Appendix G

Water Supply Assessment

Balance Hydrologics, Inc.®

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March 1, 2018

Catherine Sylvester
Helix Environmental Planning, Inc.
11 Natoma Street, Suite 155.
Folsom, California 95630

RE: Water Supply Assessment, Boca Quarry Expansion EIR, Nevada County

Dear Ms. Sylvester:

This water supply assessment (WSA) of the proposed Boca Quarry Expansion Project (Project) was completed consistent with the requirements of SB610 and California Water Code Sections 10910 through 10915. The assessment documents project water supplies in relation to anticipated demands during average, dry and critically dry rainfall years over the 30-year life of the project.

Summary of Findings

This WSA serves as an update to our previously submitted WSA for this project, dated April 25, 2012. The estimated water demand associated with the updated project description is equal to that evaluated for the previous project description; this update simply uses more recent precipitation data and recharge estimates, including the historically dry period from 2012 to 2017.

The quarry is located wholly within a mix of volcanic deposits associated with a now stable Quaternary landslide complex. The Project proposes to use water from an on-site spring (‘Dobbas Spring’) for dust control at the quarry. Spring outflow was documented to be approximately 220 gallons per minute (gpm) during the spring and summer of 1996 and 1997, falling to about 80-90 gpm in late fall and early winter. Numerous borings at and near the Project site have not encountered water, while the lone on-site well yields only approximately 15 gpm, indicating the local geologic formations have only limited groundwater availability. However, occasional near-vertical faults and highly fractured shear zones are known to contain and transmit groundwater in the region, and the Dobbas Spring likely receives flows from fractured bedrock, as well as from within the landslide complex. More detailed investigations would be required to discern the relative contributions to the spring from these two sources.

Balance Hydrologics used historical precipitation data and spring-flow monitoring measurements to predict recharge and develop a synthetic spring flow record for a range of water years. Conservative assumptions included delineating the recharge area based on topography and geology, and assuming recharge at 25% of annual rainfall. Estimated supplies met project demand during normal (1906-2017 average) and dry (2013) years. During the critically dry year scenario (2001), the anticipated supply of 47 acre-feet met the lower estimate of annual project demand (39 acre-feet) but not the higher one (56 acre-feet). With an estimated recurrence interval of 100 years, if such a year occurs again over the Project's lifetime, we recommend that the operator modify operations to reduce water use, or reduce production rates as appropriate so that there will be adequate water.

1.0 INTRODUCTION

1.1 Background

The Boca Quarry Expansion Project (Project) seeks to expand the active mining area on the currently permitted parcel (APN 48-090-12) and extend mining onto the adjacent parcel (APN 48-200-03). Both parcels are located near the Town of Truckee in the County of Nevada (**Figure 1**).

Pursuant to the application for a modified use permit and mine reclamation plan, the County is conducting an environmental review under the requirements of the California Environmental Quality Act (CEQA). The CEQA documentation must include an assessment of water supply adequacy for the proposed Project, as required by Senate Bill 610 (SB610). SB 610, enacted in 2002, modified California Water Code sections 10910 through 10915 to require an assessment of whether or not available water supplies would be sufficient to serve the demand generated by the Project, as well as the reasonably foreseeable cumulative demand in the project area over the next 20 years under average year, single dry-year and multiple dry-year conditions.

The Water Supply Assessment (WSA) must identify existing water supply entitlements, water rights, or water service contracts related to the water supply for the proposed Project, and document the water received pursuant to those entitlements, rights, and contracts. This report describes the WSA for the proposed Boca Quarry expansion in Nevada County.

1.2 Project Description

The Boca Quarry is located east of the town of Truckee and north of the Truckee River and Interstate Highway 80 (I-80). The community of Hirschdale lies approximately 1 mile to the south and across I-80.

The project site covers roughly 230 acres, of which about 40 acres is currently being mined. Teichert Aggregates, Inc. (Teichert), which has leased and operated the quarry since 2005, seeks to expand the mining area to approximately 158 acres. The property is characterized by moderately steep to steep terrain at elevations 5,700 to 6,200 msl, with a series of ridges draining west and south towards the Truckee River. Excavation will expand the existing mining operation westward between the ridgelines.

The mining plan envisions removal of 13 million cubic yards of material in three phases over a 30-year period. In Phase 1, mining of the existing East Pit would continue. In Phases 2 and 3, the West Pit would be opened and mined,while the East Pit remains open to allow for the mixing of materials and flexibility during extraction. Mining will create a series of benches in the mountainside. When operations have ceased, topsoil will be applied to most of the mined area which will then be replanted with native plants, returning the site to open space. Water from an on-site spring (‘Dobbas Spring’), previously permitted for off-site water sales, is proposed to be used for dust control. As we understand it, this is the only proposed use of this water source.

2.0 APPLICABILITY OF SB610

The water supply assessment process under SB610 involves answering a specific series of questions about the proposed Project:

1. Is the proposed project subject to CEQA?
2. Is the proposed project a “Project” under SB 610?
3. Is there a public water system that will service the proposed project?
4. Is there a current UWMP that accounts for the project demand?
5. Is groundwater a component of the supplies for the project?
6. Are there sufficient supplies to serve the project over the next twenty years?

Responses to each of these questions are provided below.

2.1 Is the proposed project subject to CEQA?

The County has determined that the proposed quarry expansion application is a “project” and subject to CEQA because the application requests discretionary approvals (permits) that may result in a physical change in the environment.

2.2 Is the proposed project a “project” as defined by the water code?

SB610 defines a project according to California Water Code Section 10912. In this case the Boca Quarry Expansion qualifies as a ‘project’ under Section 10912(a)(5)(A) in that the Project is a proposed industrial, manufacturing, or processing plant occupying more than 40 acres of land. SB610 requires that a project, as defined in Section 10912, is subject to CEQA and requires preparation of a water supply assessment for inclusion in the CEQA documentation.

