. These subangular to rounded pebble- to cobble-size gravels overlie the Miocene volcanic rocks on a distinct angular unconformity. Largely consisting of granite and gneiss, the basal portion of this unit reflects erosion of pre-Tertiary units at higher elevations.
- Tv – Miocene age volcanic rocks, which include a mixture of rhyolite, andesite, basalt, and pyroclastic rocks. These Tertiary volcanics border Lanfair Valley on the northeast (Castle Mountains), east (Piute Range), and southwest (Hackberry and Woods Mountains), as well as forming the Grotto Hills and Lanfair Buttes near the center of the valley.
- gr – Mesozoic age granite forms the New York Mountains and Middle Hills which border the western side of the valley, although it is also found along the southeast corner of the valley. This appears to be part of a regional pluton in the area with numerous outcrops in the region, including at Billie Mountain near the southeast corner of the basin. This rock forms some of the basement rocks below the alluvial deposits, although the subsurface extent is not known.

- pC – Precambrian rocks – Undifferentiated basement rocks, primarily described as gneiss but also as schist and amphibolite (Capps, 1988) outcrop in various portions of the Lanfair Valley borders including in the northern portion of the New York Mountains, Castle Mountain, the Middle Hills, Table Mountain, the Vontrigger Hills and Billie Mountain. Age dating of these rocks in the New York Mountains puts them at 1.7 Ga (Capps, 1988) or Proterozoic.

3.2.1 Faults

No active or potentially active faults have been identified in the Lanfair Valley region, and faulting in the area is generally associated with Miocene extensional tectonics. Miocene continental extension produced the volcanism and structural trends of Miocene rocks and faults in the region. The southern part of the Castle Mountains is apparently a volcano-tectonic depression created by the eruption of rhyolite and tuff units.

The Castle Mountains are divided into north and south parts by west- to northeast-striking faults with steep dips (**Figure 8**). These faults cut the lower volcanic section and underlying migmatitic gneiss. The high-angle faults locally exhibit dip-slip offsets that generally are on the order of tens of meters. Geometric relations indicate that horizontal offsets on some faults may be as great as 300 to 1,000 meters.

3.3 Lanfair Valley Area Hydrogeology

3.3.1 General

Two hydrogeologic studies of the Lanfair Valley were conducted by the U.S. Geological Survey (USGS; Thompson, 1921; and Friewald, 1984). These studies identified well locations and depths, measured groundwater depths in wells, groundwater spring locations and approximate elevations, and analyses of groundwater chemistry. Following multiple rounds of geophysical studies of Lanfair Valley, a network of groundwater monitoring wells was installed by CMV in 2020 to provide additional information regarding the basin fill and bedrock hydrogeology of Lanfair Valley immediately southwest of CMM and in the bedrock aquifer at the southern end of the mine property (Clear Creek Associates, 2020).

Historical studies and more recent studies completed by CMV (e.g., GLA, 2017a, 2017b; Clear Creek Associates, 2020) indicate that groundwater flows through Lanfair Valley alluvial sediments from west-northwest to east-southeast (**Figure 9**). Groundwater recharge is derived from percolating seasonal runoff along the margins of topographic highlands along the west and northwest portions of the valley adjacent to the New York Mountains where rainfall is

greatest. Review of historical studies and groundwater modeling completed for CMV (GLA, 2022a) indicate that groundwater in the westernmost portion of Lanfair Valley discharges via underflow to Fenner Valley to the south, while the majority of groundwater in the remainder of the valley discharges via underflow to Piute Valley at the southeast corner of Lanfair Valley. Measured outflow from Lanfair Valley at Piute Spring ranged from 100 to 630 acre-feet per year (Friewald, 1984).

Piute Spring is also the only perennial stream and riparian corridor in the Preserve. Sampling by the USGS revealed a radiocarbon date for the water at Piute Spring of 6,825 years, indicating that discharge from the spring originated as precipitation in the New York Mountains during the mid-Holocene epoch (U.S. National Park Service, 2016).

The results of CMV's studies suggest that there are two aquifer systems in Lanfair Valley, a younger (upper) alluvial system that supplies the West Wellfield (the historical groundwater production area due west of CMM), and a deep alluvial-volcanic aquifer that extends to depths of as much as 1455 feet south and southwest of CMM. These aquifers are separated by widespread late Tertiary basalt volcanic flows that were observed in numerous well boreholes in the area. These flows likely limit groundwater flow between the two aquifer systems. The fractured bedrock aquifer system south of CMM is dominated by rhyolite flows and volcaniclastic units in which two wells, CMM-W-01 and CMM-W-02, were constructed in 2017 (GLA, 2017a; 2017b).

The groundwater gradient in Lanfair Valley is steepest in the upstream portions of the valley and flattens in the downstream portion of the valley, even though the lateral extent of the basin fill deposits decreases in the downstream portion. This suggests that the basin fill deposits have a higher transmissivity in the downstream (southeastern) portion of the valley.

3.3.2 Regional Wells

Figure 10 shows the location of the regional wells and natural groundwater springs identified from various published sources within or in close proximity to the Lanfair Valley boundaries. A total of 63 regional wells (including 51 within the Lanfair basin boundaries) and 13 groundwater springs (including 8 within the Lanfair basin boundaries) were identified. Other than the CMM production wells that operated beginning in late 1980's, groundwater production within Lanfair Valley is quite modest (Friewald, 1984) at an estimated average of no more than about 40 AFY.

3.3.3 Alluvial Aquifer

Lanfair Valley is filled with alluvial sediments that contain a wide range of grain sizes from clay to gravels, including some partially cemented horizons as well as interbeds of volcanic flows and pyroclastic deposits. The alluvial sediments are believed to be underlain primarily by crystalline intrusive and metamorphic basement rocks with rare occurrences of Paleozoic sedimentary rocks. The maximum depth of the alluvial fill for much of the basin is unknown, although borings near the center of the valley indicate depths of greater than 1,000 feet (GLA, 2018). To the south and west of the Castle Mountains, the measured or indicated depth of the alluvial deposits range from about 300 to over 1,400 feet, averaging about 650 feet. The pre-mining measured saturated thickness of basin fill alluvium in this area ranges from 90 to 666 feet, averaging about 315 feet.

Prior to 2021, measured hydraulic conductivity of these deposits was only measured in the northernmost portion of the valley and indicated a low to moderate hydraulic conductivity of 0.07 to 8.5 feet per day (ft/d) for the alluvial aquifer. In 2021, CMV drilled and installed production well CMM-03 south of the mine to a total depth of approximately 1474 feet within alluvial, volcaniclastic, tuff and basalt (GLA 2022c,). Aquifer testing at well CMM-03 yielded a transmissivity value of about 4,920 ft^2/day which equates to a hydraulic conductivity value of 5.14 ft/day at an aquifer thickness of 958 ft. While these measured aquifer properties are generally within the lower end of the range observed for basin and range deposits, significant variations can be expected across the valley and at depth. Although the upper portion of the alluvial basin deposits hosts an unconfined aquifer, the presence of interbedded volcanic deposits overlain by clay can create locally confined aquifer conditions at depth.

3.3.4 Bedrock Aquifer

Volcanic rocks occur predominantly in the northern, eastern, and southwestern portions of the valley but also outcrop in a few locations near the valley center (**Figure 8**). Within the Castle Mountains, the volcanic deposits can have zones of elevated permeability with measured hydraulic conductivity of 0.10 to 0.56 ft/d, although locally impermeable volcanic rocks are also present (GLA, 2022a). Mesozoic granitic intrusives, Paleozoic marine sedimentary rocks, and the Precambrian metamorphic rocks are expected to have a low to very low hydraulic conductivity (e.g., 0.03 to 0.0003 ft/d and porosity of 0.5 to 1 %).

In 2017, CMV installed two production wells (CMM-W-01 and CMM-W-02) in bedrock units near the CMM pits (**Figure 5**). These wells were drilled to depths of 1,612 ft bgs and 2,015 ft bgs, respectively. The measured depth to water was 580 feet at well CMM-W-01, representing a

saturated thickness of well screen of 997 feet. The measured depth to water was 446 feet at well CMM-W-02, representing a saturated thickness of screen of 1,526 feet. Both wells encountered similar rhyolite bedrock lithologies. Aquifer pump tests conducted at these wells indicated modest transmissivities of 217 ft^2/day and 849 ft^2/day (equating to hydraulic conductivities of about 0.22 and 0.56 ft/d) and storativities of $2.4E^{-4}$ and $6.0E^{-4}$, respectively (GLA; 2017a, 2017b).

Based on the surface geophysical survey results. CMV drilled five small-diameter exploration borings south and west of the mine pits. The five boreholes (2019-1MW, 2019-2MW, 2019-3MW, 2019-4MW, and 2019-5MW) to depths of up to 1500 feet within volcanic and older alluvial units, and water inflow was observed at multiple horizons in each borehole (Clear Creek Associates, 2020). Each borehole was reamed to a larger diameter to permit installation of monitoring wells to a depth of about 700 feet.

Observations during drilling of the five exploratory boreholes indicates that the most hydraulically conductive zones within the volcanic units are associated with fractured silicified aphyric rhyolite with flow banding. Very low conductivity was indicated in one borehole where andesite flows and volcanic tuff were identified (Clear Creek Associates, 2020). As with alluvium, it can be expected that the hydraulic properties of the various types of volcanic units vary significantly both locally and regionally within Lanfair Valley.

Based on results from the five exploratory borings drilled in 2020, a 14-inch diameter boring was drilled near monitoring well 2019-4MW (**Figure 5**). This well, designated CMM-03, was drilled, constructed, and pump tested in late 2021. As detailed in section 8.3 of the Lanfair Valley *Groundwater Model Report* (GLA, 2022a, revised 2023), the aquifer pumping tests at CMM-03 yielded an average hydraulic conductivity of about 5.14 ft/d. The Lanfair Valley Groundwater Model Report is included here as Appendix A. Full details of the aquifer test are included in the report, *CMM-03 Test Production Well Summary Report* (GLA, 2022c) which is included as Appendix A to the Lanfair Valley Groundwater Model Report (GLA, 2022a).

