WELL TEST PLAN

TIERRA DEL SOL SOLAR FARM
SAN DIEGO COUNTY, TIERRA DEL SOL, CALIFORNIA

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1. Introduction

1.1. Purpose of the Well Test Plan

This Well Test Plan was prepared on behalf of Tierra Del Sol, LLC by Dudek for submittal to County of San Diego Department of Planning and Land Use (DPLU) to satisfy groundwater resource investigation scoping requirements outlined in *Guidelines for Determining Significance and Report Format and Content Requirements – Groundwater Resources* (DPLU, 2007). The Tierra Del Sol Solar Farm will, as much as feasible, use on-site groundwater as a source of supply to meet construction and operational water demands for the 444 acre concentrated photovoltaic (CPV) Tierra Del Sol Solar Farm (Project Site) located in Unincorporated San Diego County, Tierra Del Sol, California (Figures 1). The watershed for the Project Site is defined as the Hipass Hydrologic Subarea (911.85) which is contained within the Camp Hydrologic Area (911.80) and all within the Tijuana Hydrologic Unit (911.00); (Figure 2).

The intent of this Well Test Plan is to establish methods and procedures for conducting an aquifer test of Well B and for analysis of the aquifer test data measured at Well B. The aquifer test and analysis will be used to measure hydraulic properties of the local fractured bedrock aquifer in the immediate area of Well B, and to assess the ability of this on-site groundwater resource to meet the water demands of the project. In addition, groundwater dependent habitat identified on the Project Site and near the Project Site will be evaluated to determine potential impacts from groundwater withdrawal at Well B.

2. Geology

The Project Site is located on the eastern portion of the Peninsular Range geomorphic province which is a series of northwest-oriented mountain ranges extending from the Transverse Ranges near Los Angeles south through the Baja California peninsula. The Project Site geology consists of a thin cover of residual soil and weathered granitic rock overlying granitic bedrock, designated as Cretaceous age La Posta Tonalite (Figure 4; reference USGS OFR 2004-1361, Victoria Todd, 2004).

3. Proposed Aquifer Test: Well B

The aquifer test using Well B as a pumping well will be conducted in accordance with section 67.703.2 of the County of San Diego Groundwater Ordinance as well as the

County's *Guidelines for Determining Significance and Report Format and Content Requirements – Groundwater Resources* (DPLU, 2007).

3.1. Well B (Pumping Well)

Well B is located in the eastern portion of the Project Site (Figure 3). Well B was initially drilled as an exploratory borehole in April 2012 to a total depth of 1,311 feet below ground surface (BGS) using a 6 5/8-inch percussion air-rotary bit by Stehly Brothers Drilling, Inc. (Stehly) of Valley Center, California. The discharge rate while airlifting Well B during drilling of the 6 5/8 exploratory borehole was 75 gallons per minute (GPM). The majority of the groundwater production was observed to occur from fractures located below 1,000 feet. Table 1 below provides a summary of fractures encountered and their associated flow rates.

Table 1
Well B – Exploratory Borehole Total Flow and Change in Flow

Depth (feet bgs)	Notes	Total Flow (GPM)	Change in Flow (GPM)
7	Hammer begins firing	0	0
50-60	Tripped out of borehole at 86' bgs to insert temporary conductor casing and observed ~1 GPM flowing into borehole and down borehole wall.	<1	1
100	Air-percussion hammer does not fire, possible small void or fracture zone.	<1	0
160-163	Air-percussion hammer advances faster. Possible loose, fractured zone requires several attempts to penetrate below.	2.3 (at 186', end of stick)	1.3
286	No noticeable voids, fracture zones or change in lithology.	3.5	1.2
310-320	Air-percussion hammer advances faster. Possible loose, fractured zone. Drill cuttings show lithology shifts to more micaceous, with a higher percentage of biotite. Possibly responsible for the faster drilling.	0	0
361	Lithology shifts back to a more indurated, solid tonalite.	6	2.5
436	Drill cuttings indicate evidence of weathering/oxidation staining (rust-colored orange) on light grey tonalite.	5.6	-0.4
536	No noticeable voids, fracture zones or change in lithology.	8.7	3.1
611	No noticeable voids, fracture zones. Drill cuttings produced slightly larger fragments that had evidence of weathering and oxidation staining.	7.8	-0.9
661	No noticeable voids, fracture zones or change in lithology.	8.8	1
695-710	Air-percussion hammer advances faster. Loose or fractured zone.	9.6	0.8
761	Air-percussion hammer advances faster. Possible loose, fractured zone requires several attempts to penetrate below.	10	0.4
800	Lithology shifts from tonalite to more classical granitic composition.	7	-3
836	Lithology shift back to tonalite.	6	-1

Depth (feet bgs)	Notes	Total Flow (GPM)	Change in Flow (GPM)
851-853	Air-percussion hammer advances faster. Noticeable loose or fractured zone. No increase in flow. Lithology shift to granitic composition.	0	0
960-961	Air-percussion hammer advances faster. Noticeable loose or fractured zone. No increase in flow. Lithology is tonalite.	0	0
1,000-1,010	Air-percussion hammer advances faster. Possible loose, fractured zone requires several attempts to try and penetrate below. Zone is so loose that borehole is continuously filled with material from this zone.	20	14
1,036	Air-percussion hammer advances faster. Loose or fractured zone.	25	5
1,045-1,055	Air-percussion hammer advances faster. Loose or fractured zone.	0	0
1,111	Green mineral observed in drill cuttings, possibly a precipitate	30	5
1,195	Air-percussion hammer advances faster. Loose or fractured zone.	49	19
1,245-1,255	Pressure on air compressor rose 100 psi and drilling indicated loose, fractured zone.	75	26
1,311	Final depth and flow measurement.	75[a]	-

[a] The flow rate of the reamed borehole to 10 inches in diameter was measured at 120 GPM.

The pilot hole was drilled on April 18th and 25th 2012. A temporary 8 5/8" OD ASTM/ASME 5A536 steel conductor casing was set to 20 feet BGS and sealed with hydrated Hydroplug 3/8" bentonite pellets. The borehole simplified lithologic log is presented in Table 2 and a graphical log of the formations encountered by the pilot borehole is presented in Figure 8. The borehole lithology consisted primarily of weathered and unweathered granitic rock, medium to coarse grained, predominantly tonalite from 0 to 1,086 feet BGS. From 1,086 to 1,311 feet BGS, alternating zones of granodiortite and tonalite were encountered.

