

# Monitoring Well Destruction, Replacement, and New Installations at Various Locations

## Soquel, Capitola, and Aptos, CA

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*Prepared for:*  
Soquel Creek Water District



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## ABBREVIATIONS

amsl .....	above mean sea level
bgs .....	below ground surface
DDC .....	direct data cable
NGVD .....	National Geodetic Vertical Datum
OD .....	outside diameter
SP .....	spontaneous potential

## EXECUTIVE SUMMARY

A total of six new monitoring wells and seven replacement monitoring wells were drilled and constructed, and 13 monitoring well destroyed between February 7 and April 26, 2012 for the Soquel Creek Water District (District). This work took place at six different locations in the Soquel-Aptos area. The work was accomplished in order to meet the basin management objectives of the Soquel-Aptos Groundwater Management Plan (Soquel Creek Water District and Central Water District, 2007) and recommendations made in the Water Year 2010 Annual Report and Review (HydroMetrics WRI, 2011). A summary of the work performed and monitoring well construction details at each of the six locations are provided below.

### SC-21 WELL CLUSTER (CORNWELL)

*Table ES- 1: Summary Well Information for SC-21 Well Cluster*

<b>Well Cluster</b>	SC-21
<b>Well Owner</b>	Soquel Creek Water District
<b>Project Activities</b>	Drill and construct three new monitoring wells: SC-21AAA (deep), SC-21AA (intermediate), and SC-21A (shallow)
<b>Site Location</b>	District's Cornwell Road Tank Site at the end of Cornwell Road, Soquel, CA
<b>Township/Range/Section</b>	11S/1W/3
<b>GPS Coordinates</b>	Lat: 37° 0' 12.8"; Long: 121° 57' 41.8"
<b>Approximate Site Elevation</b>	220 feet above mean sea level (amsl)
<b>Well Contractor</b>	Bradley and Sons, Inc.
<b>Drilling Method</b>	Direct rotary, with bentonite and additives
<b>Drill Rig</b>	Versa Drill 1555
<b>Start and Completion Date</b>	February 7 – February 20, 2012
<b>Deep Well, Total Hole Depth</b>	600 feet
<b>Geophysical Data</b>	February 8 by Welenco: SP, Electric, Gamma
<b>Consultant</b>	HydroMetrics WRI, Oakland, CA

*Table ES- 2: Well Construction Details for SC-21 Well Cluster*

	SC-21AAA (Deep)	SC-21AA (Intermediate)	SC-21A (Shallow)
<b>Top of Well Vault Elevation (feet amsl, , NGVD 29)</b>	219.23	219.09	218.98
<b>Top of Casing Elevation (north side, feet amsl, NGVD 29)</b>	218.84	218.63	218.43
<b>Total Drilled Depth (feet)</b>	600	330	155
<b>Borehole Diameter (inches)</b>	8.75	8.75	8.75
<b>Completed Depth (feet)</b>	550	325	150
<b>Casing Diameter (inches)</b>	2	2	2
<b>Casing Material</b>	PVC Schedule 80		
<b>Screened Interval (feet)</b>	520-540	255-315	80-140
<b>Gravel Pack Material</b>	Cemex 8 x 16		
<b>Depth of Annular Seal, including bentonite seal (feet)</b>	516	238	70

*Table ES- 3: Project Chronology for SC-21 Well Cluster*

Date	Activity
February 6, 2012	Contractor mobilization
February 7, 2012	Drill deep well
February 8, 2012	Complete drilling deep well; run geophysical logs
February 9–10, 2012	Construct deep well
February 13–14, 2012	Drill intermediate well
February 14–15, 2012	Construct intermediate well
February 15, 2012	Drill shallow well
February 15–16, 2012	Construct shallow well
February 17, 2012	Wellhead completion with at grade vaults for all three wells
February 20, 2012	Well development of all three wells, contractor demobilization

## SC-A2 WELL CLUSTER (SUMNER)

*Table ES- 4: Summary Well Information for SC-A2 Well Cluster*

<b>Well Cluster</b>	SC-A2 Replacement Wells
<b>Well Owner</b>	Soquel Creek Water District
<b>Project Activities</b>	Destruction of SC-A2A, SC-A2B, SC-A2C Drill and construct three replacement monitoring wells: SC-A2RA (deep), SC-A2RB (intermediate), and SC-A2RC (shallow)
<b>Site Location</b>	End of Sumner Avenue, Aptos, CA
<b>Township/Range/Section</b>	11S/1E/28
<b>GPS Coordinates</b>	Lat: 36° 56' 43.5"; Long: 121° 52' 15.6"
<b>Approximate Site Elevation</b>	129 feet above mean sea level
<b>Well Contractor</b>	Bradley and Sons, Inc.
<b>Drilling Method</b>	Direct rotary, with bentonite and additives
<b>Drill Rig</b>	Versa Drill 1555
<b>Start and Completion Date</b>	February 7 – March 6, 2012
<b>Deep Well, Total Hole Depth</b>	500 feet
<b>Geophysical Data</b>	February 21 by Welenco: SP, Electric, Gamma
<b>Consultant</b>	HydroMetrics WRI, Oakland, CA