3.4 Basin Storage and Recharge Estimates

California Department of Water Resources (DWR) Bulletin 118 estimates that Lanfair Valley (Basin 7-001) has a storage capacity of approximately 3,000,000 acre-feet. Basin recharge is estimated by DWR to be approximately 1,800 acre-feet per year. Recharge in Lanfair Valley was also evaluated by The Mark Group (1988) to support earlier mining operations at CMM by Viceroy Gold Corporation. Their estimate for recharge was approximately 2,000 to 5,000 AFY. This range appears reasonable for desert areas and amounts to about 1.2 to 3.1% of average

precipitation. Numerical groundwater modeling completed for CMV (GLA, 2022a) identifies a calibrated steady-state recharge value of approximately 3,498 AFY.

In basin and range alluvial fill aquifers such as Lanfair Valley, the majority of the recharge comes from runoff along the mountain borders which infiltrates into the alluvial fans and along ephemeral stream channels. The majority of aquifer recharge is expected to come from the northwestern border of the basin due to the higher elevations of these mountains and consequent higher rainfall patterns in these areas. This expectation is supported by the observation from satellite photos that major washes in the alluvium flow from this area (**Figure 7**).

3.5 Groundwater Production

Other than groundwater pumping to support CMM, no significant pumping occurs within Lanfair Valley. Friewald (1983) notes that pumping within the basin in 1981 amounted to less than 40 AFY, but that well flow rates were not rigorously measured.

3.6 Groundwater Monitoring / Trends

Review of monitoring data collected for CMM's monitoring wells indicates that groundwater levels near the mine have remained relatively stable since the wells were constructed (GLA, 2022b). Review of analytical data obtained historically for CMM's production wells indicates that groundwater quality is generally good, at or near drinking water quality with Total Dissolved Solids (TDS) concentrations less than 300 milligrams per liter (mg/L).

3.7 Groundwater Modeling / Predictions

3.7.1 General

A numerical groundwater model of Lanfair Valley was developed to evaluate past and future groundwater pumping expected to support CMM, a gold mine that has recently been re-activated after a period of suspended activity (GLA, 2022a; revised 2023). The model was calibrated to observed groundwater level data spanning the period from the 1980's to the present. An acceptable calibration was achieved by adjusting boundary conditions and aquifer hydraulic properties. A copy of the model report is attached to this report as Appendix A.

Some of the specific objectives for the model included the following:

- Simulate past groundwater pumping operations at CMM and continued future pumping at the approved baseline rate (625 AFY);
- Simulate proposed future pumping from existing wells and increased pumping from proposed mine pit dewatering wells at the CMM that will support current and proposed extended mining operations;
- Assess the potential for significant impact of mine-related pumping to the Lanfair water basin and on surface and subsurface flow in the Piute Spring area in the southeast portion of Lanfair Valley;
- Simulate the long-term recovery of the groundwater system after mining has ceased.
- Simulate and evaluate the impact of a long-term drought on the Lanfair Valley aquifer system.

The model was developed using the USGS model code "MODFLOW-NWT" and the graphical user interface "Groundwater Vistas." The model domain encompasses about 738 square miles within which variable groundwater conditions occur in an approximately 456 square miles area.

The model was used to simulate a steady-state condition to represent pre-mining conditions, and an acceptable calibration was achieved using 69 wells scattered throughout Lanfair Basin. The model was then used to simulate transient conditions at the mine when pumping occurred from 1991 through 2016.

Three scenarios were simulated to evaluate various long-term groundwater pumping scenarios. These simulations include:

Baseline Scenario: The baseline run approximates current groundwater pumping rates projected through 2045. This scenario simulates historical and future pumping with aggregate rates of 387 gpm from 2024 through 2045 (625 AFY). It also anticipates five years of heap rinsing at 350 gpm and then 100 years of groundwater recovery with no pumping.

Scenario 1: This case simulates proposed increased pumping with aggregate rates up to 830 gpm (1,339 AFY) from 2024 through 2045, five years of heap rinsing at 350 gpm and then 100 years of groundwater recovery with no pumping. Seven pit dewatering wells were included in the simulation.

Drought Scenario: This scenario was developed to consider a sustained 10-year-long drought in the basin from 2024 through 2034. Groundwater pumping rates during this period are assumed

to be same as for Scenario 1. The drought is integrated in the model setup by assuming a 10 percent reduction in recharge within the highlands recharge areas.

3.7.2 Model Results

As detailed on **Figures 46-65** in Appendix A (GLA, 2022a), the results of groundwater modeling indicate that groundwater table reductions near the EWF bedrock pit dewatering extraction wells will be nearly the same for all three scenarios (200 to 300 feet) but these drawdowns will be most significant in a limited area near CMM. Groundwater table "drawdown" further out into the valley area will be considerably less and water levels will recover relatively quickly once mining ends. As summarized below, groundwater table recovery as measured as residual drawdown following the end of the active life of the mine occurs relatively slowly. Owing to its relatively great distance from the CMM pumping centers, potential groundwater pumping effects 12 miles away at Piute Spring would also occur slowly. The model estimates the potential for a maximum 5% decline in spring discharge by 2150 compared to the current baseline condition. Considering the error factor inherent with any model, and substantial distances both geographically and over time, the likelihood of notable mine-induced pumping effect on Piute Spring is considered low.

4. Ivanpah Valley Basin

4.1 Basin Description

Ivanpah Valley is a large, north trending, semi-closed basin located along the Nevada-California border in eastern San Bernardino County, California, and Clark County, Nevada (**Figure 4**). The valley encompasses approximately 1,330 square miles and is bordered by the Ivanpah Range to the west, the New York Mountains to the southeast and Clark Mountain to the northwest. Elevations in the basin range from 2,600 ft amsl (above mean sea level) on the valley floor to 8,510 ft amsl in the nearby mountains. Major infrastructure in the project area includes an active rail-line running south to north through the town of Nipton along the east side of the valley. In addition, communication lines, power lines, and radio towers are found in the valley (e.g., the new Ivanpah Solar Electric Power Facility and transmission lines located along the west side of the valley near the Nevada border).

Along the west side of the valley, the Primm Golf Resort is positioned adjacent to Interstate 15 near the California-Nevada border (**Figure 6**). Near the southeast side of the valley, the town of

Nipton is privately owned with a mostly transient population, though approximately a dozen people reside in a mobile home park in the town at least part-year.

4.2 Geology

The Ivanpah Valley was formed during the Quaternary by Basin and Range-style extensional tectonics. There are several major faults that can be traced along the mountain range / valley borders on both sides of the valley. In the southern section of Ivanpah Valley, the two main faults are the Ivanpah Fault and the State Line Fault. (**Figure 11**).

The mountain ranges surrounding Ivanpah Valley consist of Precambrian metamorphic and sedimentary rocks, Paleozoic and Mesozoic sedimentary rocks, and igneous and volcanic rocks and sediments of Tertiary age. Sediments within the valley were deposited as alluvial sands and gravel and as evaporites. At the valley margins, the younger sediments are primarily coarse sands and gravels. Towards the center of the valley, the sediments grade into fine grained silts, clays, and evaporites. The thickness of the valley alluvial sediments is estimated to be around 8,000 feet (Hewett, 1956; Molycorp, 2000). Oil and gas exploratory drilling referenced by TRC (2000), intercepted a 130-foot-thick salt layer at a depth of 1,100 feet bgs (below ground surface) in Ivanpah Valley. This salt layer could act as an impermeable base for groundwater flow and was assumed by both ENSR and TRC to be continuous throughout the valley. As indicated below, this interpretation has been refined in the area of Nipton based on local, recent drilling information.

4.3 Hydrogeology

4.3.1 General

Several historical studies describe the hydrogeology of Ivanpah Valley. Glancy (1968) was the first to attempt to develop a hydrologic model for the Nevada portion of Ivanpah Valley. Moyle (1972) compiled water well and spring data for the southern part of Ivanpah Valley for the California DWR. A study by TRC (2000) provided pumping and water quality data for the Ivanpah Well Field that was previously used for the Mountain Pass Mine when it was operated by Molycorp (now owned by MP Materials.

ENSR (2008) prepared a calibrated numerical groundwater flow model for Ivanpah Valley based on data from previous reports. These studies indicate that groundwater in Ivanpah Valley flows from the surrounding mountains toward the center of the valley, and then northward into the

northern part of the valley in Clark County, Nevada (**Figure 12**). Gradients are very steep adjacent to highlands and become flatter toward the valley bottom and playa area (ENSR 2008).

4.3.2 Basin Water Quality

Water quality in Ivanpah Valley varies with location within the basin. Water quality data compiled by Moyle (1972) showed that most wells along the valley margins had total dissolved solids (TDS) less than 500 milligrams per liter (mg/L) and the water was dominated by bicarbonate. Sulfate was generally below 200 mg/L and calcium, sodium, and magnesium were below 100 mg/L. Wells near the center of the basin at the playa had sulfate concentrations up to 1,800 mg/L with TDS up to 13,000 mg/L. Groundwater concentrations appear to increase in TDS, sulfate, chloride, and alkali metals moving closer to the center of the valley and in close proximity to the playa (ENSR 2008).

The groundwater in the basin is rated marginal to inferior for both domestic and irrigational use because of elevated fluoride and sodium contents (DWR, 2022). Elevated concentrations of sodium preclude the use of groundwater for irrigation in many parts of the basin. TDS concentrations generally range from about 300 to 500 mg/L, although near Ivanpah Lake and in the northeast part of the basin, TDS concentrations have been recorded as high as 7,702 and 27,501 mg/L.

4.3.3 Aquifers

The valley aquifers can be divided into a shallow aquifer and a deep, more confined aquifer. The shallow aquifer along the valley margins is characterized by sands, gravels, and large boulders. The deeper aquifer is characterized by the interfingering sands and gravels with clay and silt. The shallow aquifer extends to a depth of about 200 feet bgs and the deeper aquifer extends from approximately 200 to 1,100 feet bgs (ENSR, 2008). Although ENSR modeled the two aquifers as separate layers, they are viewed as hydrologically connected.

Surface geophysics completed for CMV (Clear Creek Associates, 2020) suggests that the area in and around the small town of Nipton contains alluvial fill that has a saturated thickness of up to 2500 feet. The alluvial fill appears to be fairly uniform both horizontally and vertically and much more permeable than saturated sediments in the center of Ivanpah Basin where playa deposits of clay, silt, and evaporites predominate.