Table 2: Well B – Simplified Lithologic Log

Depth (Feet, BGS)	Description
0 – 1,086	Weathered and Unweathered White Granitic Rock - Tonalite
1,086 – 1,111	White Granitic Rock - Granodiorite
1,111 – 1,236	Angular White Granitic Rock - Tonalite
1,236 – 1,311	White Grainitic Rock - Granodiorite

On July 9th 2012, the borehole was reamed to 16 inches in diameter from 0-53 feet BGS with a tri-cone drilling bit for installation of a permanent surface seal. The surface seal was set to the required minimum 50 feet BGS to meet California Department of Water Resources (DWR) standards for drinking water wells. The conductor casing (10.75-inch O.D. by 0.250-inch wall thickness Grade B Mild Steel) was installed to 53 feet BGS in 20 foot sections. Each casing joint was cleaned with a grinder, fitted and tack welded into position. The casing was arc welded, cleaned and then inspected before the casing was lowered into the borehole. On July 10h 2012, 10 sack sand/cement slurry was set from 0 to 53 feet BGS by tremie and high pressure trailer pump. A 1-inch diameter tremie pipe was installed to approximately 50 feet BGS. As the sand/cement slurry rose in the annulus between the borehole and conductor casing, tremie pipe was removed from the well. The final tremie depth was approximately 42 feet BGS when the sand/cement slurry was observed at the surface. A total of 3 cubic yards was set in the annulus. The theoretical volume of the borehole from 0 to 53 feet BGS was calculated to be 1.70 cubic yards. Therefore, the volume of cement set was greater than the theoretical volume. The greater volume was most likely due to wash-outs in the weathered granitic rock. The surface seal was inspected and approved by Peter Neubauer of the County of San Diego Department of Environmental Health (DEH).

On July 12th 2012, the borehole was reamed to 10 inches in diameter from 53 to approximately 500 feet BGS. During drilling activities on July 12, 2012, the hammer on Stehly's drill rig broke off and drilling ceased until the hammer was removed from the hole and repairs were made. Reaming activities resumed on July 16, 2012 and the borehole was reamed to 10 inches to a depth of 1,019 feet BGS. On July 19, 2012, 8-inch diameter by 0.188-inch wall thickness NEXSTEEL mild steel casing was installed to a depth of 1,019 feet BGS. The purpose of the 8" steel casing is to stabilize the borehole and prevent material from entering during airlifting and subsequent pumping. Well completion details are presented in Figure 8. While airlifting at total borehole depth, 120 GPM was produced.

Table 3: Well B – Construction Materials and Lengths/Volumes

Depth (Feet, BGS)	**Borehole Diameter (Inches)**	**Material**	**Volume Set (Yards^3)**	**Theoretical Volume (Yards^3)**
0-53	16	10.75-inch O.D. by 0.250-inch wall California Steel Industries A 53 Grade B Mild Steel Casing	NA	NA
0-53	16	Cement	3.0	1.70
53-1,019	10	8-inch O.D. by 0.188-inch wall NEXSTEEL Mild Steel Casing	NA	NA
1,019-1,311	6.625	Open-cased, granite borehole	NA	NA

3.2. On-site Wells (Monitoring Wells)

Well 1: Well 1 initially pumped at a rate of 30 GPM; however, this rate reduced to 21 GPM after 4 minutes, 14 GPM after 21 minutes and no water production after 23 minutes of pumping. The depth to water while pumping dropped from the static water level of 45.58 feet (below top of 1-inch PVC sounding tube) to the pump intake at 273 feet below top of casing during the first 23 minutes of pumping. This pumping rate indicates that the higher pumping rates observed in Well 1 are the result of removing water from casing storage and that the fractured granitic rock formation is not capable of yielding more than a few GPM from this well. A video log of Well 1 indicated that it is in good condition and lined with 4-inch PVC to total depth of 282 feet.

Well 2: Well 2 was not pumped due to a short/fault of the existing down-hole wire to the submersible pump. The pump removed from the well was identified as a 1.5 horsepower pump. The pump was set 420 feet below top of casing (BTOC). Based on the expected pumping water level and performance curve of the pump the maximum well yield for Well 2 is in the probable range of 10 to 20 GPM. The actual pumping rate should be verified when the down-hole wiring is replaced. A video log of Well 2 indicated that the well is unlined (open to fractured granitic bedrock) to a total depth of 491.7 feet BTOC. Information provided by the property owners, Joe and Jan Brown, indicated that Well 2 was originally 600 feet deep. Loose broken material was observed predominantly between 459.8 and 473.7 feet BTOC and may be the source of the well obstruction between 491.7 and 600 feet.

Well 3: A California Department of Water Resources (DWR) Driller's Well Log was obtained from Frank's Drilling of Guatay, California. The DWR Well Log indicates the estimated yield of the well is three GPM. Frank Thing of Frank's Drilling also confirmed the low production rate of the well.

Well 4: Well 4 is obstructed at 26.1 feet below top of casing due to a pipe stuck in the well associated with the former windmill. According to the property owners, Well 4 was originally 150 feet deep and produced approximately 10 GPM.

Hand-dug Well: The Hand-dug Well onsite is dry to total depth of 25.6 feet below ground surface. The property owners report the Hand-dug well was originally 100 feet deep and produced approximately 3 GPM.

Well A: Well A was drilled by Stehly in April 2012 as an exploration well to 1,000 feet BGS. The final flow rate measured in Well A was 1.8 GPM. A fracture zone from 57 to 62 feet BGS produced 7 GPM during drilling indicating hydraulic connection to the shallow aquifer system in Well A.

Presented below in Table 2 is a summary of the On-site Wells' well depth and depth to water levels. Water level elevations and direction of flow are also presented graphically in Figure 5.

Table 4
On-site Wells – Well and Water Level Depth

Well On Site	Well Depth (feet)	Depth to Water (feet)[e]	Well Production (GPM)
Well 1.	282	48.85	2
Well 2.[a]	491.7	93.00	5
Well 3	911.8	79.51	3
Well 4[b]	150	8.83	10
Hand-dug Well[c]	100	Dry to 25.6 feet BGS	3
Well A	1,000	48.00	1.8[d]
Well B	1,311	40.13	120[d]

[a] Well No 2 was reported to be originally 600 feet deep by the property owner.
[b] Well No 4 is reported to be 150 feet deep by the property owner. The well is currently obstructed at 25 feet below TOC with a pipe from the former windmill that was located on this well.
[c] Hand-dug Well is dry and obstructed at 25.6 feet below ground surface. Property owner reports Hand-dug Well was originally 100 feet deep.
[d] Airlifted production rate recorded at the end of drilling.
[e] Water levels measured on June 25, 2012.

A submersible pump will be installed into Well B to sufficient depth to allow for constant rate pumping of the well for a period of up to 72 hours. In fractured rock aquifers, it is typical for the pumping level to draw down substantially to the depth of principal water bearing fractures under extended pumping at maximum rates. Therefore, we propose conducting a 12-hour step drawdown test to establish the optimal pumping rate for the 72-hour test. The flow rate for the constant rate test will likely be greater than 30 GPM. Prior to the step test, an In-Situ, Inc. Level Troll 700 pressure transducer/ datalogger or similar will be installed into a sounding tube in the pumping well (Well B) and into the well casings of five proposed observation wells (Well 1, Well 2, Well 3, Well 4 and Well A). Well 1 and Well 4 are located within 0.5-mile of Well B (Figure 4). In advance of the test, Dudek will contact property owners adjacent to the Project Site who have domestic wells located within 0.5-mile of Well B to inform them of the well tests and offer to monitor water levels during the well tests (Figure 6).