*Table ES- 5: Well Construction Details for SC-A2 Well Cluster*

	SC-A2RA (Deep)	SC-A2RB (Intermediate)	SC-A2RC (Shallow)
<b>Top of Well Vault Elevation (feet amsl, , NGVD 29)</b>	128.96	128.76	128.85
<b>Top of Casing Elevation (north side, feet amsl, NGVD 29)</b>	128.28	128.20	128.22
<b>Total Drilled Depth (feet)</b>	500	455	175
<b>Borehole Diameter (inches)</b>	8.75	8.75	8.75
<b>Completed Depth (feet)</b>	490	450	170
<b>Casing Diameter (inches)</b>	2	2	2
<b>Casing Material</b>	PVC Schedule 80		
<b>Screened Interval (feet)</b>	460 - 480	420 - 440	140 – 160
<b>Gravel Pack Material</b>	Cemex 8 x 16		
<b>Depth of Annular Seal, including bentonite seal (feet)</b>	455	410	130

*Table ES- 6: Project Chronology for SC-A2 Well Cluster*

Date	Activity
February 6, 2012	Contractor mobilization for destruction
February 7, 2012	Destruction of SC-A2A, SC-A2B, and SC-A2C
February 20, 2012	Contractor mobilization for drilling, drill deep well
February 21, 2012	Complete drilling deep well; run geophysical logs
February 22-23, 2012	Construct deep well
February 23, 2012	Drill shallow well
February 23-24, 2012	Construct shallow well
February 27, 2012	Drill intermediate well
February 28-29, 2012	Construct intermediate well
March 5, 2012	Wellhead completion with at grade vaults for all three wells
March 5-6, 2012	Well development of all three wells, contractor demobilization

## SC-9 WELL CLUSTER (SEACLIFF)

*Table ES- 7: Summary Well Information for SC-9 Well Cluster*

<b>Well Cluster</b>	SC-9 Replacement Wells
<b>Well Owner</b>	Soquel Creek Water District
<b>Project Activities</b>	Drill and construct replacement monitoring wells SC-9RA (deep), SC-9RC (intermediate), and SC-9R E (shallow) Destruction of SC-9A, SC-9B, SC-9C, SC-9D, SC-9E
<b>Site Location</b>	Seacliff State Beach, Aptos, CA
<b>Township/Range/Section</b>	11S/1W/13
<b>GPS Coordinates</b>	Lat: 36° 58' 25.6"; Long: 121° 55' 2.2"
<b>Approximate Site Elevation</b>	13 feet above mean sea level
<b>Well Contractor</b>	Bradley and Sons, Inc.
<b>Drilling Method</b>	Direct rotary, with bentonite and additives
<b>Drill Rig</b>	Versa Drill 1555
<b>Start and Completion Date</b>	March 6 – March 23, 2012
<b>Deep Well, Total Hole Depth</b>	916 feet
<b>Geophysical Data</b>	March 13 by Welenco: SP, Electric, Gamma
<b>Consultant</b>	HydroMetrics WRI, Oakland, CA

*Table ES- 8: Well Construction Details for SC-9 Well Cluster*

	SC-9RA (Deep)	SC-9RC (Intermediate)	SC-9RE (Shallow)
<b>Top of Well Vault Elevation (feet amsl, , NGVD 29)</b>	13.91	13.89	13.91
<b>Top of Casing Elevation (north side, feet amsl, NGVD 29)</b>	13.33	13.40	13.34
<b>Total Drilled Depth (feet)</b>	920	395	155
<b>Borehole Diameter (inches)</b>	8.75	8.75	8.75
<b>Completed Depth (feet)</b>	910	390	150
<b>Casing Diameter (inches)</b>	2	2	2
<b>Casing Material</b>	PVC Schedule 80		
<b>Screened Interval (feet)</b>	625 - 900	315 - 380	25 - 140
<b>Gravel Pack Material</b>	Cemex 8 x 16		
<b>Depth of Annular Seal, including bentonite seal (feet)</b>	609	305	15

*Table ES- 9: Project Chronology for SC-9 Well Cluster*

Date	Activity
March 5, 2012	Contractor mobilization for drilling
March 6, 2012	Drill and construct shallow well, drill intermediate well
March 7-8, 2012	Drill and construct intermediate well
March 12, 2012	Drill deep well
March 13, 2012	Complete drilling deep well; run geophysical logs,
March 14-16, 2012	Construct deep well
March 20, 2012	Well development of all three wells. Air lift SC-9-A & E
March 21, 2012	Mobilization for destruction, destruction of SC-9A, SC-9B, SC-9C, SC-9D, and SC-9E
March 22, 2012	Wellhead completion with at grade vaults for all three wells
March 23, 2012	Contractor demobilization of drilling equipment