2.3 Is there a public water system that will service the proposed project?

The proposed project is not within an area served by a public water system. The Truckee Donner Public Utility District serves most of the Town of Truckee, approximately 1.4 miles west of the site, and also operates a small water system in the town of Hirschdale, approximately 0.8 miles southwest of the project site **(Figure 2).** Both systems are located across the Truckee River from the Project site.

2.4 Is there a current Water Supply Assessment (WSA) or Urban Water Management Plan (UWMP) that includes this project?

Since the proposed Project is not served by a public water system, it has not been included in any prior WSAs or UWMPs.

2.5 Is groundwater a component of the supplies for this project? If so, what information should be included in this assessment?

The planned water source for the proposed Project is groundwater from the 'Dobbas Spring' on the applicant's property.

Because there is no UWMP that includes the Boca Quarry, this WSA must be prepared using information from other sources and reports. Thus, the current and proposed future demand for water must be obtained from existing and proposed requirements reported in the Project Application and Environmental Assessment for the Boca Quarry Expansion.

3.0 GROUNDWATER SUPPLY

In terms of water rights, the planned use of self-supplied water from the 'Dobbas Spring' falls under the category of a correlative right that automatically accrues to landowners overlying a "percolating" groundwater resource. Consistent with this interpretation, the State Water Resources Control Board, Division of Water Rights has determined that an appropriative water right is not needed for use of the spring water (**Attachment A**: Letter of R. Johnson to J. Goldsmith, April 21, 1998). All water rights in California are subject to the restriction that the use of water be reasonable and beneficial. Use of groundwater for dust control as proposed for this Project meets that standard.

Per Section 10910(f), this WSA is subject to special requirements because the project supply would be groundwater, and because there is no UWMP to provide detailed information on groundwater. Therefore, this WSA must also include the following information:

- Description of any groundwater basin proposed to supply the water, including information as to whether the basin has been adjudicated and/or identified as overdrafted or projected to become overdrafted under present conditions;

- The amount and location of groundwater pumped for the past five years from the basin based on reasonably available information;

- The amount and location of self-supplied groundwater projected to be pumped from the applicant's source, based on reasonably available information; and
- An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet projected water demand associated with the project.

3.1 Existing and Projected Demand

Data on the actual and projected demand was obtained from the Project Description (July 2011). Annual water use is projected to range from 12,775,000 to 18,250,000 gallons per year, or 39 to 56 acre-feet annually. Water use is expected to remain constant on an annual basis over the 30-year permitting period for the quarry expansion. Proposed use of spring water is estimated to be roughly four times the current use of 10 to 14 acre-feet per year (A. Juncosa, pers. comm., Feb. 9, 2012), .

Aside from this proposed quarry expansion project, no other existing or future uses of water from the Dobbas Spring are planned.

3.2 Groundwater Supply

Spring flow monitoring data (**Table 1**) provided by Teichert indicates a relatively steady supply of water from the spring. In 1996 and 1997, spring flow was a steady 220 gallons per minute (gpm) during the spring and summer months, falling to 80 to 90 gpm during the fall and winter months. Due to the timing of monitoring (Dec. 1995 to Nov. 1997), total annual flow can only be calculated for one water year – water year 1997[1]. In water year 1997, the third consecutive year of above-average precipitation in the Project area, total annual flow from the Dobbas Spring was approximately 263 acre-feet.

3.3 Groundwater Basin Information

Since use of the Dobbas Spring as a water supply has not previously been publicly reviewed, it is necessary to identify any other public water systems or water service contractors that receive a water supply, have existing entitlements, water rights, or water service contracts to the same source of water.

As shown in **Figure 2**, the proposed Project is located east of and outside the Martis Valley Groundwater Basin (DWR Groundwater Basin No. 6-67). Because the Boca Quarry is not located in a defined basin, the area does not have a groundwater management plan nor has it been identified as overdrafted or projected to become overdrafted under present conditions. The following two sections briefly discuss the geology and hydrologic

[1] Hydrologic data collection and analysis in California is typically carried out on a 'water year' basis, to account for the seasonality of precipitation. The term 'water year' refers to the period from October 1 to September 30. For example, 'water year 1997' refers to the period from October 1, 1996 to September 30, 1997.

characteristics of the water-bearing rocks that supply water to wells and springs in the area, and the estimated monthly recharge that potentially contributes water to the Dobbas Spring.

3.4 Water-bearing Rock Zone Characteristics

The Boca Quarry is located within the Middle Truckee River watershed along the western margin of the Basin and Range Geomorphic Province (**Figure 3**), at the eastern margin of the Truckee Basin, a structural trough. The quarry is located wholly within a stable Quaternary landslide complex (Birkeland, 1961), which consists of horizontal basalt flows separated by layers of ash and tuff with intervals of basalt boulders, cobbles, and rubble, with locally interbedded cinders (Golder Associates, 2010). This geology gives rise to a number of springs located within the landslide complex, including the Dobbas Spring, from which the proposed project plans to draw water.

Water bearing units within the Martis Valley Groundwater Basin consist of interlayered Quaternary and Pleistocene alluvial sediments and volcanic deposits, similar to those found in the vicinity of the Boca Quarry. Groundwater in the vicinity of the quarry, however, is considered to be limited, and disconnected from groundwater in the Basin, due to: a) hydrologic separation by the Truckee River Canyon, b) geologic structure, and c) groundwater separation of the large landslide complex in which the Boca Quarry is situated. As a result, the northeastern boundary of the groundwater basin has been delineated along the Truckee River (**Figure 2**) west of and exclusive of Boca Quarry (DWR, 2003).

Very few wells have been drilled in the vicinity of the quarry. Seven cores were drilled in the vicinity of the West Pit in 2005 and 2008, and five cores were drilled in the East Pit area in 2005. Based on review of the logs of these borings and correspondence with Teichert staff, none of these borings encountered groundwater. It should be noted that the 2005 borings were drilled in September, following several years of below-average precipitation. The 2008 borings were drilled in June, when groundwater conditions would be near the seasonal maximum; however, these borings were also made after two years of below-average precipitation.