Automatic water level and flow rate readings will be recorded at a minimum of the following frequencies during each well test per County guidelines:

Table 5: Water Level and Flow Rate Monitoring Frequency

Time Since Pumping Started	Monitoring Frequency
0 to 10 minutes	30 seconds
>10 to 30 minutes	2 minutes
>30 minutes to 2 hours	10 minutes
>2 hours to 12 hours	30 minutes
>12 to 24 hours	1 hour

Prior to the step test and constant rate test, water levels will be recorded for a period of 7 days to identify any long-term trends. In addition, barometric pressure will be recorded throughout the period of water level measurements.

The recovery period from the step test as well as the 72-hour test will be a minimum of twice the duration of the pumping test and minimum recording frequency for water levels will be measured according to Table 1. Water level transducers will be left in the pumping well and observation wells for a period of 7 days after the recovery period. Manual water level measurements will be recorded at the start of the test, periodically over the test interval and during recovery after pumping ceases in order to confirm the accuracy of the pressure transducer measurements. Flow will be measured using a Sensus in-line flow meter or similar equipped with a flow totalizer. Flow rates will be measured according to Table 1 while personnel are present on the Project Site during the tests. Field personnel will monitor flow rates and make adjustments as necessary to maintain the desired constant flow rate throughout the duration of the tests. A check valve will be installed in the discharge line to avoid backflow of water into the well when the pump is shut off.

The discharge pipeline will extend a minimum of 300 feet away from Well B, and will be placed outside any surface water drainage. Water will be dispersed via sprinklers to enhance evaporation during the tests and avoid any discharge water from flowing into a downstream surface water body or drainage course. The well pump valving, flowmeter, and water level monitoring equipment will be tested at least 24 hours prior to the start of the tests in accordance with County guidelines.

4. Proposed Well Test Analysis

4.1. Aquifer Hydraulic Properties Analysis

Aquifer transmissivity (the rate at which water flows through a vertical strip of the aquifer 1 foot wide and extending through the full saturated thickness, under a hydraulic gradient of 1 or 100 percent) will be estimated using the Copper-Jacob approximation to the Theis equation (Cooper-Jacob 1946) as follows:

$$\mathbf{T = \frac{2.303\ Q}{4\ \pi\ \Delta s}}$$

Where:

T = transmissivity (feet^2/day) [multiply by 7.48 to get units of gpd/ft]
Q = average pumping rate (feet^2/day) [multiply GPM by 193]

¶ = pi (3.14)
ΔS = difference in drawdown over one log cycle (feet)

The aquifer coefficient of storage (also called storativity) is the volume of water released from storage per unit decline in hydraulic head in the aquifer per unit area of the aquifer. Due to well loses and inefficiency of the pumping well, an observation well is required to calculate the coefficient of storage. The coefficient of storage will also be estimated using the Copper-Jacob approximation to the Theis equation (Cooper-Jacob 1946) as follows:

$$\mathbf{S = 2.25 T t_o / r^2}$$

Where:

S = Coefficient of Storage (dimensionless)
T = transmissivity (feet^2/day)
t_o = intercept with x-axis, time (days)
r = distance to observation well (feet)

An estimate of groundwater drawdown at the nearest residential well induced by project pumping at 1 year will be estimated using the Cooper-Jacobs approximation of the Theis Non-Equilibrium Flow Equation (USGS 1962):

$$\mathbf{s = \frac{264\,Q}{T} \log_{10} \frac{0.3\,Tt}{r^2 S}} \quad .$$

Where:

s = predicted drawdown (feet)
Q = average pumping rate (GPM)
T = Transmissivity (gpd/ft) =
t = time (days)
r = distance from pumping well (feet)
S = coefficient of storage (dimensionless)

Based on the actual results of the drawdown data collected during the aquifer test, the use of additional analysis methods will be evaluated as appropriate.

4.2. Groundwater Dependent Habitat Analysis

Potentially occurring groundwater dependent habitat on the Project Site and near the Project Site is depicted in Figure 7. The County's Guideline 4.2.C from the Biological Guidelines for Determining Significance have the following threshold for determining a significant impact to riparian habitat or a sensitive natural community: "*The project* *would draw down the groundwater table to the detriment of groundwater-dependent habitat, typically a drop of 3 feet or more from historical low groundwater levels*."

Well 1 is approximately 1,439 feet west of Well B (1,000 feet from the Open Water (OW) mapped on the Project Site and 1,800 feet from the open coast live oak woodland (LOW) mapped to the east of the Project Site) and is completed to a total depth of 282 feet BTOC. The water levels measured in June 2012 in Well B and Well 1 were 40.13 and feet below TOC and 48.85 feet BTOC, respectively. Well 4 is approximately 1,000 feet west of the LOW mapped on the Project Site (Figure 7). The water level in Well 4 in June 2012 was 8.83 BTOC. The neighboring property owner to the east, Robert Maupin, in the area of the LOW reportedly has two shallow wells drilled to depths of 190 feet and 100 feet below land surface with well production capacity of 60 GPM and 100 GPM, respectively (Maupin, pers. comm. 2012). The water levels in the Maupin Wells have not been measured due to access limitations.

Quercus agrifolia (coast live oak) associated with the LOW vegetation is a native drought resistant evergreen tree with a root system that consists of a deep taproot with several main roots that may tap groundwater if present within approximately 36 feet of the soil surface (Canadell, 1996). Based on past experience in San Diego County with fractured rock granitic aquifers conducting long-term pump tests from deep fractures (i.e. >1,000 feet), there is typically limited hydraulic connection with the shallow fracture system that would influence groundwater dependent habitat that extends to a maximum depth of 36 feet below ground surface.

All on-site wells and, if accessible, the two wells located on the Maupin property to the east should be sufficient to monitor water level changes in the shallow portion of the aquifer and potential impacts to groundwater dependent habitat due to groundwater pumping from Well B.