## SC-8F WELL (APOTOS CREEK)

*Table ES- 10: Summary Well Information for SC-8F*

<b>Well Cluster</b>	SC-8F Replacement Well
<b>Well Owner</b>	Soquel Creek Water District
<b>Project Activities</b>	Drill and construct one replacement monitoring well SC-8RF (shallow) Destruction of SC-8F
<b>Site Location</b>	Seacliff State Beach, alongside Aptos Creek, Aptos CA
<b>Township/Range/Section</b>	11S/1E/18
<b>GPS Coordinates</b>	Lat: 36° 58' 13.2"; Long: 121° 54' 22.9"
<b>Approximate Site Elevation</b>	11 feet above mean sea level
<b>Well Contractor</b>	Bradley and Sons, Inc.
<b>Drilling Method</b>	Direct rotary, with bentonite and additives
<b>Drill Rig</b>	Versa Drill 1555
<b>Start and Completion Date</b>	March 26 – March 29, 2012
<b>Deep Well, Total Hole Depth</b>	217 feet
<b>Geophysical Data</b>	March 26 by Welenco: SP, Electric, Gamma
<b>Consultant</b>	HydroMetrics WRI, Oakland, CA

*Table ES- 11: Well Construction Details for SC-8RF*

	<b>SC-8RF (Shallow)</b>
<b>Top of Well Vault Elevation (feet amsl, , NGVD 29)</b>	11.79
<b>Top of Casing Elevation (north side, feet amsl, NGVD 29)</b>	11.35
<b>Total Drilled Depth (feet)</b>	217
<b>Borehole Diameter (inches)</b>	8.75
<b>Completed Depth (feet)</b>	210
<b>Casing Diameter (inches)</b>	2
<b>Casing Material</b>	PVC Schedule 80
<b>Screened Interval (feet)</b>	20-200
<b>Gravel Pack Material</b>	Cemex 8 x 16
<b>Depth of Annular Seal, including bentonite seal (feet)</b>	10

*Table ES- 12: Project Chronology for SC-8RF*

<b>Date</b>	<b>Activity</b>
<b>March 26, 2012</b>	Contractor mobilization for drilling
<b>March 26, 2012</b>	Contractor mobilization for drilling, drill shallow well, run geophysical logs
<b>March 27, 2012</b>	Construct shallow well
<b>March 28, 2012</b>	Develop well and wellhead completion with at grade vault
<b>March 29, 2012</b>	Contractor demobilization
<b>April 26, 2012</b>	Destruction of SC-8F

## SC-22 WELL CLUSTER (41<sup>ST</sup> AVENUE)

*Table ES- 13: Summary Well Information for SC-22 Well Cluster*

<b>Well Cluster</b>	SC-22
<b>Well Owner</b>	Soquel Creek Water District
<b>Project Activities</b>	Drill and construct three new monitoring wells: SC-22AAA (deep), SC-22AA (intermediate) and SC-22A (shallow)
<b>Site Location</b>	1840 41 <sup>st</sup> Ave. Capitola, CA
<b>Township/Range/Section</b>	11S/1W/15
<b>GPS Coordinates</b>	Lat: 36° 58' 34.30"; Long: 121° 57' 47.73"
<b>Approximate Site Elevation</b>	72 feet above mean sea level
<b>Well Contractor</b>	Bradley and Sons, Inc.
<b>Drilling Method</b>	Direct rotary, with bentonite and additives
<b>Drill Rig</b>	Versa Drill 1555
<b>Start and Completion Date</b>	April 2 – April 13, 2012
<b>Deep Well, Total Hole Depth</b>	709 feet
<b>Geophysical Data</b>	April 3, by Welenco: SP, Electric, Gamma
<b>Consultant</b>	HydroMetrics WRI, Oakland, CA

*Table ES- 14: Well Construction Details for SC-22 Well Cluster*

	SC-22AAA (Deep)	SC-22AA (Intermediate)	SC-22A (Shallow)
<b>Top of Well Vault Elevation (feet amsl, , NGVD 29)</b>	72.72	73.87	72.15
<b>Top of Casing Elevation (north side, feet amsl, NGVD 29)</b>	72.31	72.38	72.67
<b>Total Drilled Depth (feet)</b>	709	510	250
<b>Borehole Diameter (inches)</b>	8.75	8.75	8.75
<b>Completed Depth (feet)</b>	705	500	240
<b>Casing Diameter (inches)</b>	2	2	2
<b>Casing Material</b>	PVC Schedule 80		
<b>Screened Interval (feet)</b>	640-700	460-490	150-230
<b>Gravel Pack Material</b>	Cemex 8 x 16		
<b>Depth of Annular Seal, including bentonite seal (feet)</b>	619	454	141