The domestic well on the property was drilled in 1985, a near-average precipitation year following several years of above-average precipitation. The well drillers report filed with the state does not indicate at what level groundwater was encountered, but the well yield was estimated to be approximately 15 gallons per minute, apparently drawing on sandy clay units found at depths of about 330 feet.

Several monitoring wells were also drilled roughly 0.3 miles south of the quarry property. These wells penetrated stratigraphic units similar to those found on-site, with water found in sandy silt and gravelly layers at shallower depths than the domestic well, but roughly similar elevations. In several cases, the water in a layer was found to be under pressure, rising to elevations above the layer, indicating some degree of confinement in this water-bearing unit.

While the geologic formations found at the project site appear to have limited groundwater availability, occasional near-vertical faults and highly fractured shear zones are known to contain and transmit groundwater in the region. The Dobbas Spring likely receives flows from fractured bedrock, as well as from within the landslide complex. Without more detailed investigations, it is difficult to discern the relative contributions from these two sources.

3.5 Recharge

For purposes of this analysis, the recharge area for the Dobbas Spring is interpreted to be solely from within the landslide complex, as defined by geology and topography (**Figure 3**). Delineated in this way, the upgradient recharge area covers 299 acres. If, in fact, groundwater is recharged at more distant sources and supplied by flow along regional faults, the recharge area delineated in Figure 3 would be conservative as it represents a smaller potential contributing area.

3.6 Water Budgets

The availability of monitoring data for the Dobbas Spring, however limited, allows for construction of a basic water balance to evaluate the proportion of the annual precipitation over the delineated recharge area which is discharged from the spring. In this analysis, flow from the spring is considered to result from precipitation on the contributing recharge area, less the water consumed by plants or evaporated from the soil or surface prior to infiltration or running off as surface flows. Spring flow would be expected to vary annually according to the amount of precipitation received and the weather patterns occurring in any particular year.

Assuming no inter-annual carryover within the aquifer, and a 299-acre recharge area, **Table 2** shows that roughly 34 percent of the precipitation falling on the recharge area flowed from the spring during water year 1997.[2] This value is slightly higher than, but still consistent with prior analyses conducted in the Martis Valley Groundwater Basin, in which recharge was considered to be 25 percent of annual precipitation on the basin (Hydro-Search, 1995; Nimbus Engineers, 2001; Kennedy/Jenks Consultants, 2002).

Figure 4 presents the historical precipitation record from the Boca rain gage (CDEC Station BCA: 1906-2017: 91complete water years. Based on this record, mean annual rainfall is about 22.9 inches. **Table 3** presents a synthetic annual springflow record for the 91-year period of record when precipitation data was collected at Boca. As a conservative (low) estimate, we have assumed total annual spring flow at 25 percent of annual precipitation over the recharge area. Historical annual springflow is estimated to have ranged from 47 to 335 acre-feet (annualized flow rate of 29 to 207 gpm), with an average value of 142 acre-feet (88 gpm). The maximum precipitation and springflow is calculated to have occurred in 2017, and the minimum in 2001.

[2] During calendar years 1996 and 1997, spring flow was calculated to be 24 and 54 percent of precipitation on the delineated recharge zone.

4.0 ANALYSIS OF SUFFICIENCY

As stated above, annual water use by the proposed Project is projected to range from 39 to 56 acre-feet, and remain constant over the 30-year permitting period for the quarry expansion. The question answered in this section is whether or not supplies will be sufficient to serve the project over the next 20 years.

Table 2 presents water balances for wet (1971), normal (1906-2017 average), dry (2013) and critically dry (2001) years. Even with conservative assumptions regarding the areal extent of the recharge area and the proportion of rainfall recharged, predicted spring flow exceeds the highest anticipated demand during both normal and dry years. Only in the most critically dry year, with an estimated recurrence interval of 100 years, would the predicted supply not meet the upper estimate of project demand (56 acre-feet). If such a year occurs again over the Project's lifetime, we recommend that the operator modify operations to reduce water use, or reduce production rates as appropriate so that there will be adequate water.

5.0 LIMITATIONS

This technical letter report was prepared in general accordance with the accepted standard of practice existing in Northern California at the time the investigations were performed. No other warranty is made or implied.

Readers are asked to contact us if they have additional relevant information, or wish to propose revisions or modified descriptions of conditions, such that the best data can be applied at the earliest possible date.
Sincerely,

BALANCE HYDROLOGICS, Inc.

Jack Jacquet
Hydrologist/Engineer

David Shaw, P.G.
Principal Hydrologist/Geologist

Enclosures:

Tables:

Table 1.	Water flows from the Dobbas Spring, Nevada County, California
Table 2.	Observed and estimated water supply in average, wet and dry years, Boca Quarry, Nevada County, California
Table 3.	Annual precipitation, recharge, and predicted Dobbas Spring flow, Boca Quarry Expansion, Nevada County, California

Figures:

Figure 1.	Project location and vicinity (from Project Application)
Figure 2.	Source of water and nearby public water service areas (Balance)
Figure 3.	Surficial geology and well and spring locations
	Annual precipitation at Boca, California

Attachments:

Attachment A.	State Water Resources Control Board, Division of Water Rights letter from Roger Johnson to Janet Goldsmith, dated April 21, 1998.

REFERENCES

Birkeland, P.W., 1961, Pleistocene history of the Truckee area, north of Lake Tahoe, California: Stanford University, Ph.D. dissertation, 126 p. + plates

Birkeland, P.W., 1963, Pleistocene volcanism and deformation of the Truckee Area, north of Lake Tahoe, California, Geological Society of America Bulletin, v. 64, p. 1453-1464.