Oil and gas drilling referenced by TRC (2000), intercepted a 130 ft thick salt layer at a depth of 1,100 ft bgs (below ground surface) in Ivanpah Valley. While this was interpreted to be the bottom of the productive portion of the basin in ENSR's model near the MP Materials wellfield,

this does not appear to be the case in the Nipton area where there is no indication of a salt layer to the bottom of the AMT survey at a depth of about 3000 feet. This makes sense since the sediments along the margins of a large basin such as Ivanpah would consist of coarser material that gets finer toward the center of the basin.

Aquifer testing of several production wells was compiled by Glancy (1968), Moyle (1972), and TRC (2000). The wells that were tested include the MP Materials Ivanpah Well Field, several wells owned by the Union Pacific Railroad, and one private well (Ruoff). ENSR (2008) includes figures (7-1 and 7-2) and a table (7.4) showing the locations and testing results of these wells. Most of the production wells in the area are screened within the deeper aquifer in coarse alluvial sand and gravel zones. The only available drawdown data for wells that are screened in the shallow aquifer were for the Ruoff well and MP Materials well W-8.

Aquifer test data compiled by TRC (2000) for wells in the Molycorp Ivanpah well field indicate transmissivities for the deeper wells range from 1,077 to 13,400 ft^2/day but were generally between 1,000 and 2,000 ft^2/day with a specific capacity of between 5 and 10 gpm/ft of drawdown. Transmissivities for the shallower wells were about 300 ft^2/day with a specific capacity of around 2 gpm/ft.

In 2020, CMV installed test well IV-1TW to a depth of 1,485 feet on private land near Nipton, CA, on the southeast side of the basin to better understand potential yields in the basin and its possible use to help meet the water demands of CMM (Clear Creek Associates [CCA], 2021). Subsequent aquifer pump tests completed at the IV-1TW well indicate the transmissivity of the aquifer near Nipton is approximately 19,150 ft^2/day with a corresponding hydraulic conductivity of 18.6 ft/day and storativity of 0.000449. The specific yield of IV-1TW at a constant pumping rate of 982 gpm was 13.46 gpm/ft of drawdown. These results indicate that the aquifer near Nipton, proximate to highland areas, is significantly more permeable than in areas closer to the basin center.

4.4 Estimated Basin Storage and Recharge

Precipitation occurs mainly in the mountains and the associated mountain front runoff is the main component of recharge for the valley. Rain falling on the valley floor may supplement recharge, but is not expected to be a major component.

The total storage capacity of the basin within California is estimated to be about 3,090,000 AF (DWR, 1975). Literature indicates that recharge in Ivanpah Basin is about 2,000 AFY with about

752 AFY in Ivanpah North and 1,184 AFY in Ivanpah South and Jean Valley is about 119 AFY (ENSR, 2008).

ENSR's 2008 model report discussion of recharge identifies conflicting recharge estimates in earlier studies of Ivanpah Basin. ENSR noted that they preferred to be conservative and that future studies may identify more accurate estimates since "under very exceptional periods of rainfall, this conservative approach may not hold" (ENSR, 2008).

4.5 Groundwater Production

Published or publicly available historical groundwater pumping rates have been presented by various parties. Molycorp (2000) suggested that total groundwater pumping from their wells (now mostly inactive), the wells in Primm, Nevada, the Colosseum Mine wells (no longer pumping), and the Primm Golf Course wells, was about 1,800 gpm (2,904 AFY). The inactive Molycorp wells were rated at about 850 gpm (Glancy 1968). In 2005, the Primm Golf Course complex reportedly used 1,560 AF of water; water use in 2002 through 2004 was 1,680 to 1,727 AFY (MWH 2006). Between 1953 and 1998, the Molycorp wells pumped between 484 and 1,242 AFY (TRC 2000).

The town of Jean used about 554 to 690 AFY of groundwater during 1995-2000 (Parsons 2002) and disposed of gray water through infiltration basins. Jean Valley wells near the Southern Nevada Correctional Facility can produce up to about 182 AFY. According to Parsons (2002), casino gray water in the town of Primm accounts for about 700 AFY, most of which is returned to the valley aquifer through infiltration basins. Groundwater used in the Goodsprings, Nevada area comes mainly from private wells in alluvium and carbonate rocks. According to Glancy (1968), Goodsprings used about 10 AFY of groundwater in 1968. In 2006, water use at Goodsprings was estimated to be approximately 120 AFY, based on a population of 232 individuals and water consumption at 463 gallons per capita per day (Nevada DWR 2006).

Though conflicting estimates of basin pumping rates have been given, our review of available data indicates that the most probable distribution of pumping is approximately 2,340 AFY for Ivanpah South and about 2,000 AFY for Ivanpah North.

4.6 Groundwater Monitoring / Trends

Review of historical and ongoing monitoring data collected for the old Molycorp evaporation ponds indicates that groundwater levels in the basin are relatively stable (Arcadis, 2022). One notable increase in groundwater levels occurred in all monitoring wells following the especially

rainy 2010 winter, though this would seem at odds with the ENSR model assumption that rainwater falling within the lower basin does not contribute to basin recharge. With the exception of the monitoring wells most proximate to the old evaporation ponds, water quality has remained relatively stable, with TDS and nitrate concentrations below about 500 mg/L and 3 mg/L, respectively.

4.7 Groundwater Modeling / Predictions

4.7.1 Model Setup

There are several historical studies that describe the hydrogeology of Ivanpah Valley. Glancy (1968) was the first to attempt to develop a hydrologic model for the Nevada portion of Ivanpah Valley. Moyle (1972), with the California DWR, compiled the water well and spring data for the southern part of Ivanpah Valley. ENSR (2008) presented a calibrated numerical groundwater flow model for Ivanpah Valley. The ENSR groundwater model was constructed using the USGS' model code "MODFLOW 2000" (Harbaugh et al, 2000) as implemented in the graphical user interface, Groundwater Vistas (Environmental Solutions, Inc. [ESI], 2005). The model domain covers 1,330 square miles, measuring 52 miles north to south and 25 miles from east to west.

The ENSR numerical groundwater model of Ivanpah Valley was updated for CMV's project to evaluate the effects of groundwater pumping by CMV to support CMM's planned amended operations (CCA, 2022). Minor adjustments to ENSR's model input parameters were made to account for data obtained from well IV-1TW and for changes in pumping patterns that have occurred in the area since 2008. Production wells that were included in CCA's model adjustment are shown on **Figure 6**. No additional pumping data for Ivanpah Valley was found to be available after 2008, therefore, 2008 pumping rates were used for the period 2008-2020. An additional aquifer property "zone" was also integrated in the analysis to account for aquifer test data that was obtained following construction of the IV-1TW well.

As indicated in Appendix B (GLA, 2022d), CCA's model adjustment of the ENSR model was completed using the MODFLOW-NWT (Niswonger et al, 2011) platform and the Groundwater Vistas, version 8 (Environmental Simulations Inc., 2020) graphical user interface. To accommodate data from well IV-1TW, the aquifer hydraulic conductivity for the area near Nipton was modified to make this coarse alluvial area relatively more permeable. Pumping rates were kept constant from 2005, the last year of ENSR's calibration, to 2022, the earliest time when pumping from well IV-1TW may begin. Additional pumping rate data reviewed by CCA indicated only a minor amount of pumping growth in the California portion of the valley which is the portion of the basin of most interest for this WSA. Pumping rates have increased to the

north near Primm; however, this portion of the valley (north Ivanpah) is relatively isolated by the State Line Fault which appears to limit groundwater flow between the northern and southern portions of Ivanpah Valley.

Stress periods were added to CCA's model simulation to accommodate the period 2006 to 2022 and from 2023 to 2045, the period planned for CMV's planned Phase II active mining. An additional 100 years was added to simulate 2046 to 2145 groundwater rebound after CMM water use ends. Simulation of the potential drought conditions in the basin was developed by adding a stress period of 10 years in which mountain front recharge was decreased by 10 percent. Other than the drought simulation, boundary conditions were left unchanged from the ENSR 2008 model.

Comparison the ENSR's original calibration results for their 2008 model with results from CCA's model adjustments indicates that CCA's minor model changes result in similar calibration statistics.

4.7.2 Model Results

CCA's model predicts that after IV-1TW ceases pumping, drawdown within IV-1TW will be on the order of about 75 feet (at the production well) and a maximum of 5.3 feet in the nearby vicinity of Nipton (**Figures 8 and 9** in Appendix B, GLA, 2022d). Model results indicate that a drought will not have a measurable effect on drawdown near IV-1TW.

5. Conclusions

Field data and groundwater modeling indicate that planned groundwater pumping in the relatively remote Lanfair and Ivanpah Basins is sustainable throughout the planned active life of CMM and that potential effects on local groundwater resources will be minor regardless of drought conditions. Groundwater quality within CMM's planned pumping locations is relatively stable and will be adequate for long-term mine operations. Owing to the coarse alluvial character of the aquifer at well IV-1TW, planned pumping by IV-1TW is expected to result in only very minor effects that will be limited to the pumping well area. While the Lanfair basin groundwater table response to planned mine pit dewatering and mining operations is more pronounced, the largest effects will occur close to the CMM mine area, and groundwater levels in this area will recover.