5. References

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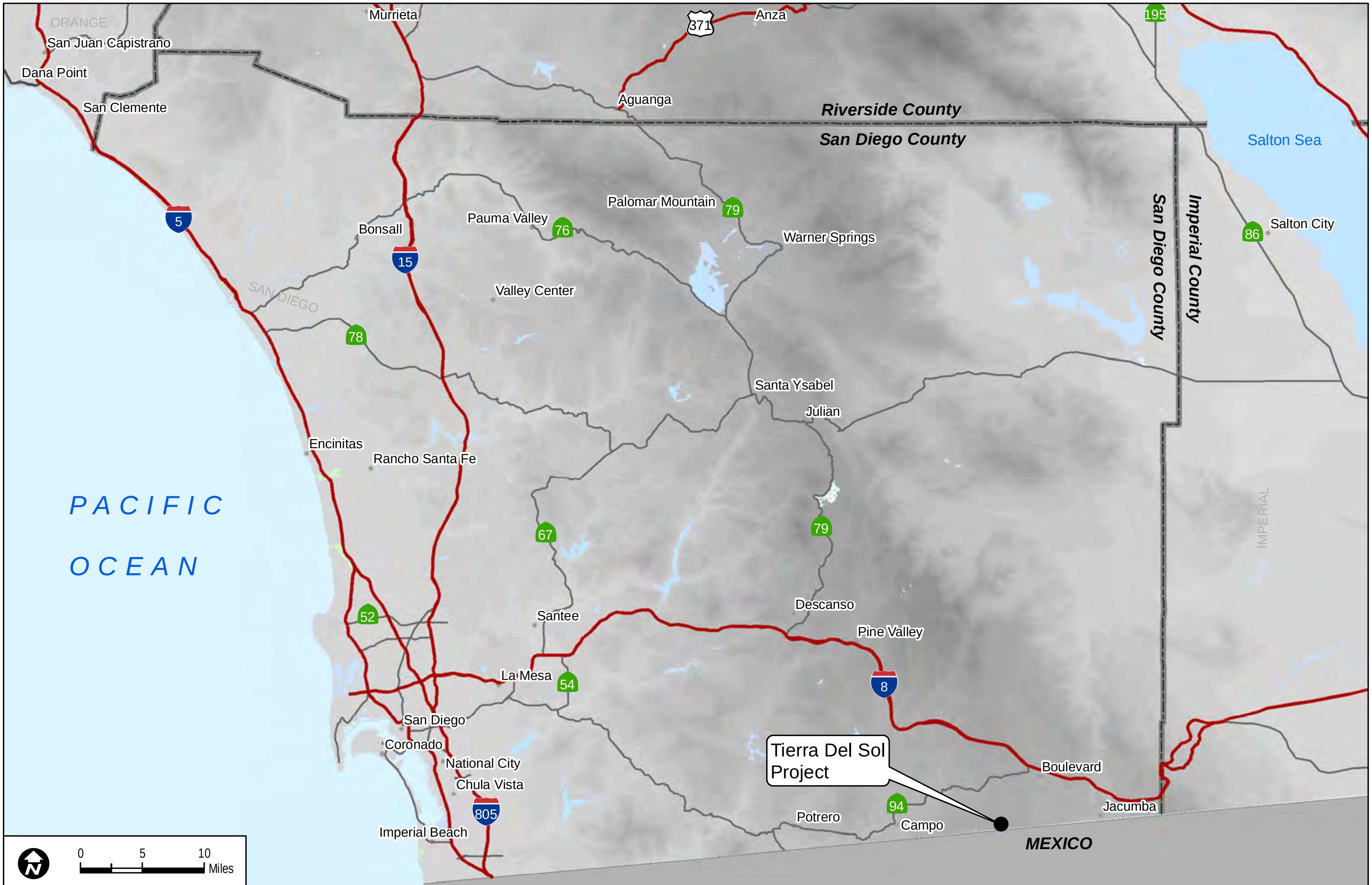

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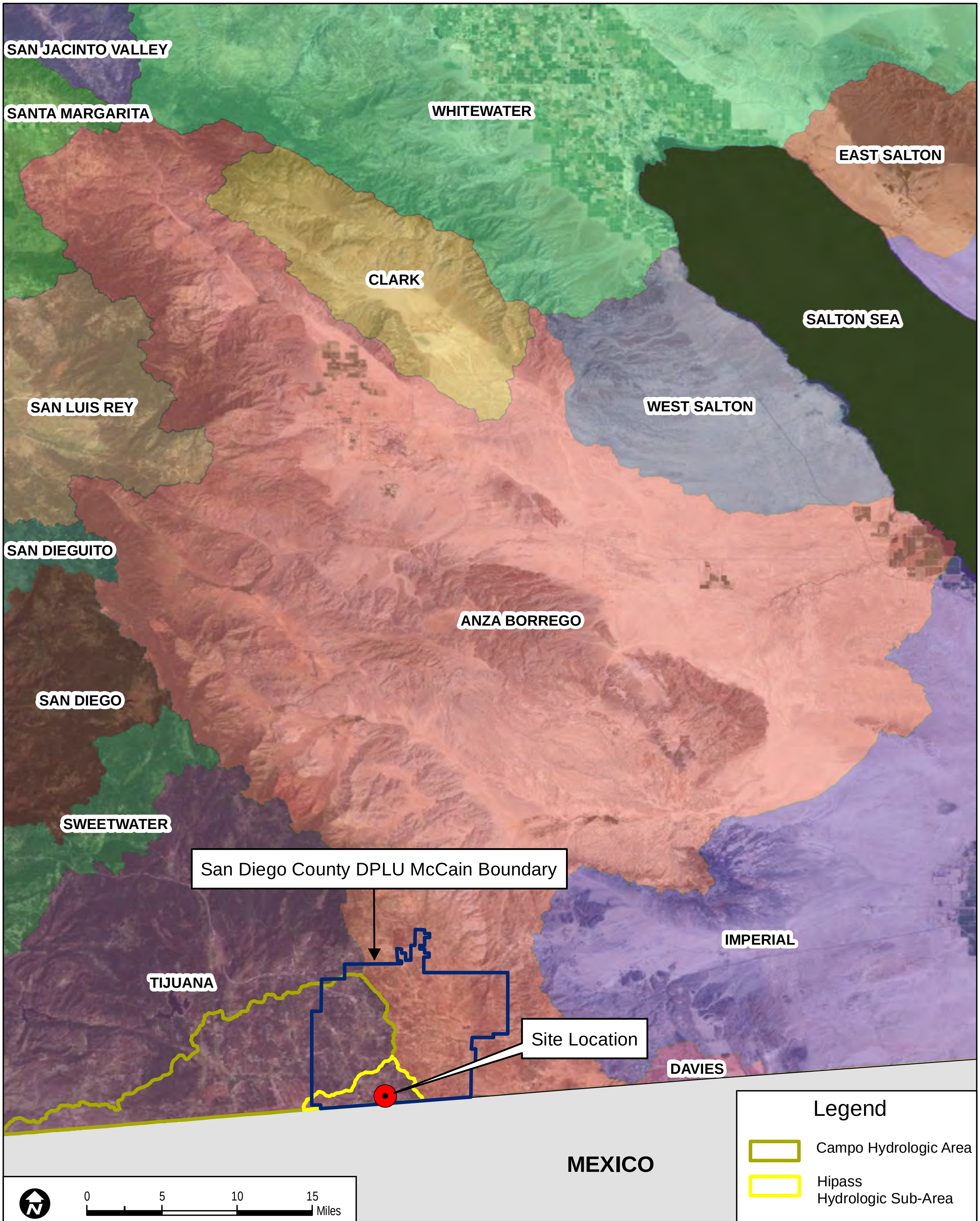
FIGURE 1