Birkeland, P.W., 1964, Pleistocene glaciation of the northern Sierra Nevada, north of Lake Tahoe, California, The Journal of Geology, v. 72 n. 6, p. 810-825.

Golder Associates, 2010, Stability evalution of the West Pit, Boca Quarry, Hirschdale, Caliofnia: consulting report prepared for Teichert Aggregates, 16 p. + figures, photographs, and appendices.

Hydro-Search, 1995, Ground-water management plan Martis Valley Ground-water Basin, Basin No. 6-67, Nevada and Placer Counties, California: report prepared for Truckee Donner Public Utility District, 53 p. + tables, figures, plates, and appendices

Nimbus Engineers, 2001, Ground water availability in the Martis Valley Groundwater Basin, Nevada and Placer Counties, California: consulting report prepared for Truckee Donner Public Utility District, Placer County Water Agency, and Northstar Community Services District42 p. + tables and figures.

Saucedo, G.J., 2005, Geologic Map of the Lake Tahoe Basin, California and Nevada, 2005, California Department of Conservation California Geological Survey Regional Geologic Map Series, Map No. 4, 1:100,000 scale

Table 1. Water flows from the Dobbas Spring, Boca Quarry, Nevada County, California.

Month	Spring flow		
	(gpm)	*(cfs)*	*(acre-ft)*
Dec-95	100	0.22	14
Jan-96	115	0.26	16
Feb-96	120	0.27	15
Mar-96	160	0.36	22
Apr-96	210	0.47	28
May-96	220	0.49	30
Jun-96	220	0.49	29
Jul-96	220	0.49	30
Aug-96	180	0.40	25
Sep-96	115	0.26	15
Oct-96	110	0.25	15
Nov-96	90	0.20	12
Dec-96	80	0.18	11
Jan-97	115	0.26	16
Feb-97	150	0.33	19
Mar-97	200	0.45	27
Apr-97	225	0.50	30
May-97	220	0.49	30
Jun-97	220	0.49	29
Jul-97	215	0.48	29
Aug-97	210	0.47	29
Sep-97	120	0.27	16
Oct-97	100	0.22	14
Nov-97	90	0.20	12

Source: The Hydrodynamics Springs Development Group, as provided by . Teichert Aggregates, Inc.

Table 2. Observed and estimated water supply in average, wet, and dry Years, Boca Quarry, Nevada County, California

	Recharge				Demand		Supply		
	Year[1]	Annual precipitation[2]	Percent of average annual precipitation	Annual precipitation on recharge area[3]	Minimum	Maximum	Annual spring flow[4]	Annual springflow as percent of precipitation	Average annual flow rate
			(%)	*(ac-ft)*	*(ac-ft)*	*(ac-ft)*	*(ac-ft)*	*(%)*	*(gpm)*
Observed									
	1997	30.8	135%	767.2	39.2	56.0	263.0	34%	80
Calculated									
Normal Year (51% exceedence)[5]	--	22.9	100%	569.2	39.2	56.0	142.3	25%	88.2
Wet Year (70% exceedence)	1971	27.1	119%	675.3	39.2	56.0	168.8	25%	104.7
Dry Year (30% exceedence)	2013	16.7	73%	415.7	39.2	56.0	103.9	25%	64.4
Critical Dry Year (1% exceedence)	2001	7.5	33%	187.8	39.2	56.0	47.0	25%	29.1

nc = not calculated

Notes:

[1] To account for the seasonality of rainfall and influences of fall recharge on spring and summer flows, water balance calculations are carried out on a water year basis, from October 1 to September 30 of the following year.

[2] Annual precipitation as measured at Boca, California and reported by the California Data Exchange Center (CDEC Station BCA)

[3] The recharge area delineation is based primary on topography and localized geology. It does not include potential flow along regional faults, and is therefore considered to be a conservative estimate.

[4] Calculated values are based on a conservative assumption that annual recharge and resulting spring flow is 25 percent of the total precipitation over the 299-acre recharge area.

[5] Normal Year is defined as an average precipitation year, based on the record presented in Table 3 of this report.

Table 3. Annual precipitation, recharge, and predicted Dobbas Spring flow, Boca Quarry Expansion, Nevada County, California