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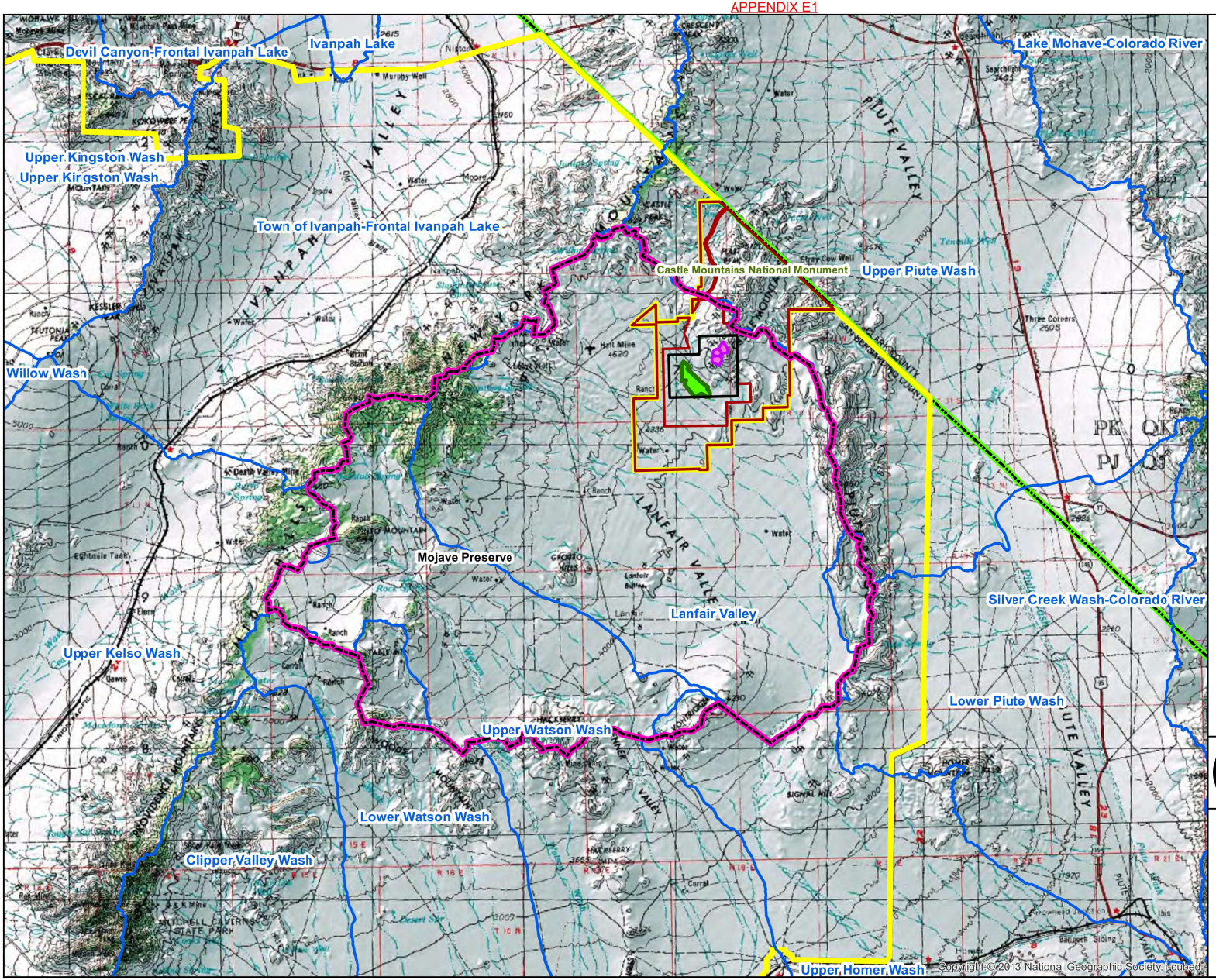
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FIGURES



Explanation

- CMM Project Boundary
- Model Basin Outline
- USGS Watershed Boundaries
- Castle Mountain National Monument
- Mojave National Preserve
- State Boundary
- Mine Pits
- Heap Leach Pad

Notes:

0 2 4 8 Miles

Revision Date: 6/14/2023

Job Number: CC20.1105

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Figure 1

Site Location Map

Equinox Gold
Castle Mountain Mine, CA

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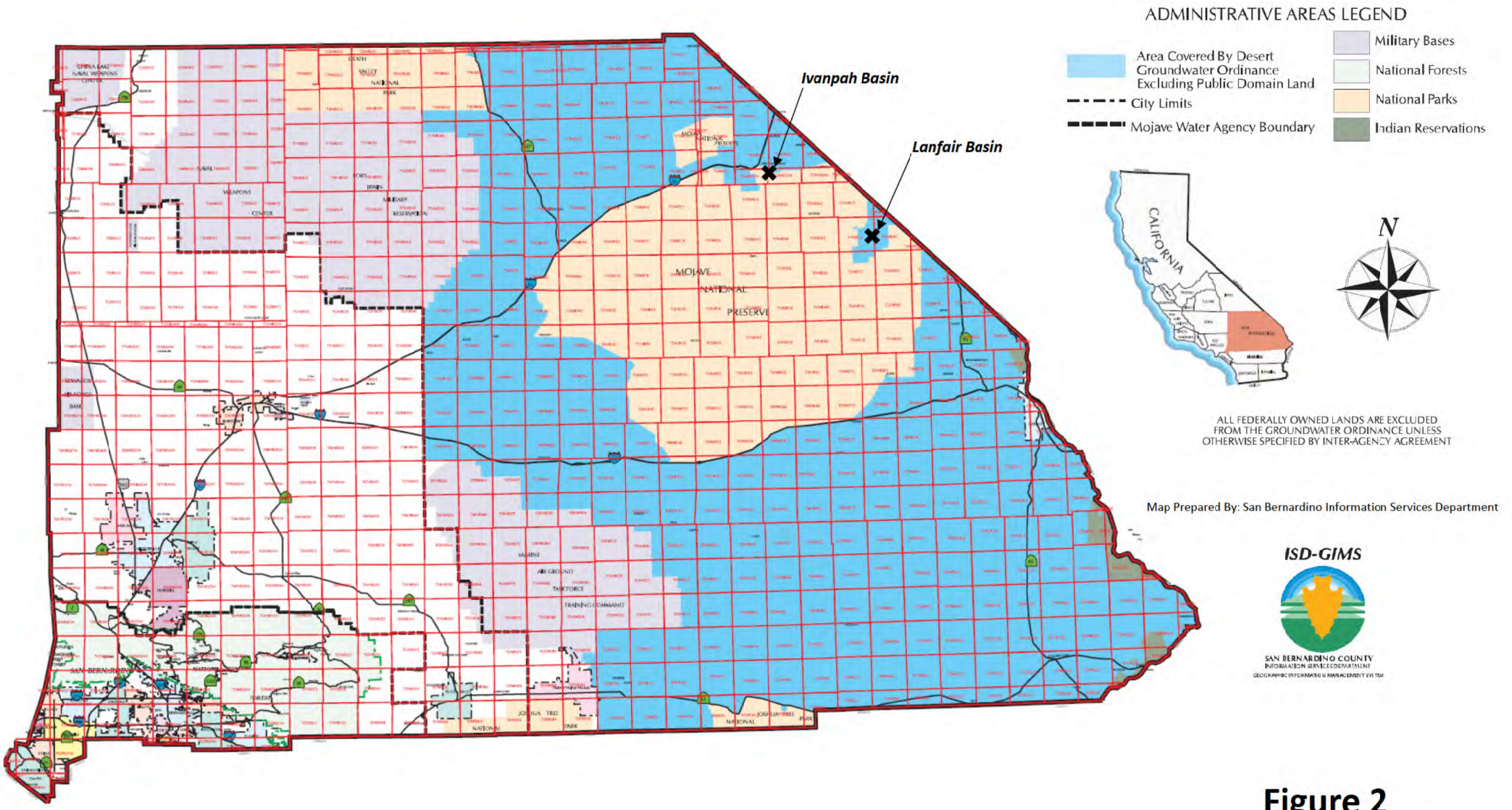
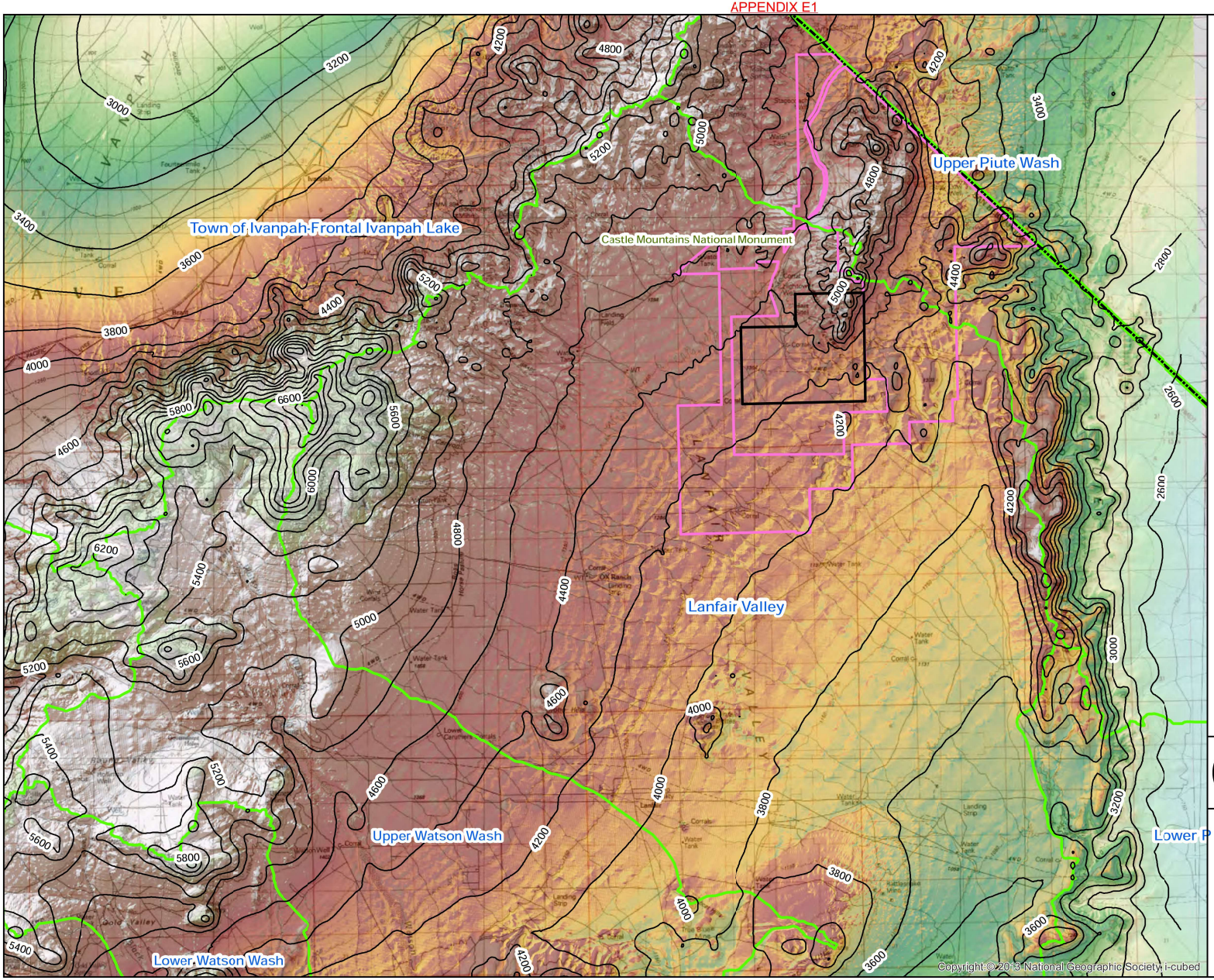