*Table ES- 15: Project Chronology for SC-22 Well Cluster*

Date	Activity
April 2, 2012	Contractor mobilization
April 2-3, 2012	Drill deep well
April 3, 2012	Complete drilling deep well; run geophysical logs
April 4-5, 2012	Construct deep well
April 9, 2012	Drill shallow well
April 9-10, 2012	Construct shallow well
April 10-11, 2012	Drill intermediate well
April 11-12, 2012	Construct intermediate well
April 12, 2012	Wellhead completion with at grade vaults for all three wells
April 13, 2012	Well development of all three wells, contractor demobilization

## SC-5 WELL CLUSTER (NEW BRIGHTON)

*Table ES- 16: Summary Well Information for SC-5 Well Cluster*

<b>Well Cluster</b>	SC-5
<b>Well Owner</b>	Soquel Creek Water District
<b>Project Activities</b>	Destruction of two monitoring wells: SC-5D and SC-5E
<b>Site Location</b>	New Brighton State Beach, Capitola, CA
<b>Township/Range/Section</b>	11S/1W/14
<b>GPS Coordinates</b>	Lat: 36° 58' 58.72"; Long: 121° 55' 59.79"
<b>Approximate Site Elevation</b>	120 feet above mean sea level
<b>Well Contractor</b>	Bradley and Sons, Inc.
<b>Start and Completion Date</b>	March 12 - March 14, 2012
<b>Consultant</b>	HydroMetrics WRI, Oakland, CA

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# **SECTION 1**

## **INTRODUCTION**

### **1.1 BACKGROUND**

Groundwater monitoring is an essential aspect of groundwater management of the Soquel-Aptos groundwater basin. The first action item listed in the first element of the Soquel-Aptos Groundwater Management Plan Update is to “continue and expand existing regional groundwater monitoring programs.” Part of Soquel Creek Water District’s (District) ongoing efforts on this action item is to install replacement and new monitoring wells.

The District has established groundwater elevations that protect the basin from seawater intrusion at its coastal monitoring wells. Groundwater levels are recorded at least monthly in all coastal monitoring wells. Groundwater is also sampled at the coastal monitoring wells to assess seawater intrusion. In the Annual Report and Review each year, groundwater level data from the coastal monitoring wells are compared to protective elevations to evaluate overdraft and recovery in the basin. These comparisons and salinity concentrations at the wells are used to describe the state of the basin each year.

The SC-9 wells at Seacliff and the SC-8F well at Aptos Creek are coastal monitoring wells located at Seacliff State Beach in Aptos. These wells are completed in the Purisima Formation and provide data for all productive aquifer units of the formation. SC-9A was sanded up to 100 feet, which indicates a hole in the casing. All five completions at SC-9 were nested in a single borehole. Our recommendation was to replace each completion with a well in its own borehole. However, only three of the wells were replaced to meet groundwater management objectives. The A, C, and E completions are screened exclusively in a single aquifer unit (A, BC, and DEF respectively) and provide more representative data for the aquifer units than the B completion screened across the B aquitard unit and the BC aquifer unit and the D completion screened across the D aquitard unit. This report documents the destruction of all five completions, and the construction of the replaced A, C, and E completions.

SC-8F was also sanded up to 100 feet and provided unreliable data. Completed in the Purisima F aquifer unit, salinity concentrations measured at the well in the past have been high indicating the possibility of shallow seawater intrusion near Aptos Creek, and suggesting the possible presence of paleochannels providing

pathways for seawater intrusion in the area. SC-8F is in a separate borehole from the SC-8 wells and was replaced to assess whether shallow seawater intrusion is presently occurring. This report documents the destruction of SC-8F and the construction of its replacement.

SC-A2 was a multi-completion coastal monitoring well in the Aromas aquifer where seawater intrusion has been observed. The galvanized casing of this well rusted and became detached from the well head. It was likely that the steel casing at depth where it is in contact with seawater had also corroded. As such, the well may have been compromised and was replaced with three clustered individual wells. During drilling, data about the freshwater-saltwater interface was collected. This report documents the destruction of all three completions, and the construction of the replacement monitoring wells.

Five monitoring wells were installed at New Brighton Beach State Park in 1985. The three deep wells, SC-5A, 5B, and 5C, were replaced in 2003. We recommended destroying the remaining two shallow wells SC-5D and 5E because they do not produce useful data. SC-5D appears to have sanded up. Groundwater levels have not been measured at the well since 2000 and water quality samples have not been collected since 1992. No historical data were available from SC-5E. The as-built diagram shows a total depth of 45 feet, and the well has apparently always been dry. It may be useful to replace SC-5D and SC-5E with a single well completed in the unconfined Purisima DEF unit at a depth of approximately 90 feet, but this replacement is not a priority at this time. This report only documents the destruction of SC-5D and SC-5E.