Regional Location Map



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SOURCE: BING MAPS, DEPT. WATER RESOURCES

FIGURE 2

Regional Watershed Map

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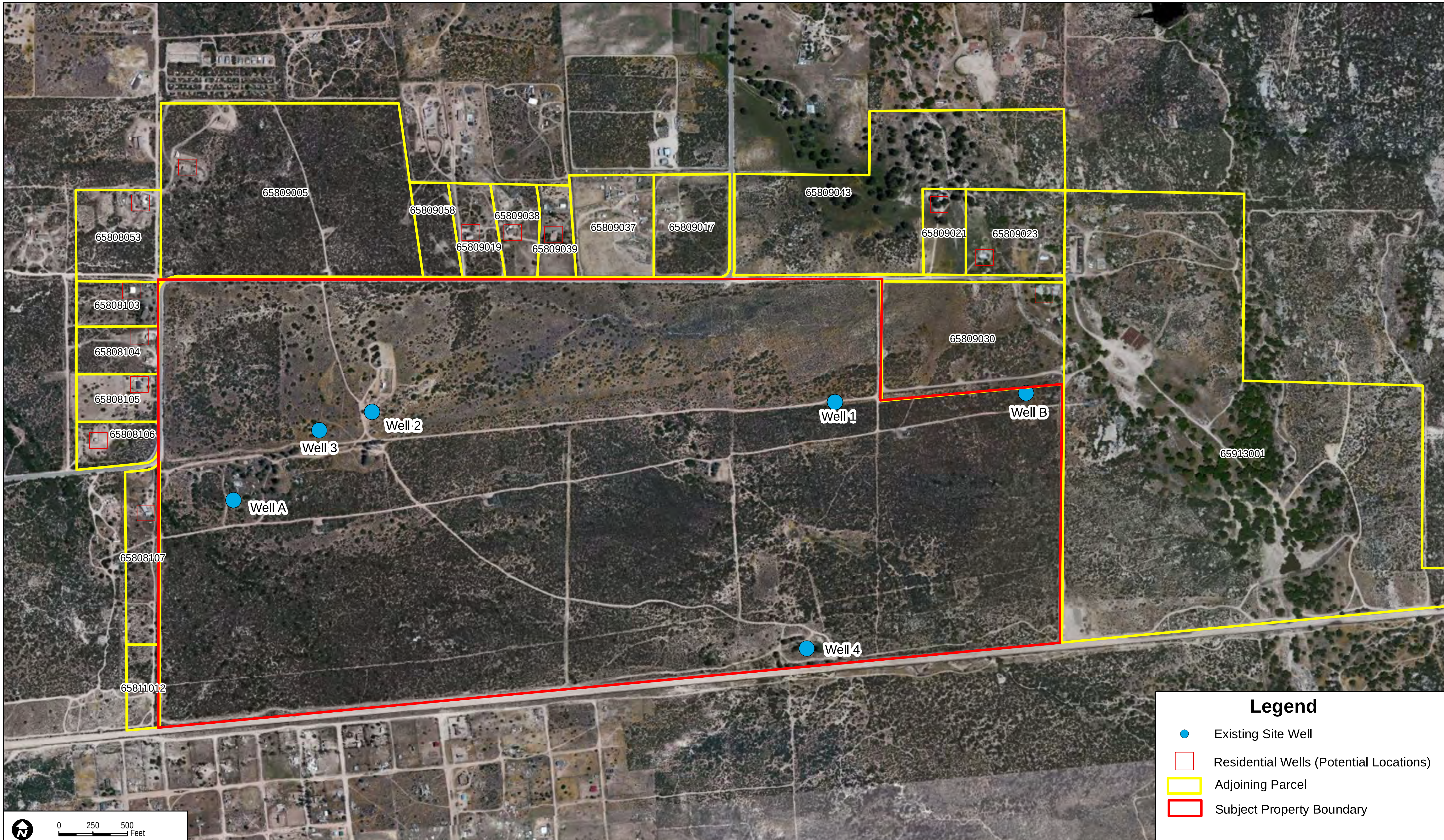

SOURCE: Digital Globe 2008, SanGIS 2010

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FIGURE 3

Parcels and Well Locations Map

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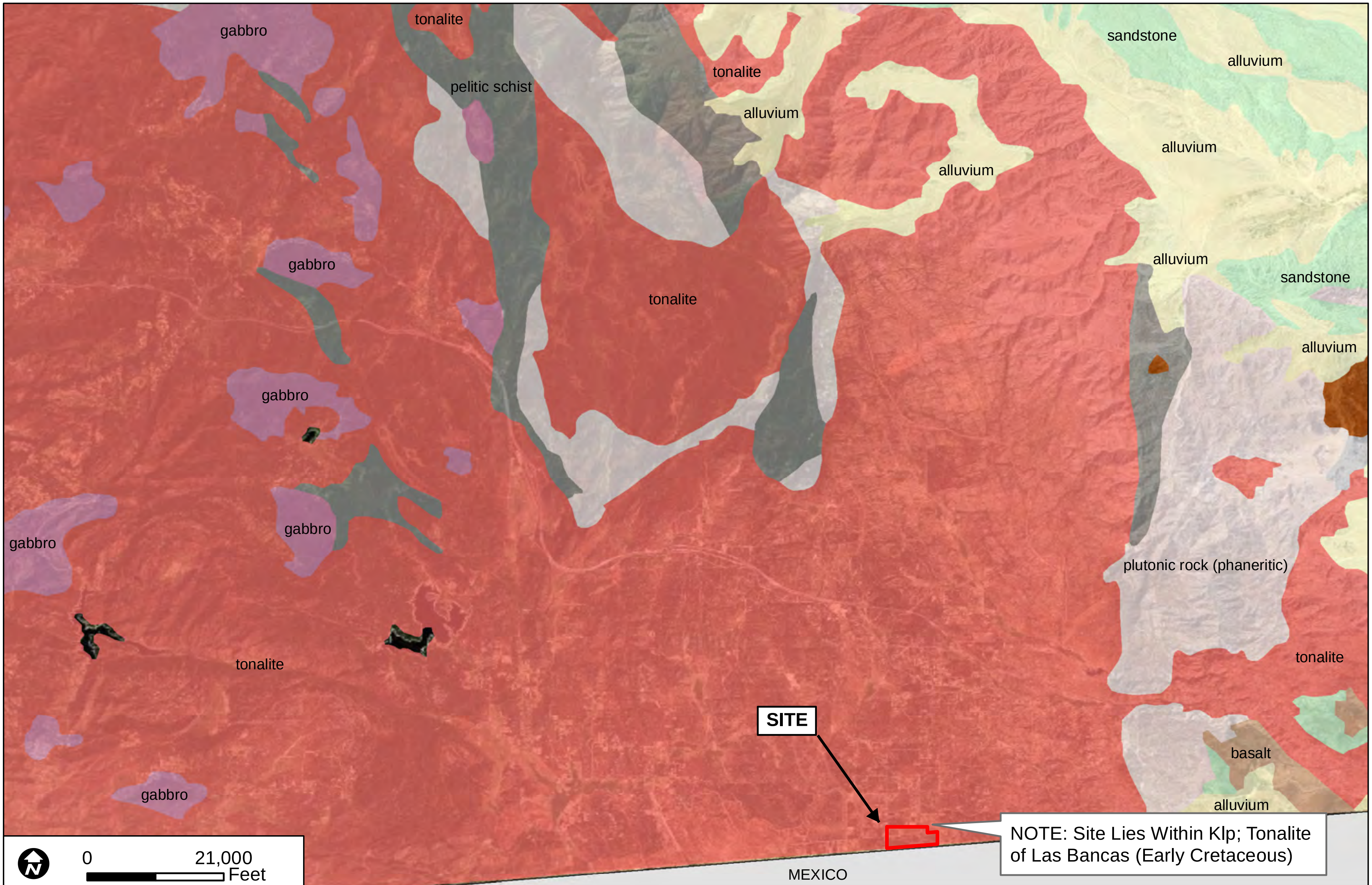