Figure 2

Areas Covered By County Ordinance No. 3872

Water Supply Assessment, Castle Mountain Mine



Explanation

- Elevation Contours
- CMM Project Boundary
- USGS Watershed Boundaries
- Castle Mountain National Monument
- State Boundary

Land Surface Elevation (feet)
- High : 7514.67
- Low : 2364.84

Notes:

Miles
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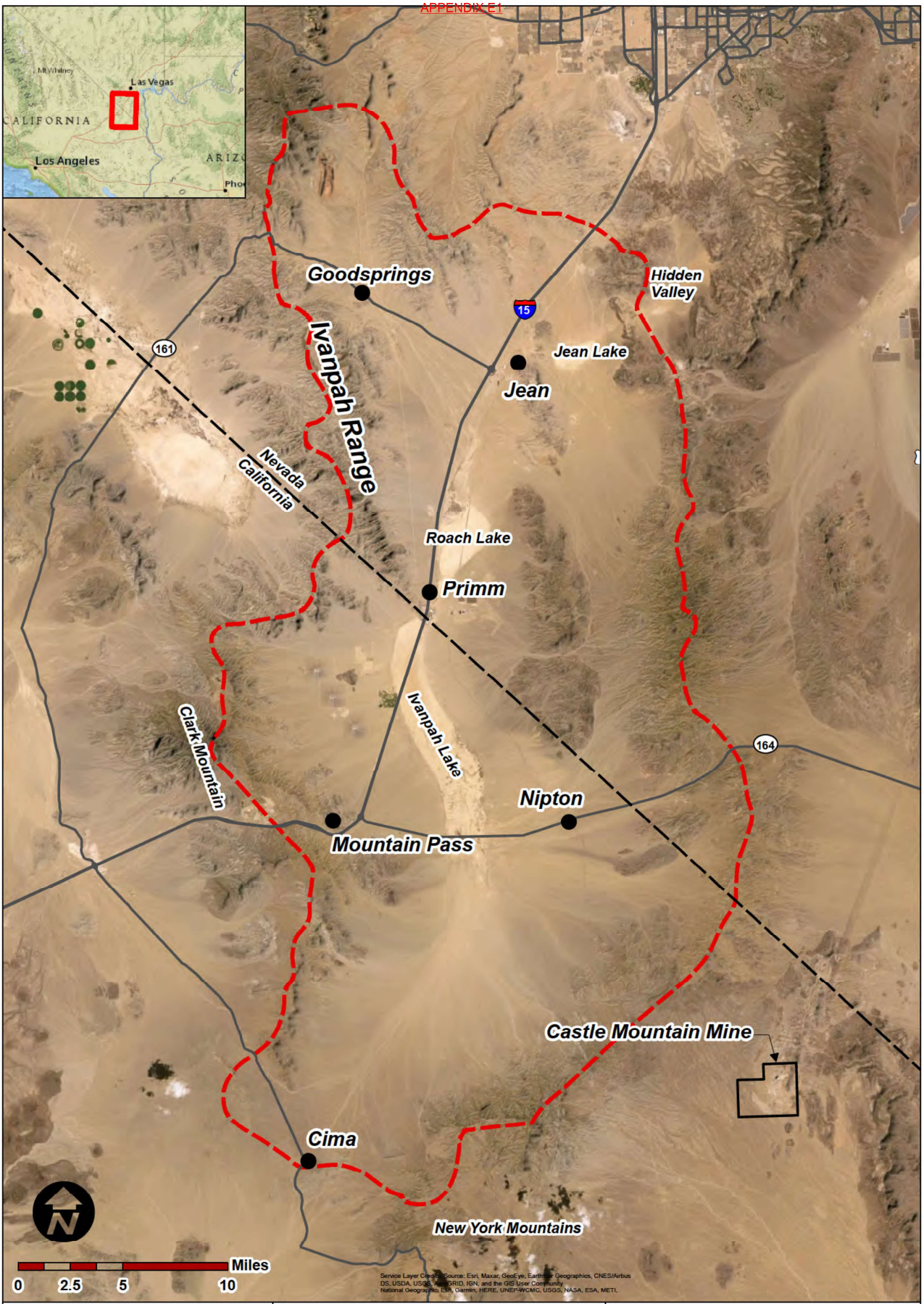
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Figure 3
Lanfair Valley

Equinox Gold
Castle Mountain Mine, CA

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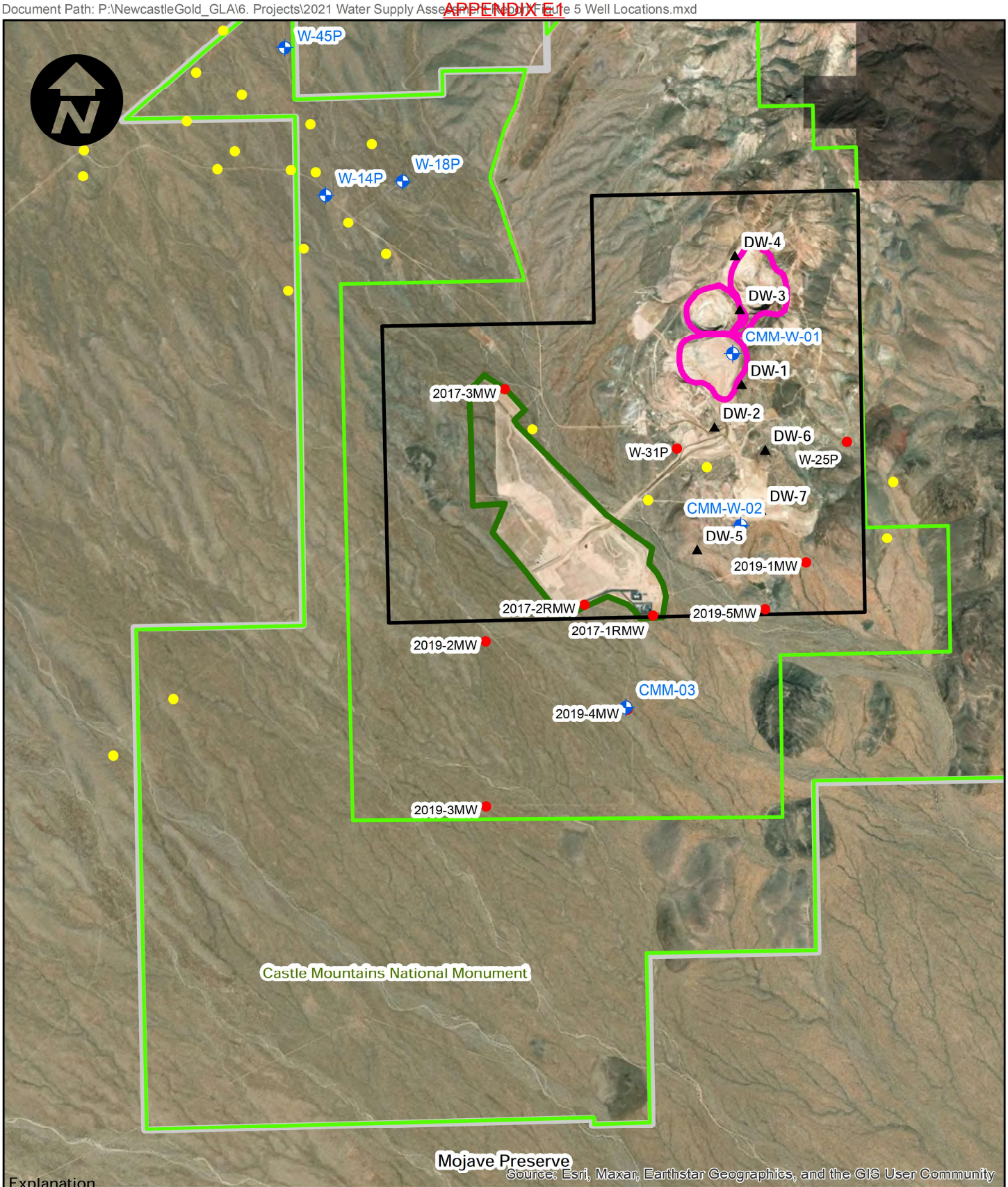
EXPLANATION:

Groundwater Model Domain Boundary

Figure 4

Ivanpah Basin Location

Water Supply Assessment, Castle Mountain Mine



Explanation

Future Dewatering

Well Locations
- Monitor
- Production Well
- Reclaimed PW/MW

CMM Project Boundary
Castle Mountains National Monument
Mojave Nationak Preserve
Mine Pits
Heap Leach Pad
No Flow Cells