The District and the City of Santa Cruz (City) are planning to install new production wells in the western area of the Purisima Formation where this aquifer system is a shared resource by the two agencies. As part of its Well Master Plan EIR, the District includes in Mitigation Measure 3.3-2b a plan for the two agencies to install two inland monitoring locations between the City's planned Beltz #12 well and the District's wells (ESA, 2011). This report documents the construction of a cluster of three monitoring wells (called the SC-22 well cluster) on 41<sup>st</sup> Avenue located between the Beltz #12 well and the District's existing Garnet well. These wells were constructed to monitor the Purisima A and AA aquifer units and underlying Tu aquifer.

The Cornwell Road tank site provides a well location to better understand groundwater levels upgradient of the District's planned O'Neill Ranch well. This location will assist with the management of pumping at that well and fill in this monitoring data gap. This report documents the construction of a cluster of three wells (called the SC-21 well cluster) to monitor the Purisima A and AA aquifer units.

## 1.2 SITE LOCATIONS

The site locations and subsequent sections of this report are listed in the order that work took place at each well site.

Three new clustered monitoring wells were drilled and constructed at the Cornwell Road tank site in Soquel (Figure 1). As this was a new monitoring well site, no wells were destroyed at this location. The designations of these wells are: SC-21AAA (Deep), SC-21AA (Intermediate), and SC-21A (Shallow).

The three nested monitoring wells that comprise the SC-A2 wells were destroyed prior to their replacement with three clustered monitoring wells. The well site is located at the end of Sumner Avenue in Aptos (Figure 2). The replacement monitoring wells, SC-A2RA, B, and C, are located 22, 8 and 8 feet, respectively away from the destroyed monitoring wells.

The original SC-9 nested monitoring wells, alongside a restroom on Seacliff State Beach, consisting of five multi-level monitoring wells completed within one large diameter borehole. All five of the nested wells were destroyed prior to three replacement clustered monitoring wells being drilled and installed. The replacement wells, SC-9RA, C and E, are located 20, 28 and 39 feet, respectively away from the destroyed wells. Figure 3 shows the location of the three replacement monitoring wells.

The SC-8RF replacement monitoring well is located approximately 70 feet north-northeast from the SC-8F well, which was destroyed as part of this project. The well is located on State Park property at Seacliff Beach State Park on the west side of Aptos Creek (Figure 4).

Three new monitoring wells, SC-22A, SC-22AA, and SC-22AAA, were drilled and constructed at 1840 41st Avenue in Capitola. The wells are located in a

privately owned parking lot (Figure 5). As this was a new monitoring well site, no wells were destroyed at this location.

The location of the two nested monitoring wells, SC-5D and SC-5E, which were destroyed at New Brighton State Beach are shown in Figure 6.



Figure 1: Location of SC-21 Well Cluster



Figure 2: Location of SC-A2R Well Cluster



Figure 3: Location of SC-9R Well Cluster



Figure 4: Location of SC-8F



Figure 5: Location of SC-22 Well Cluster



Figure 6: Location of SC-5

## SECTION 2

### PROJECT METHODOLOGY

This section describes the methodology to drill, construct, develop, and equip all monitoring wells for this project. The methodology for destruction of monitoring wells is also described. Details for individual wells are described in Section 3.

#### **2.1 BOREHOLE DRILLING**

All drilling was performed by Bradley and Sons, Inc. of Madera, California. The wells were drilled using the direct-rotary method with bentonite and additives as drilling fluid. The borehole diameter for all wells was 8.75 inches.

Where possible, the deepest well of each cluster was drilled first. This order was followed at all new well locations, where it was especially important for collecting well design information. During drilling of the deepest well, samples of cuttings from the borehole were collected every ten feet and stored in zip lock bags. Additionally, chip trays containing representative samples of each ten foot interval were prepared and photographed. A detailed log describing the lithology and photographs of the cuttings are included in Appendix A. A geophysical survey of the deep borehole was undertaken immediately after completion of drilling. The suite of geophysics included: natural gamma radiation, spontaneous potential, short- and long-normal resistivities, and single point resistance. Appendix A includes the geophysical logs for the deepest well at each well cluster.

All other boreholes in each well cluster were drilled using the same drilling method as the deep borehole. No geophysical logs or detailed lithologic logging were undertaken, although the onsite geologist took general note of the lithology during drilling to check whether it corresponded with the deep borehole lithology.