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SOURCE: USGS

FIGURE 4

Regional Geologic Map

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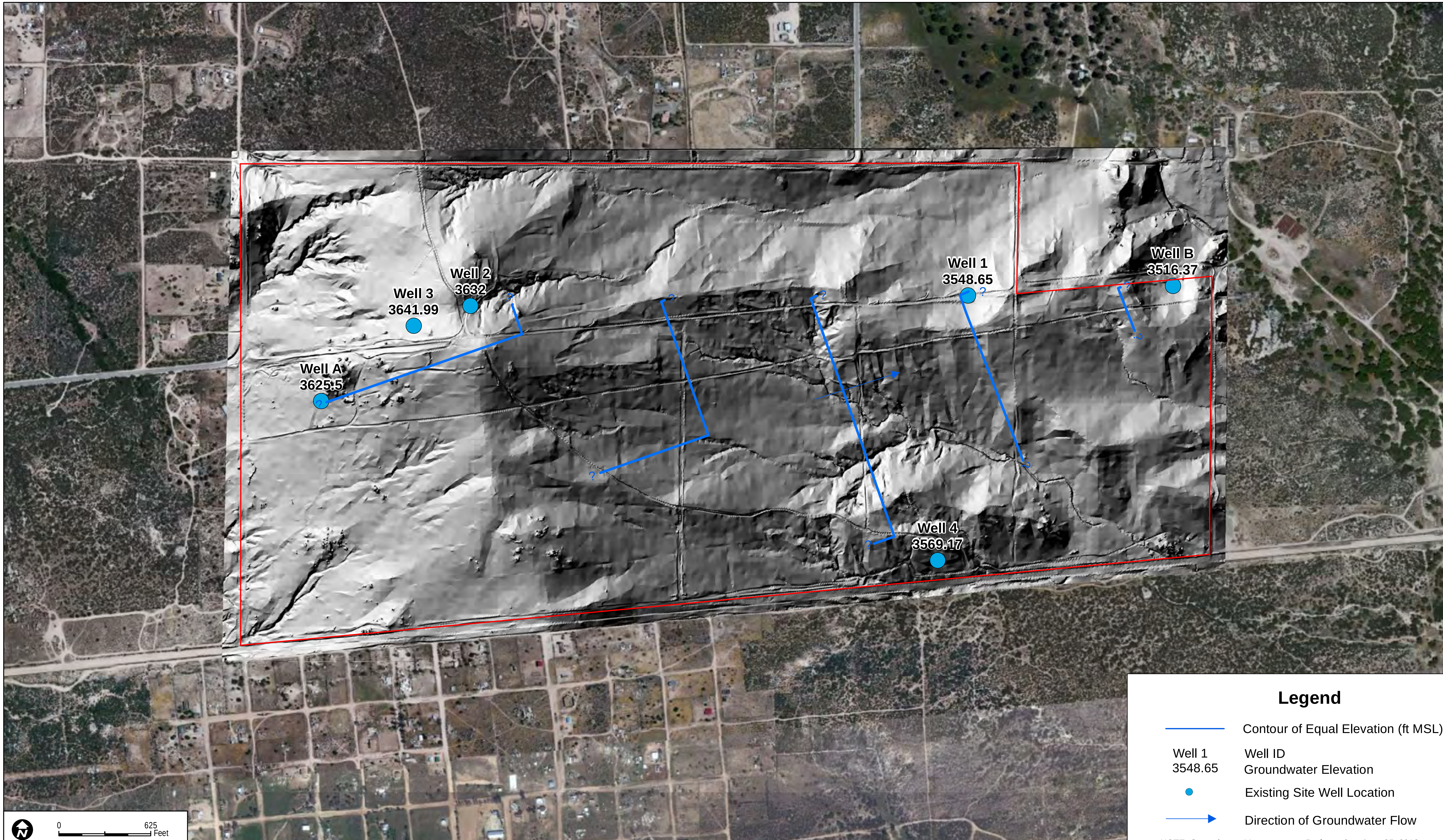

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SOURCE: BING MAPS, SanGIS 2010, TDS 0.5 Foot Topographic Contours

FIGURE 5
Groundwater Elevation Map

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SOURCE: Digital Globe 2008, SanGIS 2010