	Precipitation [1]	Percent of Average	Exceedence Probability	Recharge [2]	Calculated Annual Springflow [3]	Annualized Flow Rate
	(inches)	*(%)*		*(ac-ft)*	*(ac-ft)*	*(gpm)*
Recharge Area: 298.9 acres						
Spring Flow to Recharge Coefficient: 0.25						
Minimum Project Demand: 39 ac-ft/yr						
Maximum Project Demand: 56 ac-ft/yr						
Water Year [4]						
1906	15.83	69%	0.25	394	98.6	61
1907	35.32	155%	0.90	880	219.9	136
1908	9.32	41%	0.02	232	58.0	36
1909	24.82	109%	0.61	618	154.6	96
1910	26.93	118%	0.68	671	167.7	104
1911	36.69	161%	0.92	914	228.5	142
1912	11.1	49%	0.07	276	69.1	43
1913	21.12	92%	0.49	526	131.5	82
1914	23.92	105%	0.55	596	149.0	92
1915	28.39	124%	0.74	707	176.8	110
1916	39.05	171%	0.96	973	243.2	151
	DATA NOT AVAILABLE FROM 1917 TO 1938					
1938	32.31	141%	0.86	805	201.2	125
1939	11.63	51%	0.08	290	72.4	45
1940	25.24	110%	0.63	629	157.2	97
1941	19	83%	0.41	473	118.3	73
1942	24.02	105%	0.57	598	149.6	93
1943	25.45	111%	0.64	634	158.5	98
1944	16.16	71%	0.28	403	100.6	62
1945	21.86	96%	0.51	544	136.1	84
1946	24.73	108%	0.60	616	154.0	95
1947	17.25	75%	0.36	430	107.4	67
1948	16.07	70%	0.27	400	100.1	62
1949	17.58	77%	0.38	438	109.5	68
1950	25.71	113%	0.65	640	160.1	99
1951	28.78	126%	0.77	717	179.2	111
1952	37.86	166%	0.95	943	235.8	146
1953	21.04	92%	0.48	524	131.0	81
1954	14.12	62%	0.16	352	87.9	55
1955	14.05	61%	0.15	350	87.5	54
1956	31.7	139%	0.84	790	197.4	122
1957	17.23	75%	0.35	429	107.3	67
1958	29.29	128%	0.79	730	182.4	113
1959	13.79	60%	0.13	343	85.9	53
1960	13.44	59%	0.11	335	83.7	52
1961	16.04	70%	0.26	400	99.9	62
1962	19.53	85%	0.43	486	121.6	75
1963	31.56	138%	0.83	786	196.5	122
1964	17.08	75%	0.33	425	106.4	66
1965	28.49	125%	0.75	710	177.4	110
1966	14.51	63%	0.17	361	90.4	56
1967	33.47	146%	0.88	834	208.4	129
1968	16.35	72%	0.29	407	101.8	63
1969	33.44	146%	0.87	833	208.2	129
1970	26.55	116%	0.67	661	165.3	102
1971	27.11	119%	0.70	675	168.8	105
1972	16.86	74%	0.32	420	105.0	65
1973	20.87	91%	0.47	520	130.0	81
1974	23.69	104%	0.54	590	147.5	91
1975	23.39	102%	0.52	583	145.7	90
1976	12.78	56%	0.09	318	79.6	49
1977	10.52	46%	0.04	262	65.5	41
1978	25.76	113%	0.66	642	160.4	99
1979	17.83	78%	0.39	444	111.0	69
1980	27.95	122%	0.72	696	174.0	108
1981	36.23	159%	0.91	902	225.6	140
1982	42.32	185%	0.97	1054	263.5	163
1983	42.59	186%	0.98	1061	265.2	164
1984	25.1	110%	0.62	625	156.3	97
1985	21.58	94%	0.50	538	134.4	83

Table 3. Annual precipitation, recharge, and predicted Dobbas Spring flow, Boca Quarry Expansion, Nevada County, California

					Calculated Annual Springflow [3]	Annualized Flow Rate
	Precipitation [1]	Percent of Average	Exceedence Probability	Recharge [2]		
	(inches)	*(%)*		*(ac-ft)*	*(ac-ft)*	*(gpm)*
Recharge Area: 298.9 acres						
Spring Flow to Recharge Coefficient: 0.25						
Minimum Project Demand: 39 ac-ft/yr						
Maximum Project Demand: 56 ac-ft/yr						
Water Year [4]						
1986	34.65	152%	0.89	863	215.8	134
1987	10.32	45%	0.03	257	64.3	40
1988	10.76	47%	0.05	268	67.0	42
1989	24.72	108%	0.59	616	153.9	95
1990	17.19	75%	0.34	428	107.0	66
1991	15.17	66%	0.21	378	94.5	59
1992	15.62	68%	0.22	389	97.3	60
1993	28.71	126%	0.76	715	178.8	111
1994	13.49	59%	0.12	336	84.0	52
1995	31.46	138%	0.82	784	195.9	121
1996	28.91	127%	0.78	720	180.0	112
1997	30.8	135%	0.80	767	191.8	119
1998	28.25	124%	0.73	704	175.9	109
1999	23.61	103%	0.53	588	147.0	91
2000	19.39	85%	0.42	483	120.7	75
2001	7.54	33%	0.01	188	47.0	29
2002	17.39	76%	0.37	433	108.3	67
2003	20.74	91%	0.46	517	129.1	80
2004	13.84	61%	0.14	345	86.2	53
2005	24.32	106%	0.58	606	151.4	94
2006	32.21	141%	0.85	802	200.6	124
2007	13.01	57%	0.10	324	81.0	50
2008	15.68	69%	0.24	391	97.6	61
2009	15.14	66%	0.20	377	94.3	58
2010	20.24	89%	0.45	504	126.0	78
2011	36.72	161%	0.93	915	228.7	142
2012	15.66	69%	0.23	390	97.5	60
2013	16.69	73%	0.30	416	103.9	64
2014	14.61	64%	0.18	364	91.0	56
2015	18.76	82%	0.40	467	116.8	72
2016	27.63	121%	0.71	688	172.1	107
2017	53.77	235%	0.99	1339	334.8	208
Average	22.9			569.2	142.3	88.2
Median	21.6			537.5	134.4	83.3
Maximum	53.8			1339.3	334.8	207.6
Minimum	7.5			187.8	47.0	29.1
Standard Deviation	8.8			219.4	54.9	34.0
n	91					

[1] Annual precipitation as measured at Boca, California and reported by the California Data Exchange Center (CDEC Station BCA)

[2] The recharge area delineation is based primary on topography and localized geology. It does not include potential flow along regional faults, and is therefore considered to be a conservative estimate.

[3] Calculated values are based on a conservative assumption that annual recharge and resulting spring flow is 25 percent of the total precipitation over the 299-acre recharge area.

[4] Water balance calculations are carried out on a water year basis, from October 1 to September 30 of the following year.