#### **2.2 WELL CONSTRUCTION AND DEVELOPMENT**

All wells were constructed in the same manner. Well casing and screen consisted of flush-threaded, Schedule 80 PVC (Figure 7). The outer diameter of the casing

and screen was 2-inch, with the upper foot below ground surface being 4-inches diameter to provide additional space for placement and access to dedicated monitoring equipment. The screened portion consisted of horizontal machine-cut 0.040-inch slots. The bottom of each well was completed with a 10-foot cellar pipe made of blank monitoring well casing and a threaded end cap. PVC centralizers were installed every 40 feet along the casing to ensure the casing was centered in the borehole (Figure 7).



*Figure 7: Schedule 80-PVC screen and centralizer being installed.*

Once the blank and screen had been hung in the well, 8 x 16 gradation filter pack was tremied into the well. Figure 8 shows a close up photograph of the 8 x 16 filter pack material. The filter pack was placed from the bottom of the well to a depth of approximately 10 feet above the top of the screen. After the top of the

filter pack was tagged, a transitional bentonite seal was installed. Three bags of bentonite were used for each seal, which resulted in approximately a five to six foot seal. On top of the bentonite seal, cement was tremied into the well using a positive displacement pump. The deeper wells were cemented in two separate lifts to prevent heat damage to the PVC well casing.

For monitoring wells located within lockable District facilities, at-grade well vaults with a bolted cover were constructed (Figure 9), while monitoring wells located in public or on private property were furnished with lockable vaults as shown in Figure 10.



Figure 8: 8 x 16 Filter Pack.

Well development comprised of airlifting from the top of the water column to the bottom of the screened interval. Static water level and total well depth were recorded for each well that was developed. Typically each well was pumped for approximately six hours. Once the pumped water appeared clear, a sample was collected for water quality analysis. Discharge from the wells was contained in baker tanks and discharged to sanitary sewer or storm drains when solids had

settled and turbidity was reasonable. For the SC-9RCluster and SC-8RF, all discharge water was hauled offsite.



Figure 9: Bolted Well Cover at SC-21AAA

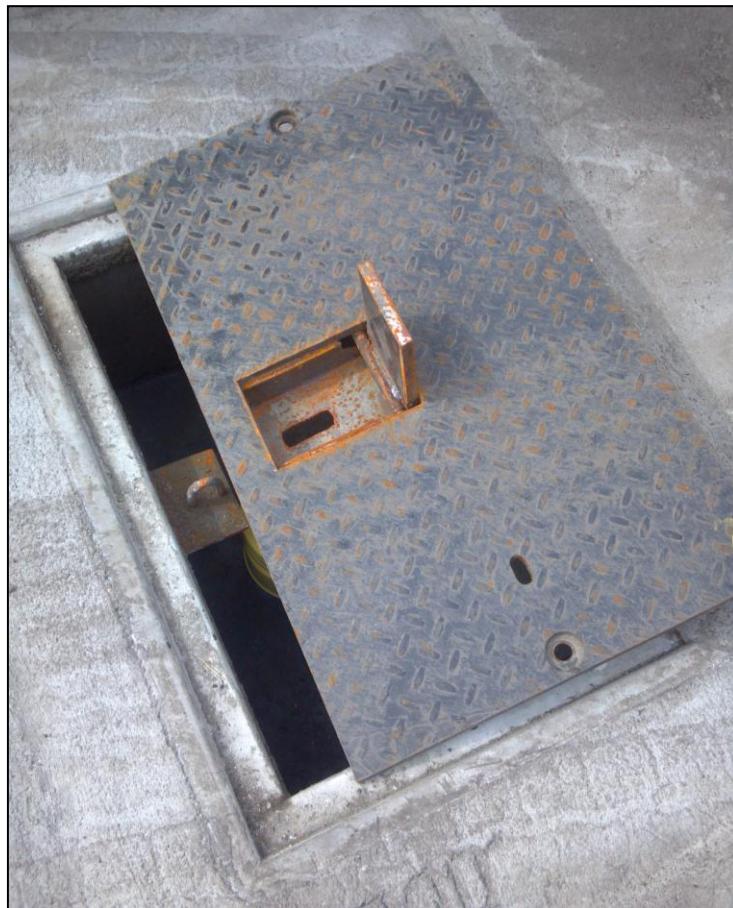


Figure 10: Lockable Well Vault at SC-9R

## **2.3 WELL DESTRUCTION**

All destructions were performed by the project contractor, Bradley and Sons, Inc., in accordance with Department of Water Resources Bulletins 74-81 and 74-90, Santa Cruz County Code Ordinance 4901 and 5022, and Chapter 7.70 of Santa Cruz County Code relating to water wells. The contractor was responsible for obtaining well destruction permits for each well. Destruction permits are included in Appendix A for relevant wells.