FIGURE 6
Well B Half-Mile Well Test Radius of Influence

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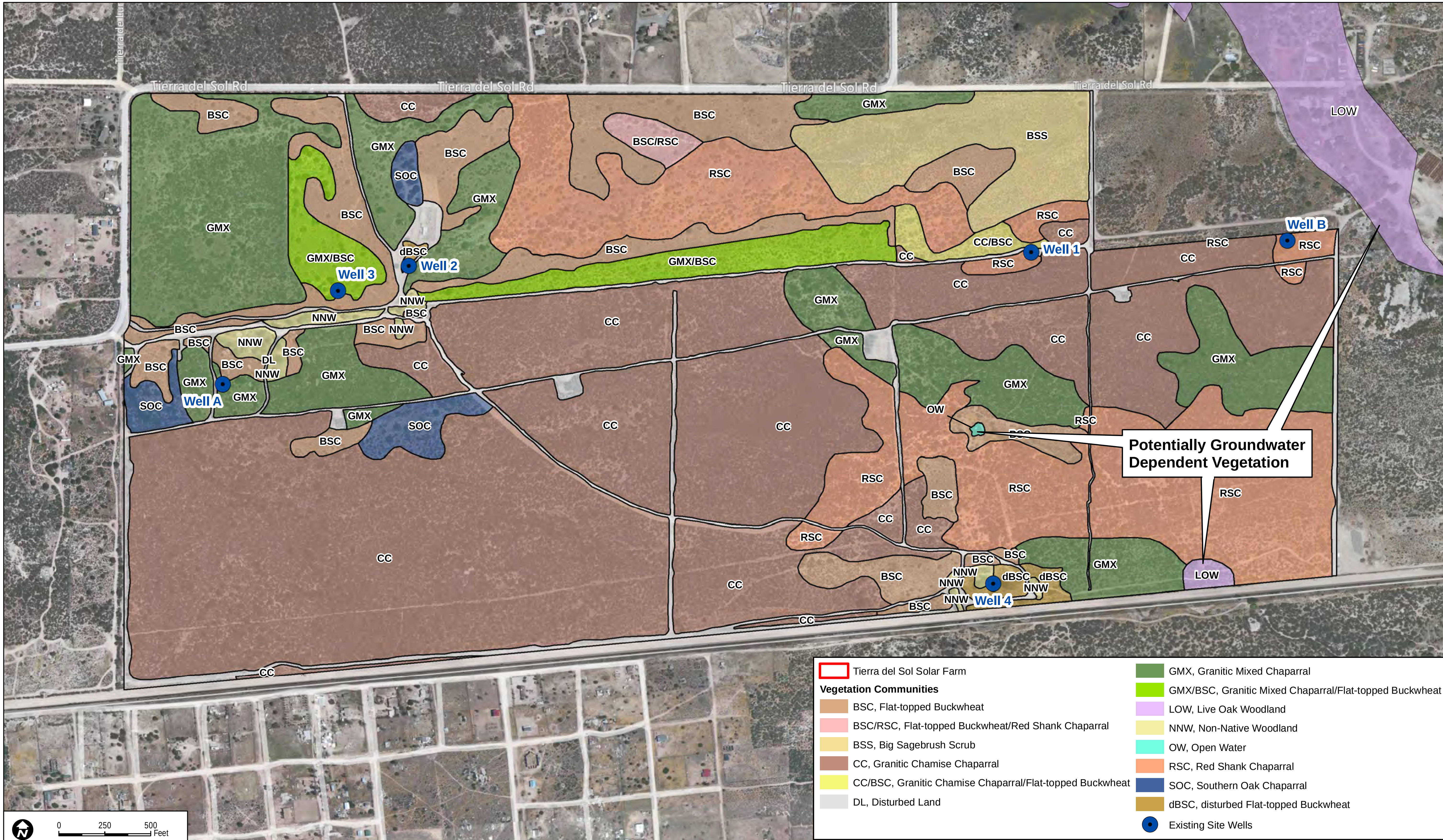

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SOURCE: Bing Maps, SanGIS

FIGURE 7

Potentially Groundwater Dependent Vegetation

Approximate GPS Coordinates: 32.60721°N, 116.31337°W (Datum: WGS 84)
Ground Surface Elevation Approximately 3,556.5 Feet (Source: TDS Survey)

0-11 feet below TOC, Decomposed Granitic rock yellowish-brown.
Approximately 50 feet below TOC, weathered tonalite, first water @ <1 GPM.
11 to 100 feet below TOC, weathered light grey granitic rock - tonalite
Fracture at 48.2 (horizontal), 76.2-79.5 (vertical) and 97.7 (vertical) feet below TOC
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

100 to 200 feet below TOC, weathered to indurated light grey granitic rock - tonalite (Formation becomes harder around 100 feet below TOC).
Fracture at 100.2 (horizontal), 164.3 (vertical, loose/broken material observed), and 198-192 (vertical) feet below TOC.
Flow measured @ 2.3 GPM (186 feet)
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

200 to 300 feet below TOC, light grey granitic rock - tonalite
Fracture at 239.5-242 (vertical)
Flow measured @3.5 GPM (286 feet)
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

300 to 400 feet below TOC, medium to light grey granitic rock - tonalite
Fracture at 331-333.2 (vertical), 336.7-337.5 (vertical), 346.2-347 (vertical), 367-370.7 (vertical), 372.8-374 (vertical) and 391.7 (vertical).
Flow measured @6 GPM (361 feet)
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

400 to 500 feet below TOC, medium to light grey granitic rock - tonalite
Fracture at 407.3 (vertical), 412 (vertical), 431 (vertical) and 451.3-454 (vertical)
Flow @5.6 GPM (436 feet)
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

500 to 600 feet below TOC, medium to light grey granitic rock - tonalite
Fracture at 526.2-530.7 (vertical, apparent precipitate minerals in fracture trace)
Flow @8.7 GPM (536 feet)
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

600 to 700 feet below TOC, medium to light grey granitic rock - tonalite
Fracture at 635.6-637.1 (vertical), 640.6 (vertical) and 683.5-685.8 (vertical)
Flow @7.8 GPM (611 feet); Flow @8.8 GPM (661 feet)
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

700 to 800 feet below TOC, medium to light grey granitic rock - tonalite
Fracture at 757.1-758.4 (horizontal)
Flow @9.6 GPM (711 feet)
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

800 to 900 feet below TOC, medium to light grey granitic rock - tonalite and granodiorite
Fracture at 848-853 (vertical broken zone, appears fractured)
Flow @7 GPM (800 feet); Flow @6 GPM (836 feet)
[mineralogy; quartz, plagioclase feldspar, orthoclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

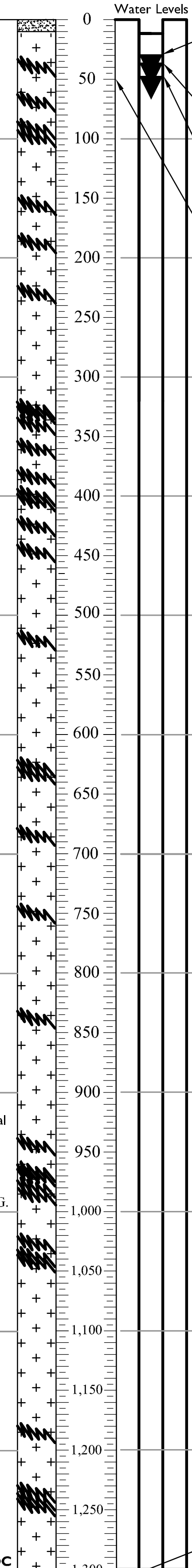
900 to 1,000 feet below TOC, medium to light grey granitic rock - tonalite
Fracture at 953.7-958 (vertical), 973.4 (horizontal), 974.3-983.9 (vertical, loose and broken material observed), 988.1-991(vertical) and 993.3-unknown (vertical, borehole collapsed and filled with loose material at 995.6 feet below TOC. Fracture depths beyond this depth are from drilling log)
Flow does not visually change from 900-1,000 feet
[mineralogy; quartz, plagioclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].
Fractures REVIEW FINAL VIDEO LOG.