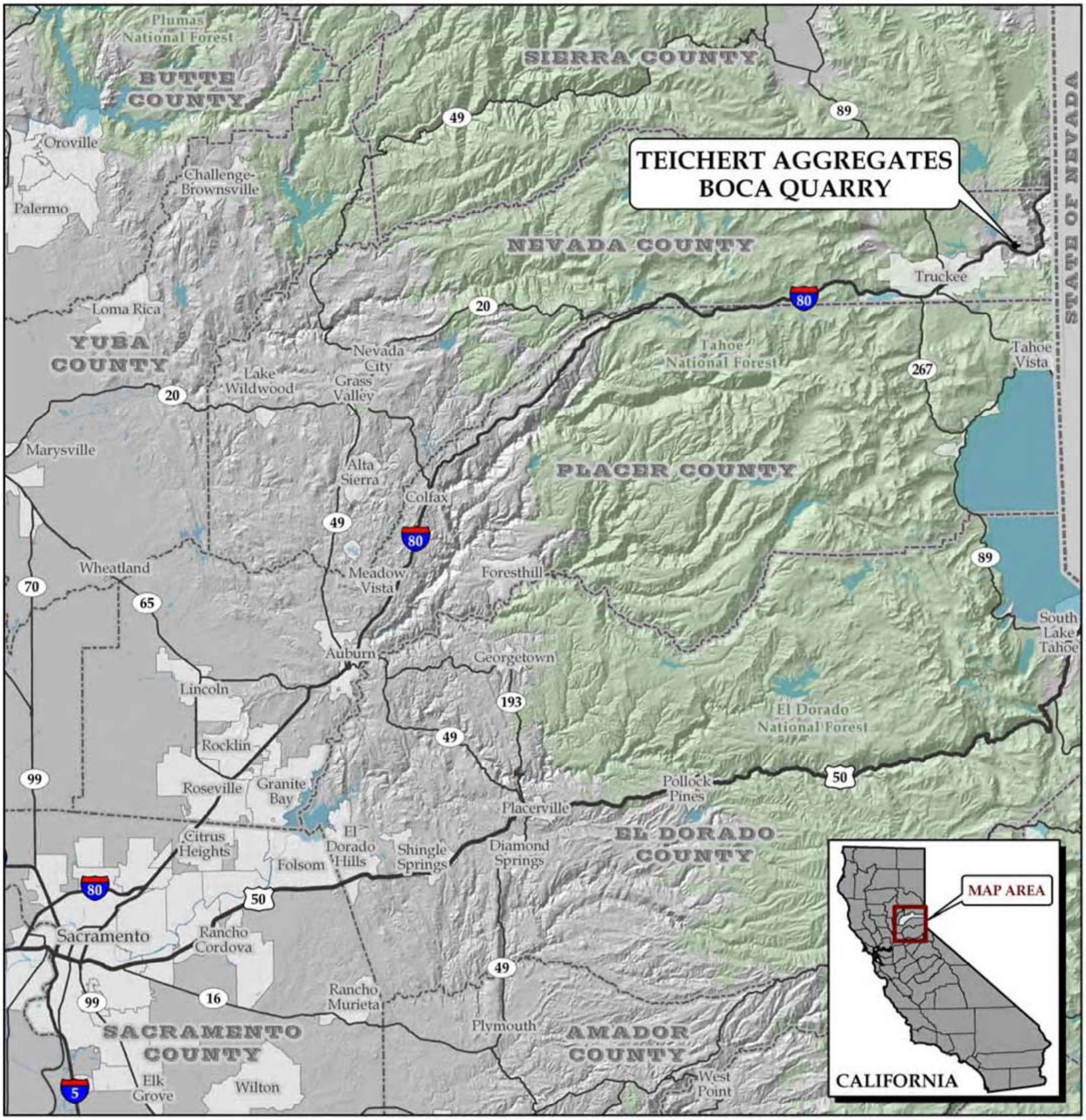


FIGURE 1

REGIONAL LOCATION

BOCA QUARRY
TEICHERT AGGREGATES
NEVADA COUNTY, CALIFORNIA

SCALE:
0 6 12 Miles

SOURCE:
Background:
USGS 30 Meter Hillshade

MAP CREATED BY: C. Cornejo
DATE: 07/27/2011

BOQ_WestPit_Fig1RegionalLoc_201107.mxd

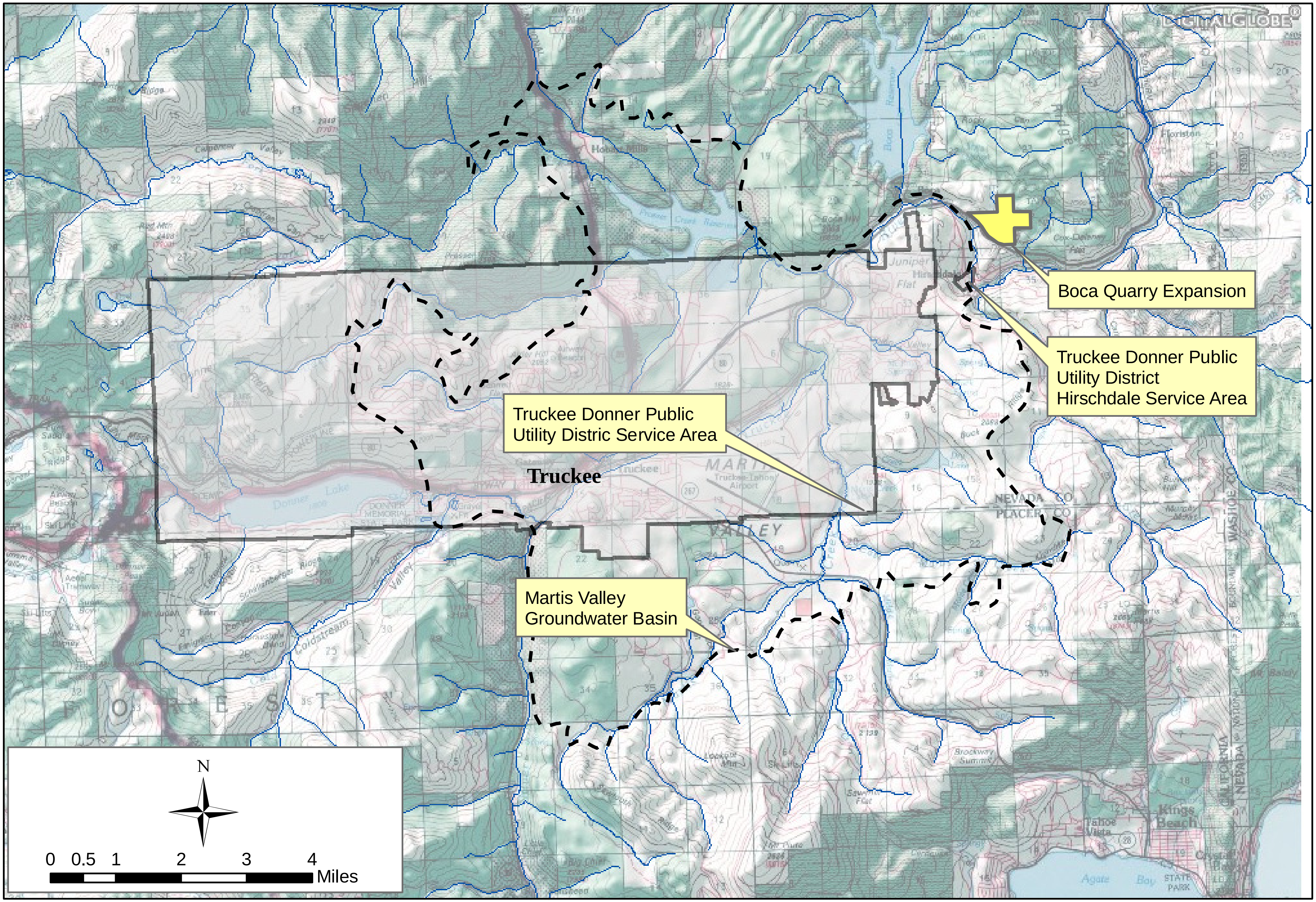
LEGEND:

- Highways
- County Boundaries
- City & Community Boundaries
- Lakes & Reservoirs
- US Parks

DISCLAIMER:

The data was mapped for assessment purposes only. No liability is assumed for the accuracy of the data shown.

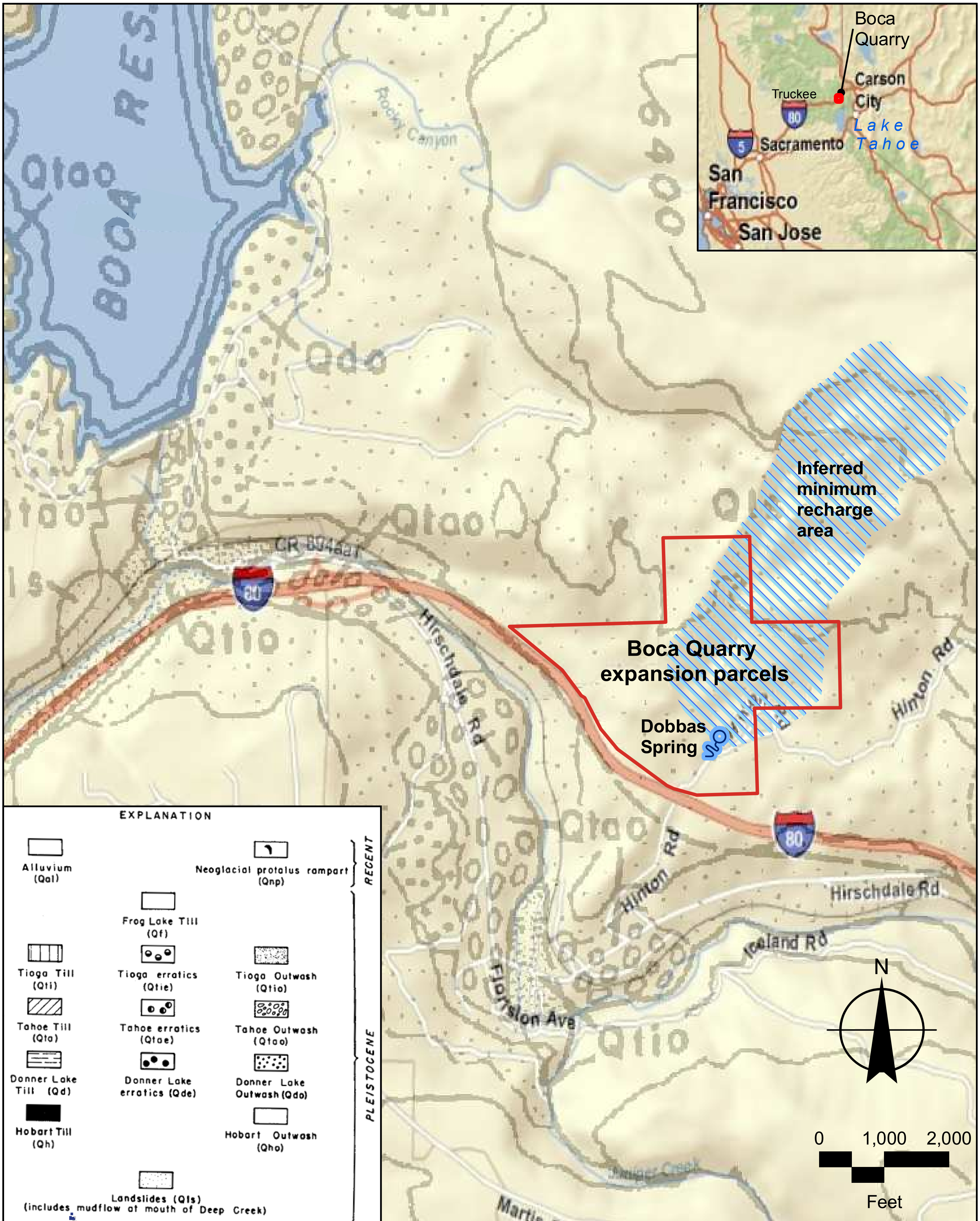
TEICHERT AGGREGATES
GIS DEPARTMENT



Balance Hydrologics, Inc.