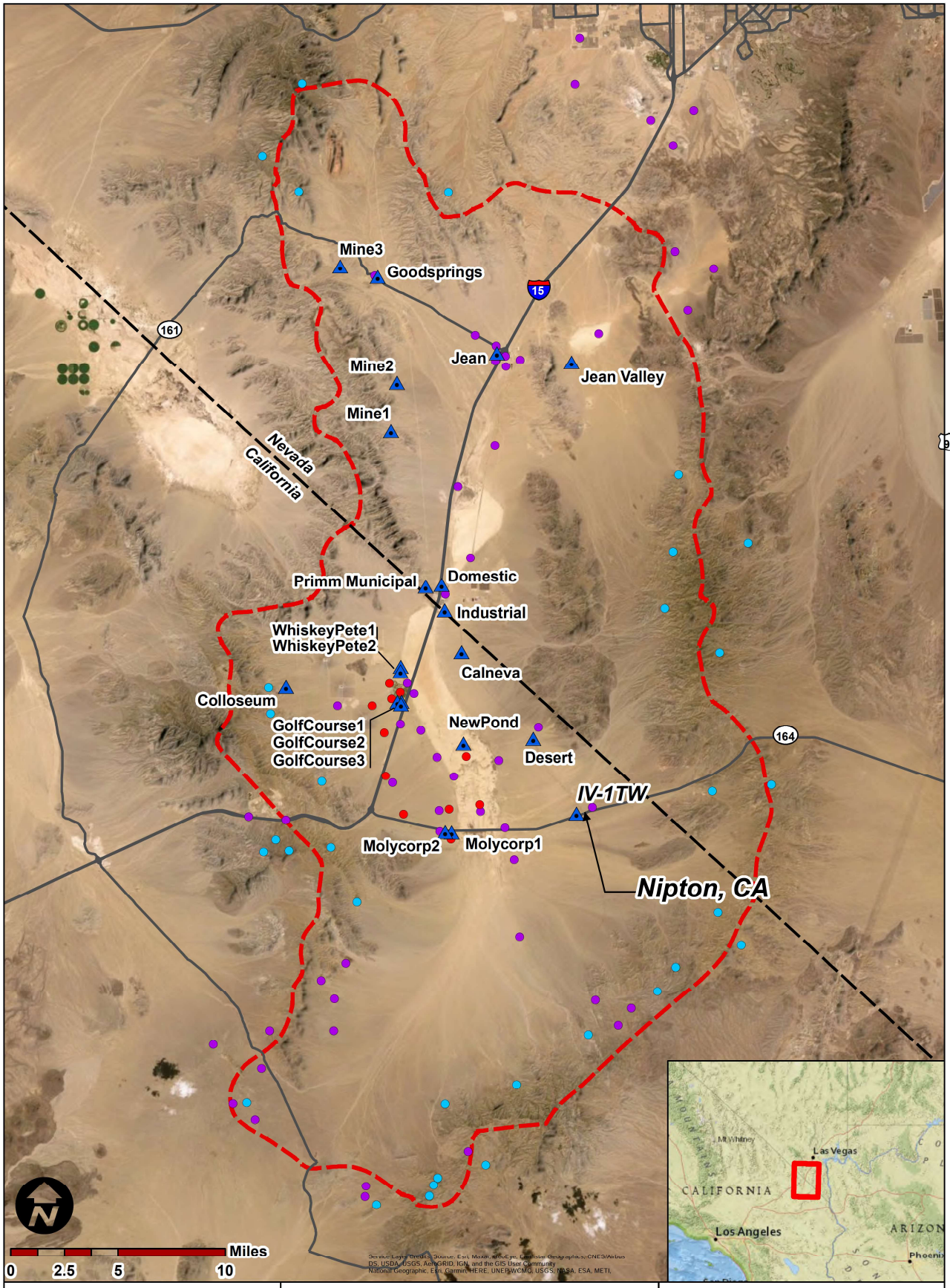
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Well Location Map
Castle Mountain Mine
Equinox Gold
Castle Mountain Mine, CA

Figure 5



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Drawn/Reviewed by: JO / RM

Date: 3/1/2022

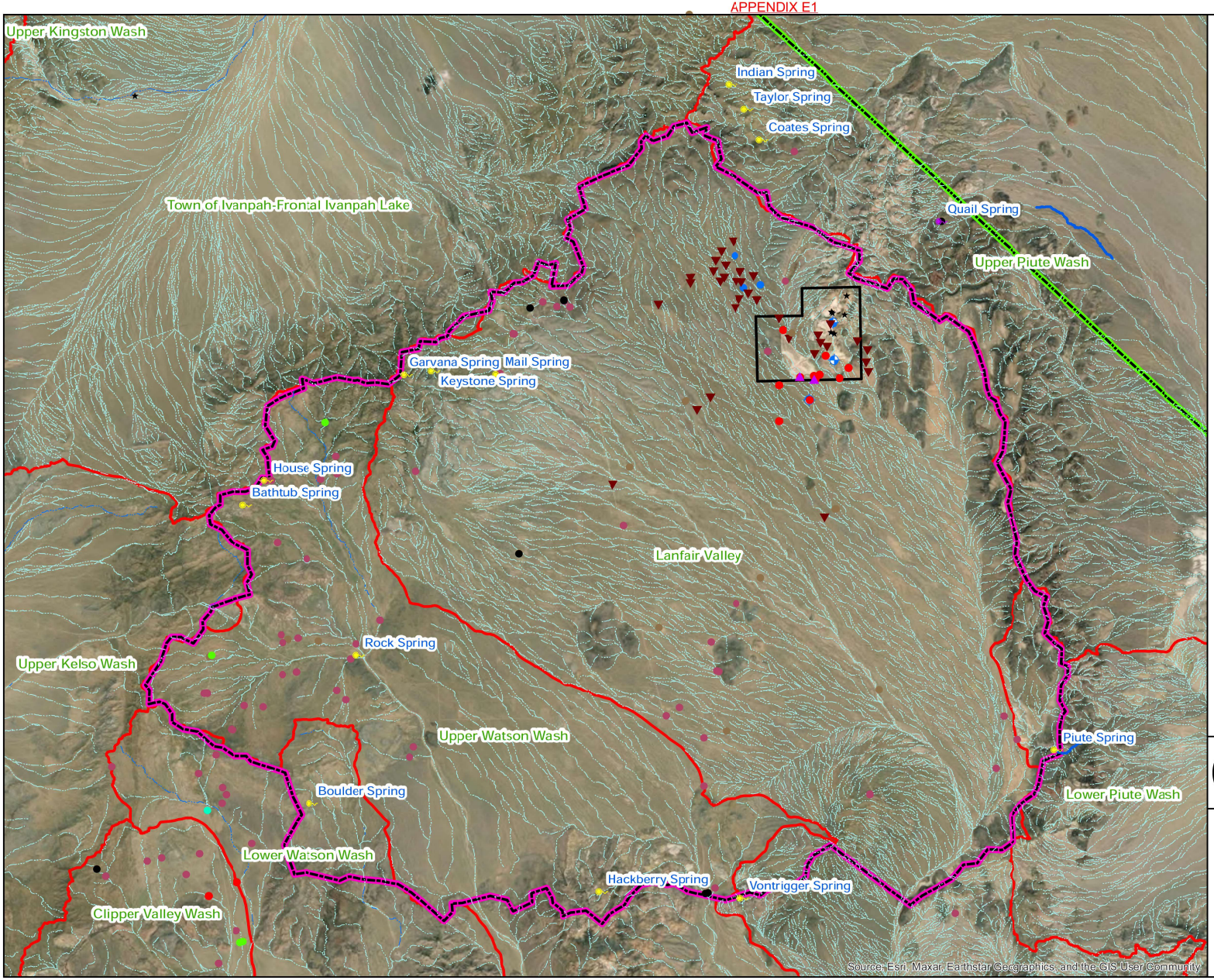
EXPLANATION:

- Groundwater Model Domain Boundary
- Modeled Groundwater Pumping Well
- Spring
- TRC (2000) Calibration Wells
- Well

Figure 6

Ivanpah Valley Wells

Water Supply Assessment, Castle Mountain Mine



Explanation

Springs

WELLTYPE

- Dry Spring
- Spring
- <all other values>

Type

- Abandoned
- Abandoned Monitor Well
- Domestic Well
- Existing CMM Well
- Exploration Drillhole
- Monitor Well
- Other Well or Boring
- Production Well
- Regional Water Supply Well
- Removed CMM Well
- Stock Well
- CMM Project Boundary

National Hydrography Dataset

- <all other values>

Stream Type

- Ephemeral
- Intermittent
- Perennial
- Model Basin Outline
- USGS Watershed Boundaries
- State Boundary

0 1 2 4 6 Miles

Revision Date: 6/22/2023

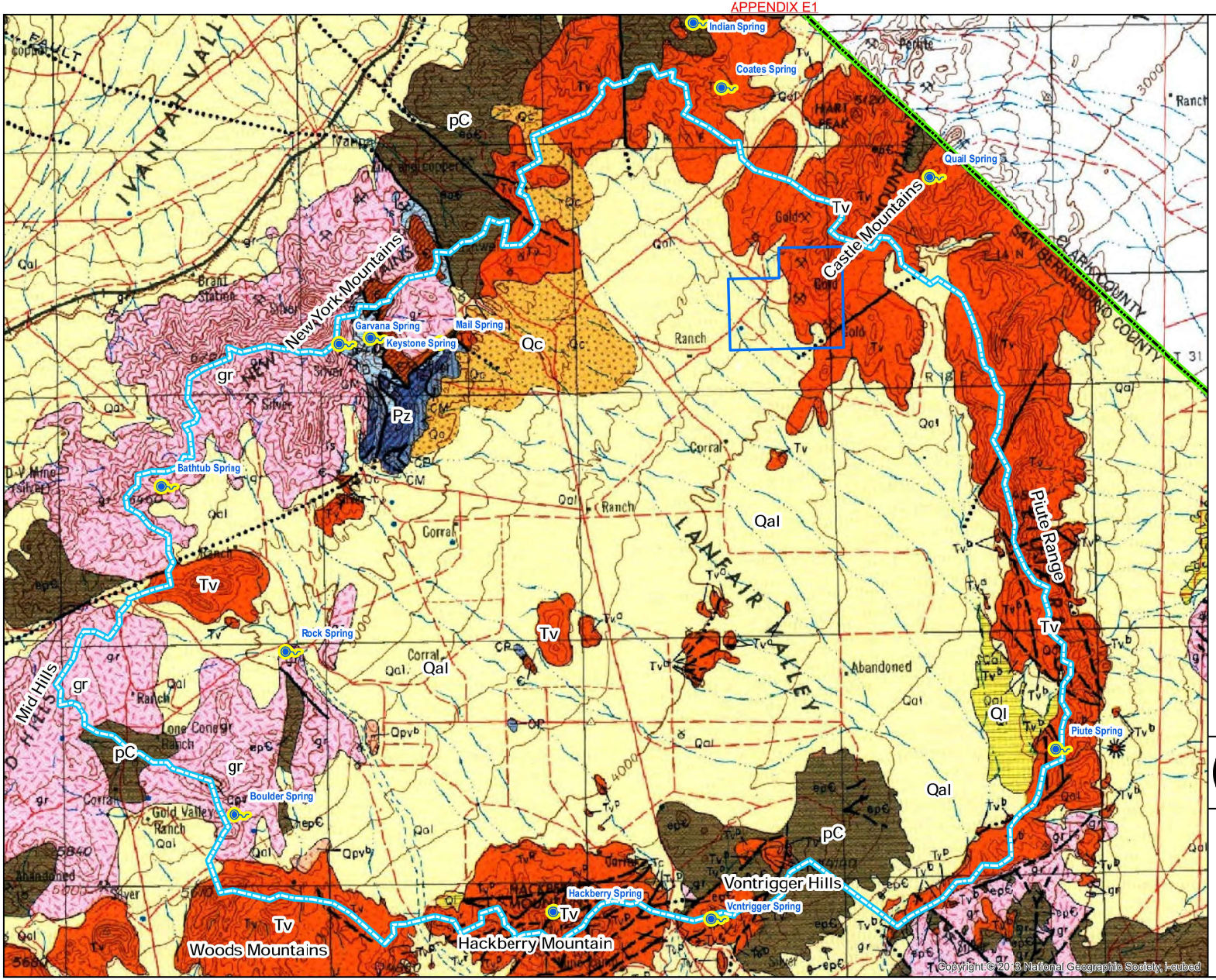
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Figure 7