1,000 to 1,100 feet below TOC, medium to light grey granitic rock - tonalite and granodiorite
Possible fracture zone at 1,030-1,036 and 1,045-1,050
Flow @20 GPM (1,011 feet); Flow @25 GPM (1,036 feet)
[mineralogy; quartz, plagioclase feldspar, orthoclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

1,100 to 1,200 feet below TOC, medium to light grey granitic rock - tonalite and granodiotire
Possible fracture zone at 1,195 feet
Flow @30 GPM (1,111 feet)
[mineralogy; quartz, plagioclase feldspar, orthoclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

1,200 to 1,311 feet below TOC, medium to light grey granitic rock - tonalite and granodiorite
Possible fracture zone at 1,245-1,255 feet
Flow @49 GPM (1,200 feet); Flow @75 GPM (1,261 feet); Flow at 75 GPM (1,311 feet)
[mineralogy; quartz, plagioclase feldspar, orthoclase feldspar (lighter minerals) with hornblende, biotite and quartz (darker minerals)].

Total Depth = 1,311 feet below TOC



Water Level = 29.45 feet below TOC on 19 April, 2012 at 10:45 (8-inch casing to 20'; 6-inch borehole open to 286').

Water Level = 29.95 feet below TOC on 20 April, 2012 at 10:15 (8-inch casing to 20'; 6-inch borehole open to 800').

Water Level = 36.30 feet below TOC on 23 April, 2012 at 11:00 (8-inch casing to 20'; 6-inch borehole open to 1,011 but collapsed to 1,000').

Water Level = 44.90 feet below TOC on 3 May, 2012 at 15:15 (8-inch casing to 20'; 6-inch borehole open to 1,311').

Cascading water (<1 GPM) observed during 12.5" ream for conductor pipe at approximately 50 feet below TOC on 18 April, 2012.

Final flow measured while airlifting = 75 GPM

Well B Drill Cuttings

DUDEK
605 Third Street Encinitas, CA 92024
760.942.5147 Fax 760.632.0164

Dates Drilled: 18-20, 23, 25 April 2012
Drilling Method: Air rotary percussion
Sampling Method: Cuttings
Logged by: Patrick Rentz
Driller: Stehly Brothers Drilling

TIERRA DEL SOL WELL B
Tierra Del Sol, California

WELL B

FIELD LITHOLOGIC LOG

DRAWING FIGURE 8
SHEET ____ OF ____
DATE May 2012
CAD FILE Litho Well B

8/2/2012 4:00:48 PM P:\400.Hydrogeology\7123 Tierra del Sol\CAD\Litho Well B

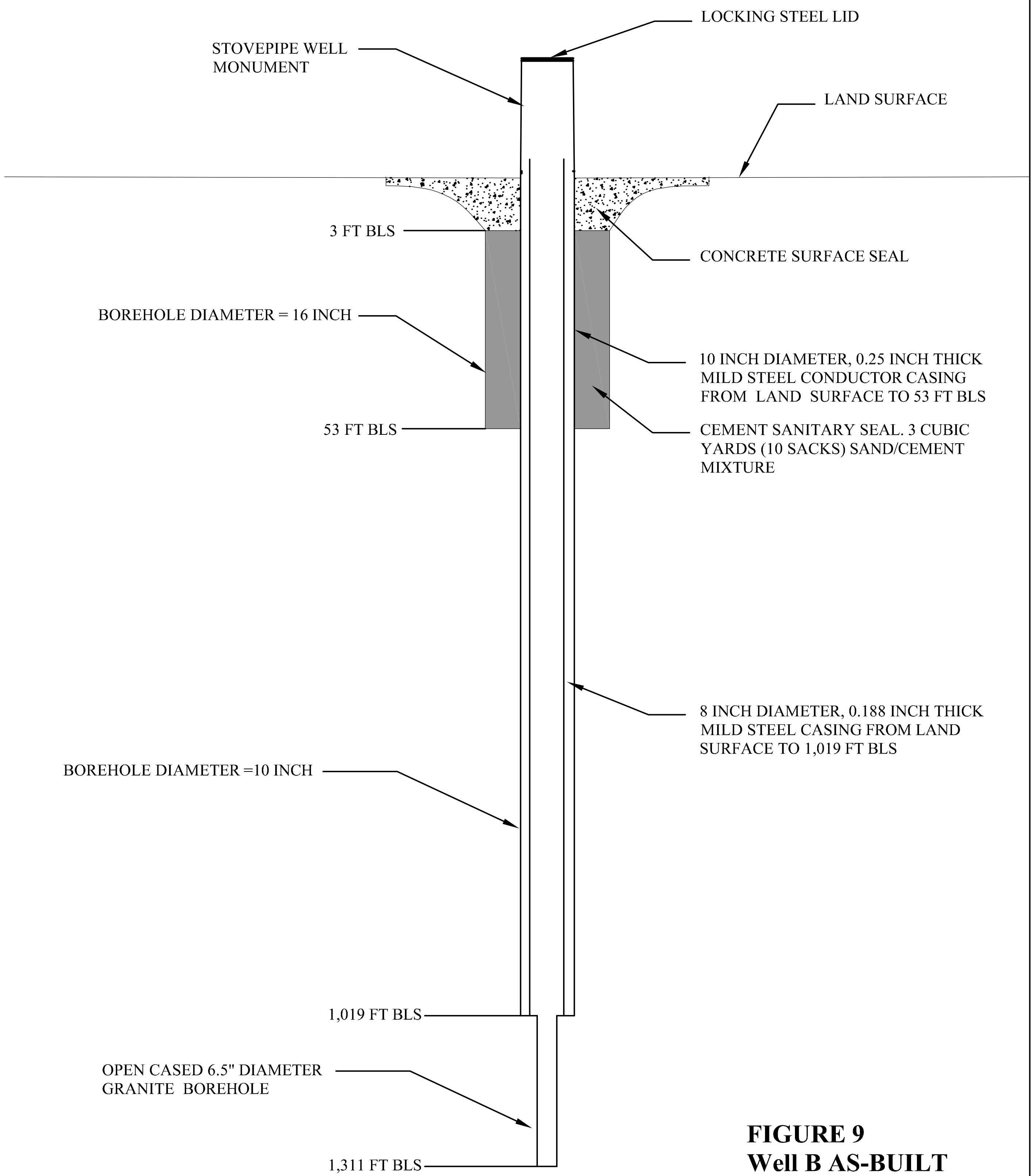


FIGURE 9
Well B AS-BUILT
Tierra Del Sol
Tierra Del Sol, CA

NOT TO SCALE