Figure 2. Location of Boca Quarry relative to the Martis Valley Groundwater Basin and Truckee Donner Public Utility District Service Areas
Boca Quarry Expansion Project Water Supply Assessment, Nevada County, California
Note-

W:\Projects\210028 lower end-potential restoration.mxd



Balance Hydrologics, Inc.

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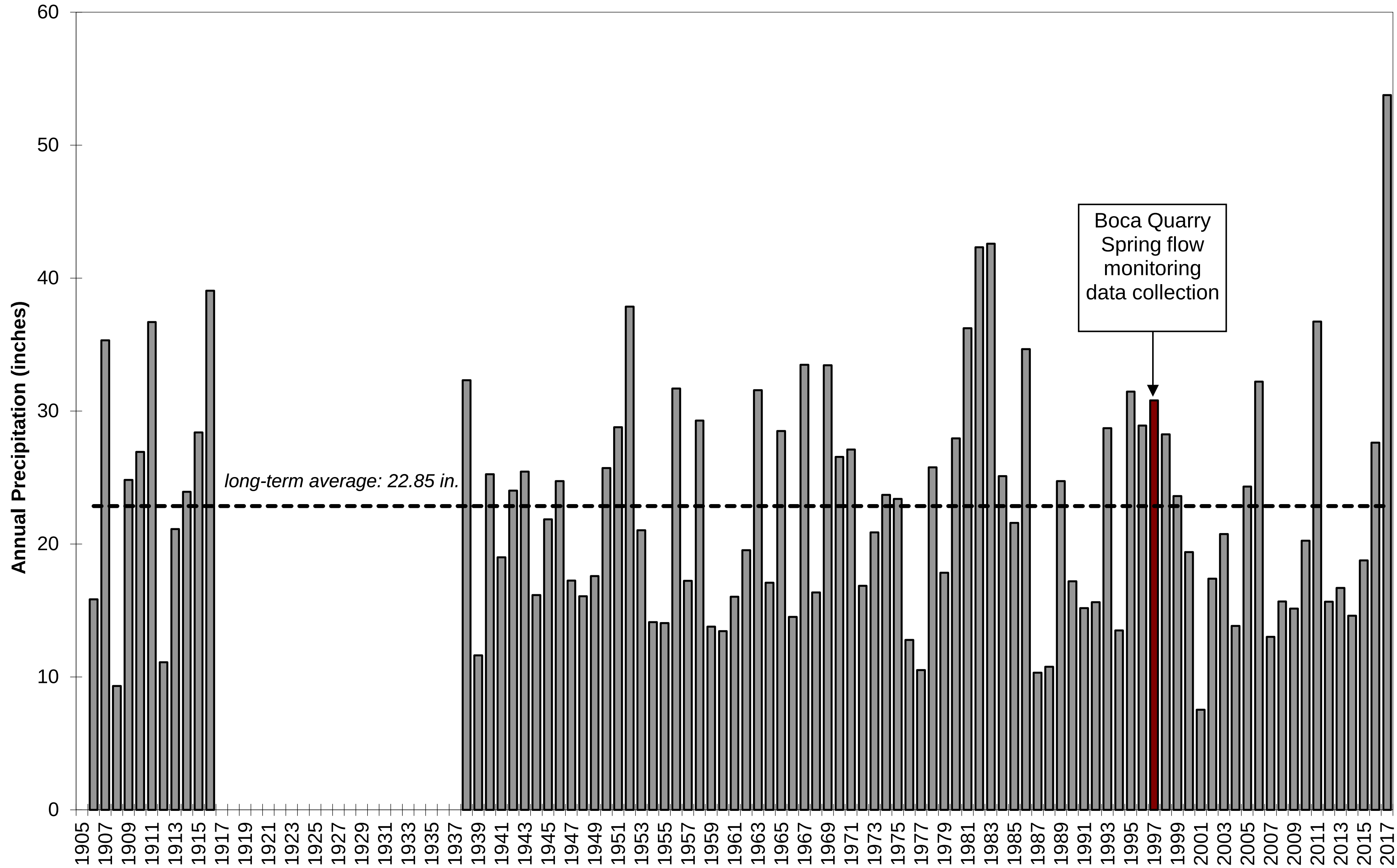
Figure 3. Local geology and inferred recharge area, Boca Quarry Expansion, Nevada County, California

Sources: ESRI; Geology from Birkeland, 1961.



Balance Hydrologics, Inc.

Figure 4. **Historical precipitation at Boca, California**
Source: California Data Exchange Center (CDEC Station BCA)

Cal/EPA

State Water
Resources
Control Board

Division of
Water Rights

Mailing Address:
P.O. Box 2000
Sacramento, CA
95812-2000

901 P Street
Sacramento, CA
95814
(916) 657-1985
FAX (916) 657-1485

Pete Wilson
Governor

APRIL 21 1998

Ms. Janet Goldsmith
Kronick, Moskovitz, Tiedemann & Girard
400 Capitol Mall, 27th Floor
Sacramento, CA 95814-3363

Dear Ms. Goldsmith:

DOBBAS PROPERTY IN NEVADA COUNTY

This is a follow up to our meeting on April 17, 1998, concerning the need for water rights related to the Dobbas' property in the Truckee River Basin in Nevada County. The Dobbas' have proposed taking water from a spring on their property and exporting the water to Reno for bottling and further distribution.

After reviewing the material you furnished at our meeting and other material in the Division of Water Rights' files, it is my opinion that an appropriative water right is not needed for use of water from the spring. The spring water appears to be percolating groundwater, over which the State Water Resources Control Board has no permitting authority. The pond on the property appears to have been created inadvertently during the construction of the I-80 freeway years ago. No beneficial use is being made of the water in the pond. Therefore, it is my opinion that no appropriative water right is needed for the pond.

If you have any questions or need additional information, please call me at (916) 657-1985.

Sincerely,

Roger Johnson

Roger Johnson
Assistant Division Chief