Surface Water/Springs Map
Lanfair Valley
Equinox Gold
Castle Mountain Mine, CA

Document Path: P:\NewcastleGold_GLA\6. Projects\2021 Water Supply Assessment Report\Figure 7 Surface Drainage Map.mxd



Explanation

Springs

- Springs
- CMM Project Boundary
- Model Basin Outline
- State Boundary

Notes:

Qal - Quaternary alluvium
Oc - Older alluvium
Ql - lakebed deposits
Tv - Tertiary volcanics
Pz - Paleozoic Sedimentary rocks
pC - Precambrian Metamorphic rocks

See discussion in text. Source: Jennings, C.W., 1961. Geologic Map of California, Kingman Sheet; California Department of Natural Resources, Division of Mines.

Miles
0 1.25 2.5 5

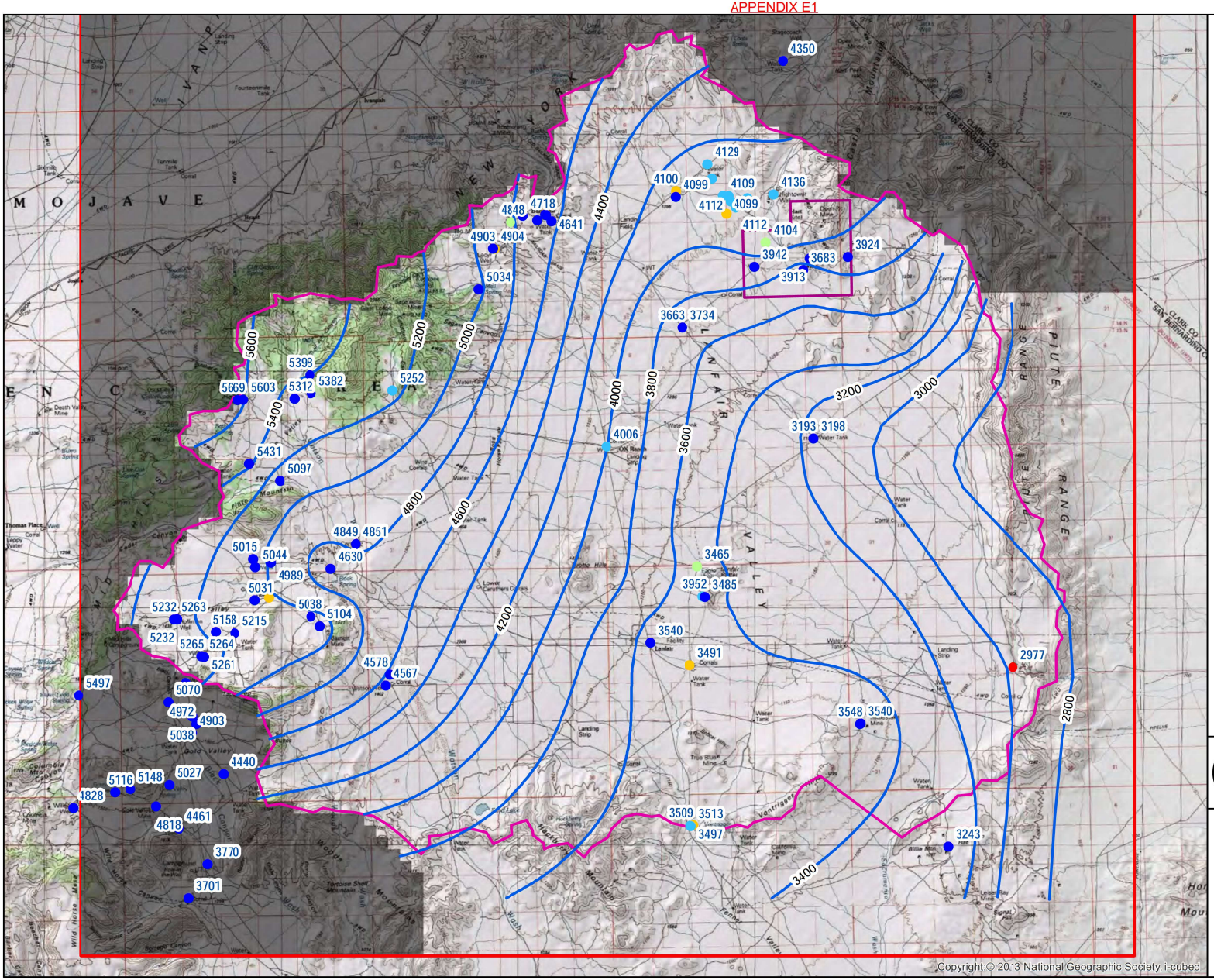
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Figure 8

Surface Geology Map
Lanfair Valley
Equinox Gold
Castle Mountain Mine, CA

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Explanation

Average Water Level

Count of Water Levels

- 1
- 2 - 5
- 6 - 10
- 11 - 15
- 16 - 24

Water Level Contours

CMM Project Boundary

Basin Outline

Model Domain

No Flow Cells

Notes:

Average water level from available measurements, collected over 1917 to 2020.

0 1.25 2.5 5 Miles

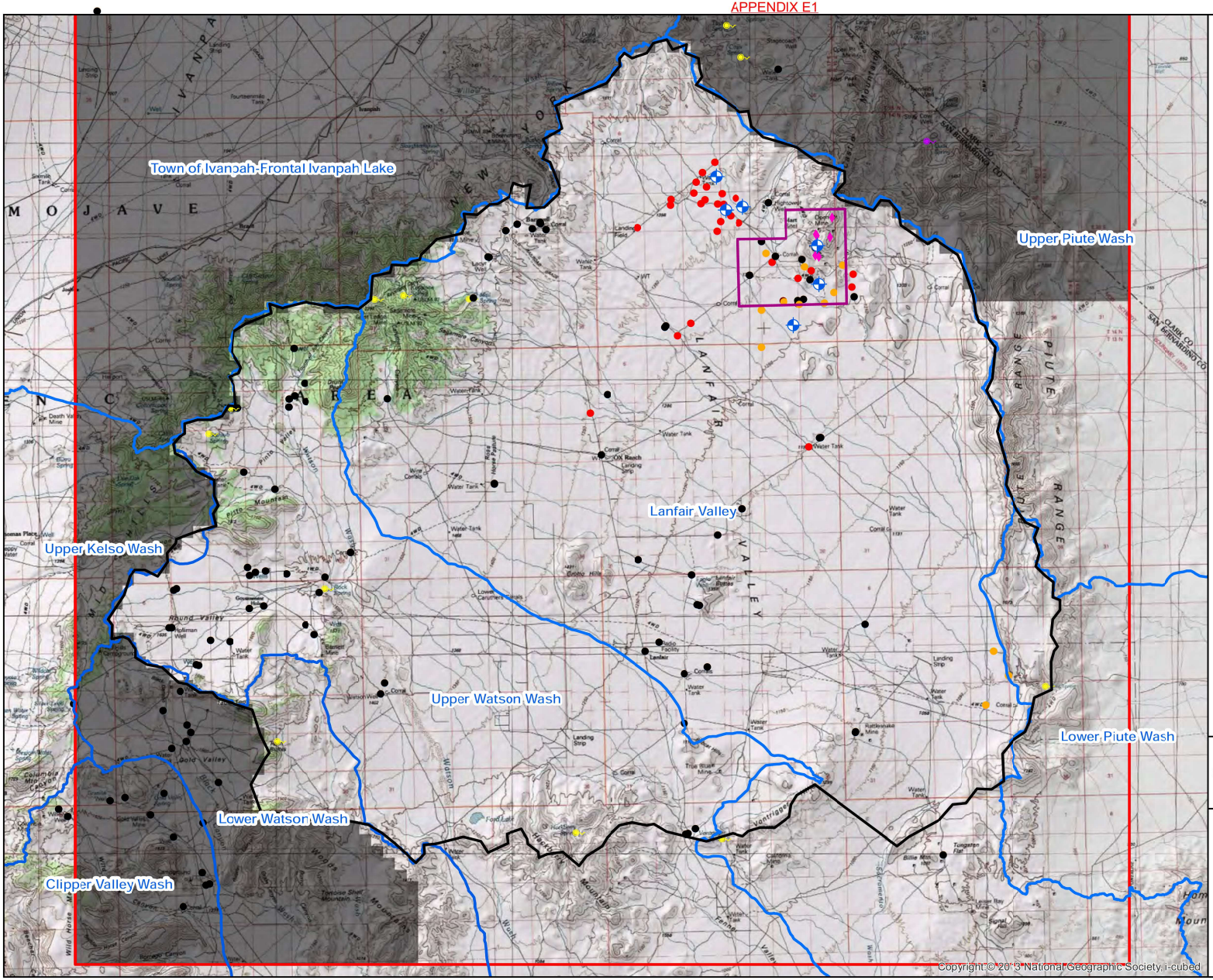
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Figure 9

Water Level Data: 1917-2020
Lanfair Valley
Equinox Gold
Castle Mountain Mine, CA

Document Path: P:\NewcastleGold_GLA\6. Projects\2021 Water Supply Assessment Report\Figure 9 Average Water Leves.mxd