Prior to destruction, the District removed any downhole sampling and logging equipment from the monitoring wells. The depth of each well was established by tagging the bottom of the hole. Some wells required bailing to remove sediment that had accumulated in the bottom before sealing could take place. Casing from 5 feet below ground surface, filter pack and annular seal materials were left in place during sealing operations.

The upper 5 feet of casing was cut off and removed prior to sealing. Cement grout was tremied into the casing, and forced out of the screened interval, under pressure, into the surrounding filter pack. During pressure grouting, a minimum of 25 pounds per square inch (PSI) was maintained for five minutes or until pumping refusal. The grout was allowed to spill over into the excavation to form a cap. To complete the process, the excavation was backfilled by compacted native material.

A Santa Cruz County well inspector was onsite during the destruction process to witness the destructions. After completion of the destruction, the project contractor was responsible for filing a notice of completed work to Santa Cruz County and providing a copy of the DWR well report.

## **2.4 WELL INSTRUMENTATION**

Each of the monitoring wells has been equipped with a QED Well Wizard bladder pump and Diver data logger (pressure transducer). The bladder pumps are connected to two lines of twin-bonded polyethylene tubing, a 1/4" OD air line and a 3/8" OD sample discharge line. Diver loggers will be attached to direct data cables (DDC) so that District staff can program and download data with a handheld device without retrieving the logger. The pump and logger assemblies were installed and lowered into the wells simultaneously.

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## **SECTION 3**

### **SC-21 WELL CLUSTER (CORNWELL)**

#### **3.1 BOREHOLE DRILLING**

The SC-21 wells were drilled in order of decreasing depth, i.e., SC-21AAA, SC-21AA, and SC-21A, respectively. Logs of SC-21AAA describing the lithology and photographs of the cuttings are included in Appendix A.

The deep borehole, SC-21AAA, was drilled to a depth of 600 feet. A geophysical survey of the borehole was undertaken immediately after completion of drilling. Appendix A contains the results of the geophysical survey.

#### **3.2 WELL CONSTRUCTION AND DEVELOPMENT**

The monitoring wells constructed at the District's Cornwell Road tank site were sited at this location to fill in a monitoring data gap upgradient of the District's planned O'Neill Ranch well. Groundwater levels measured at the monitoring wells will assist with the management of pumping at the O'Neill Ranch well. Water quality samples collected at the monitoring wells will help establish background water quality for the western Purisima area.

The screen intervals for the O'Neill Ranch well are planned for 200 to 600 feet below ground surface (bgs) (ESA, 2010). Based on the hydrostratigraphy documented in Johnson et al. (2004), the well would produce from the Purisima AA unit and the Tu unit below the Purisima. According to hydrostratigraphy presented by the City of Santa Cruz's consulting hydrogeologist, the well would produce from the Purisima A unit in addition to the AA and Tsm unit below the Purisima (Hopkins, 2009).

Initially, three monitoring wells were planned for the Cornwell Road tank site to monitor the A, AA, and Tu/Tsm units. However, the Tu /Tsm unit was not encountered at the Cornwell Road tank site at the expected depth. Based on hydrostratigraphic contours in Johnson et al. (2004), the Tu unit was expected to be encountered at approximately 475 feet. The geophysical log of the borehole drilled to 600 feet did not show the Tu/ Tsm unit. This finding is consistent with the interpretation by Mike Cloud, geologist for Santa Cruz County, that the Tu unit is thinner to non-existent in the hills upgradient of the coastal plain. Cloud

estimated that the Tu unit at the Cornwell site would be no more than 50 feet thick below the borehole depth (Cloud, 2012).

Since the Tu/Tsm unit was not encountered at the Cornwell site down to 600 feet bgs, the deep well SC-21AAA was screened from 520 to 540 feet bgs around the small lens of relatively resistive materials at 530 feet bgs. The unit screened should be considered the deep AA unit or possibly the Tp aquitard unit at the base of the Purisima Formation. Only 5 feet of filter pack above the screen was used to line the bentonite seal up with the overlying clay.

The intermediate well SC-21AA was screened from 255 to 315 feet. This screen is in the AA unit below a thick clay at the top of the AA unit. The clay occurs from 150-250 feet bgs.

The shallow well, SC-21A, was screened from 80-140 feet bgs. The interval from 100-150 feet bgs is interpreted to be a transition from the A unit to the top of AA unit. However, depth to water was measured at 106 feet bgs. The well is designed to screen the A unit above 100 feet and the water table below 100 feet.

A summary of well construction is provided in table form in Table 1 and graphically on Figure 11.