Explanation

- CMM Project Boundary
- Basin Outline
- USGS Watershed Boundaries
- Model Domain
- Other/Unknown
- Abandoned
- Drillhole
- Dry Spring
- Monitor
- Production Well
- Reclaimed PW/MW
- Spring
- No Flow Cells

Notes:

0 1.25 2.5 5 Miles

Revision Date: 6/22/2023

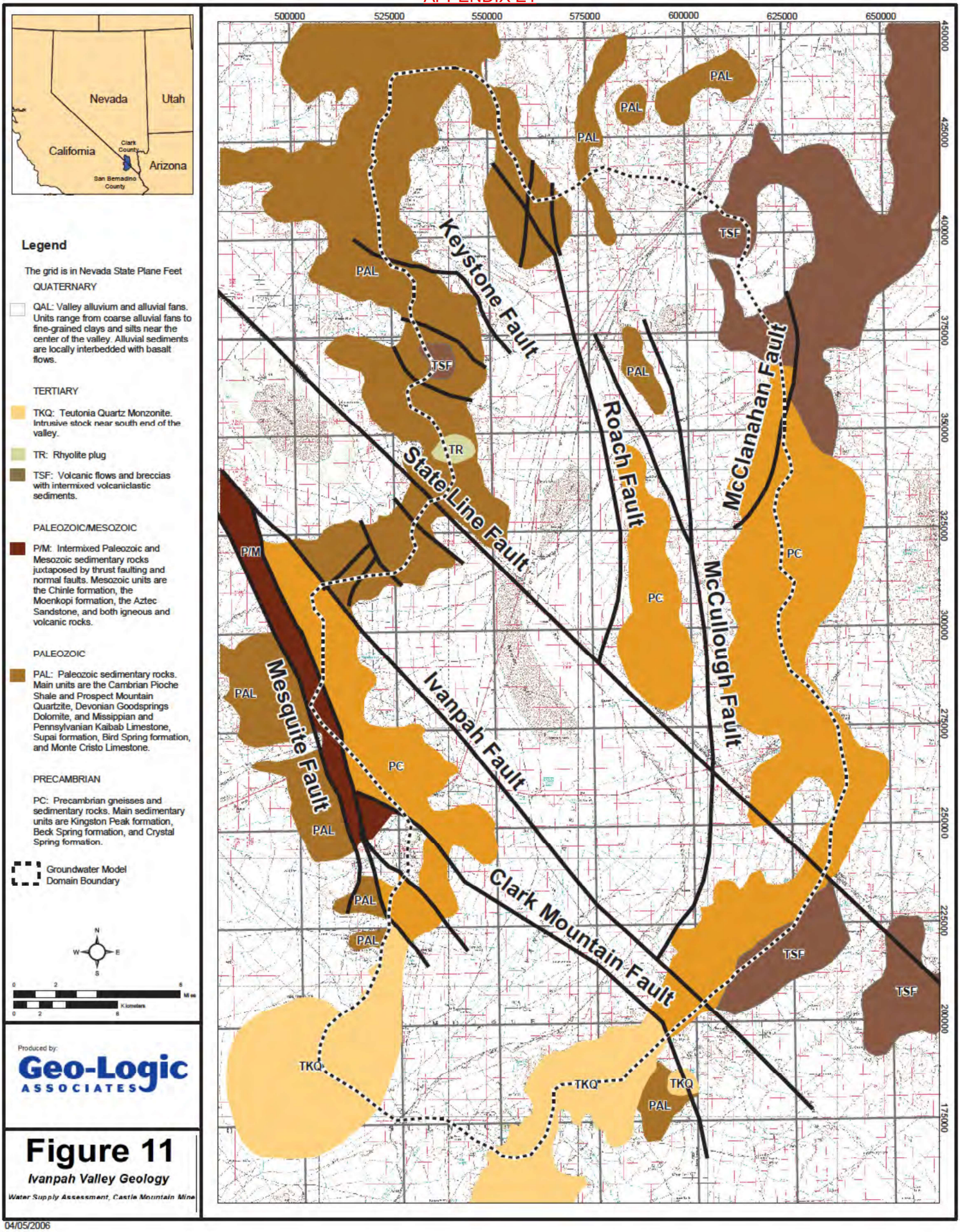
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Figure 10

Wells and Springs
Lanfair Valley
Equinox Gold
Castle Mountain Mine, CA

Document Path: P:\NewcastleGold_GLA\6. Projects\2021 Water Supply Assessment Report\Figure 10 Wells and Springs in Model Area.mxd



Legend

The grid is in Nevada State Plane Feet

QUATERNARY

QAL: Valley alluvium and alluvial fans. Units range from coarse alluvial fans to fine-grained clays and silts near the center of the valley. Alluvial sediments are locally interbedded with basalt flows.

TERTIARY

TKQ: Teutonia Quartz Monzonite. Intrusive stock near south end of the valley.

TR: Rhyolite plug

TSF: Volcanic flows and breccias with intermixed volcaniclastic sediments.

PALEOZOIC/MESOZOIC

P/M: Intermixed Paleozoic and Mesozoic sedimentary rocks juxtaposed by thrust faulting and normal faults. Mesozoic units are the Chinle formation, the Moenkopi formation, the Aztec Sandstone, and both igneous and volcanic rocks.

PALEOZOIC

PAL: Paleozoic sedimentary rocks. Main units are the Cambrian Pioche Shale and Prospect Mountain Quartzite, Devonian Goodsprings Dolomite, and Missippian and Pennsylvanian Kaibab Limestone, Supai formation, Bird Spring formation, and Monte Cristo Limestone.

PRECAMBRIAN

PC: Precambrian gneisses and sedimentary rocks. Main sedimentary units are Kingston Peak formation, Beck Spring formation, and Crystal Spring formation.

Groundwater Model Domain Boundary

N
W
E
S

0 2 6 Miles
0 2 6 Kilometers

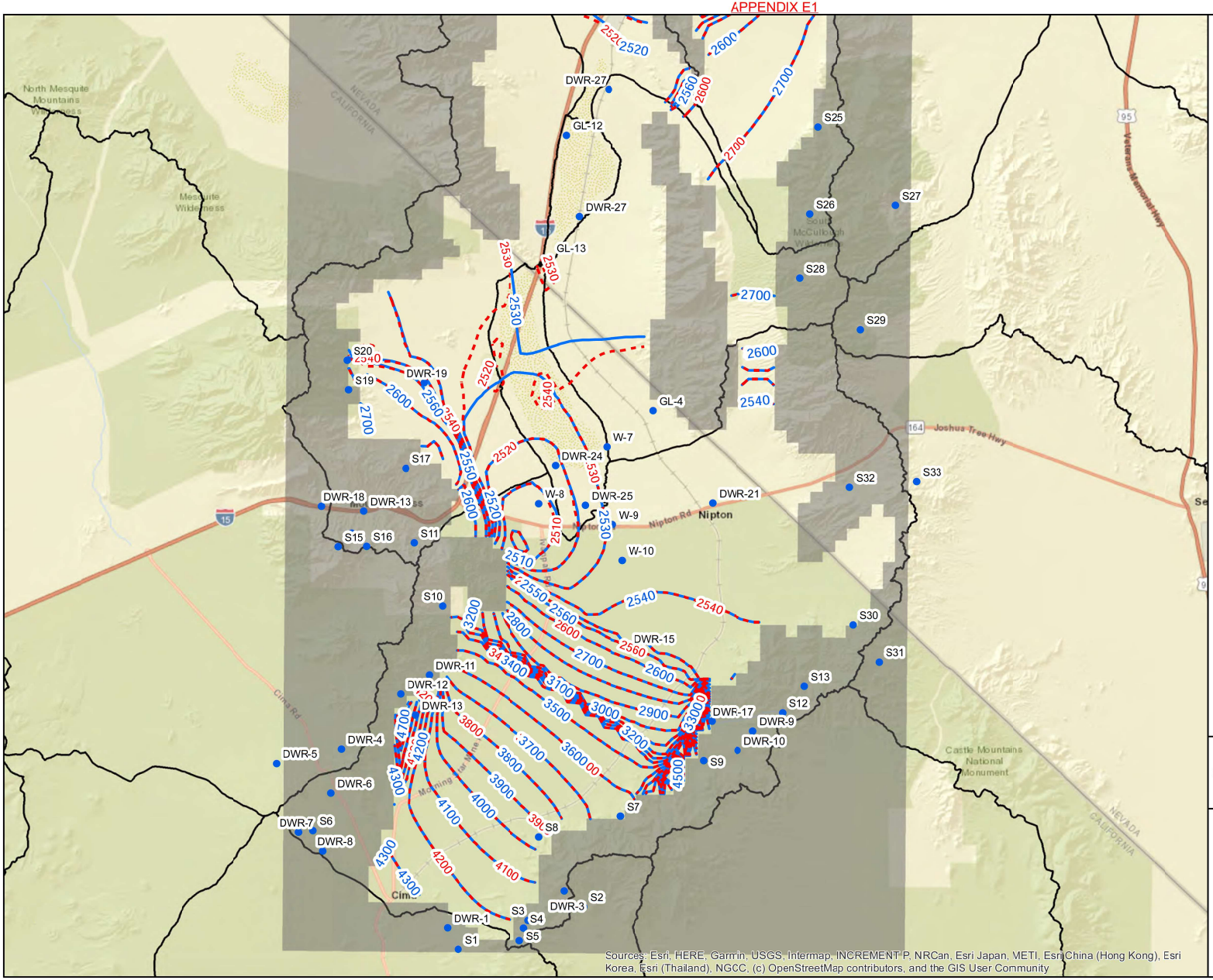
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Figure 11

Ivanpah Valley Geology

Water Supply Assessment, Castle Mountain Mine

04/05/2006



Explanation

- Wells and Springs
- Simulated 2021 Contours
- Simulated 1973 Water Levels
- No Flow Cells
- USGS Watershed Boundaries

Notes:

Miles
0 2 4 8

Revision Date:	6/22/2023
Job Number:	2017.A002

CLEAR CREEK ASSOCIATES
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Figure 12

Simulated 1973 and 2021 Water Level Elevations
Water Supply Assessment
Castle Mountain Mine, CA

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