*Table 1: Well Construction Summary for SC-21 Well Cluster*

	<b>SC-21AAA (Deep)</b>	<b>SC-21AA (Intermediate)</b>	<b>SC-21A (Shallow)</b>
<b>Date Constructed</b>	2/7/12-2/10/12	2/13/12-2/15/12	2/15/12-2/16/12
<b>Total Drilled Depth (feet)</b>	600	330	155
<b>Completed Depth (feet)</b>	550	325	150
<b>Casing Diameter (inches)</b>	2	2	2
<b>Screened Interval (feet)</b>	520 - 540	255-315	80-140
<b>Depth of Annular Seal (feet)</b>	516	238	70

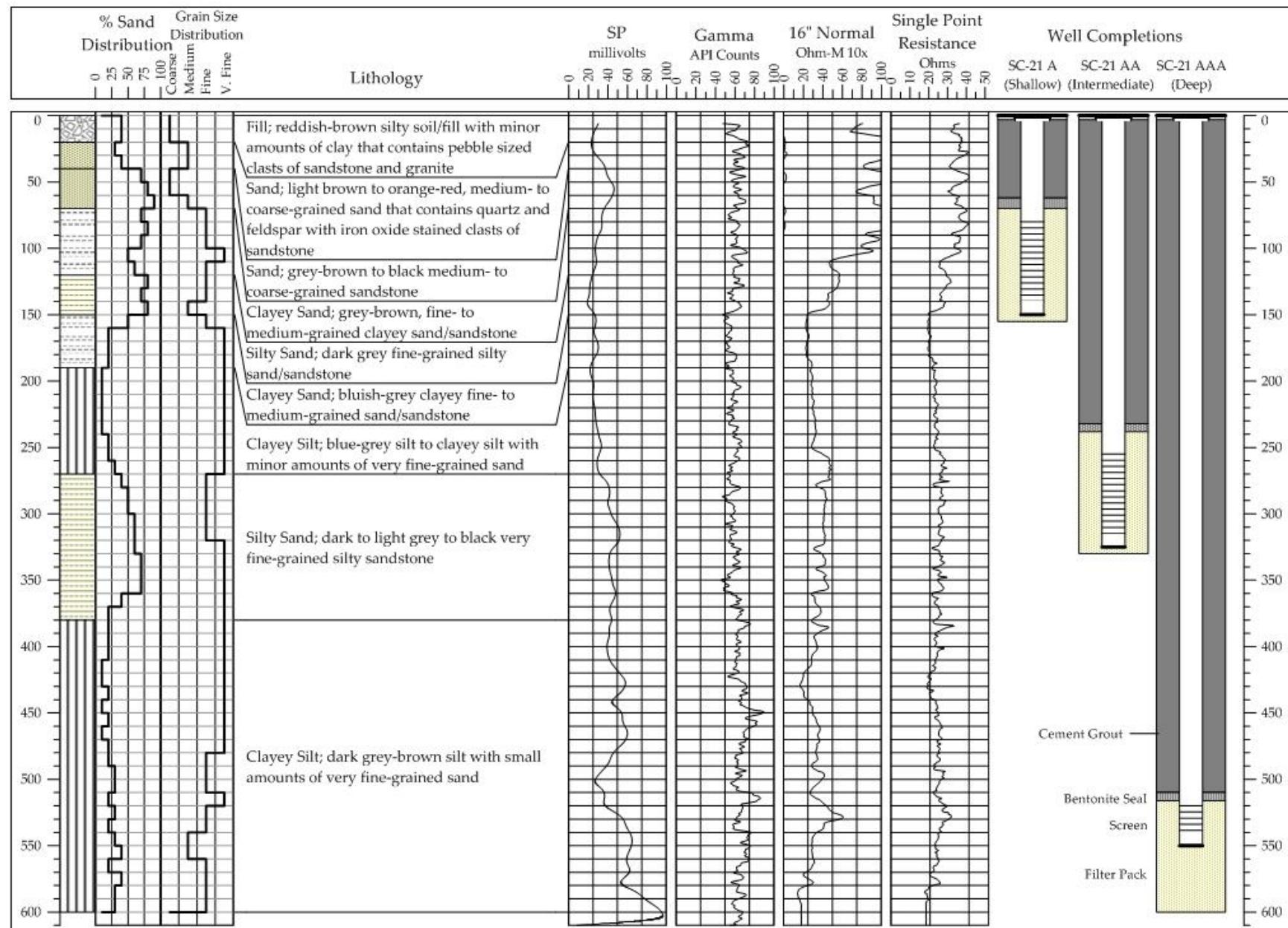


Figure 11: SC-21 Well Cluster Construction and Lithology

After completion of all three wells, they were developed on February 20<sup>th</sup>, 2012. Each well was airlifted for approximately six hours. The two deepest wells cleaned up during this process and were producing clear water. The shallow well stopped producing water after about 4 hours of air lifting, so a bailer had to be used to remove excess sediment from the well. This process was successful and the shallow well was again swabbed and airlifted until it was producing clear water. All three SC-21 wells were sampled after being developed and static water levels were measured after a period of at least twice the time it took to develop the well.

### 3.3 WATER QUALITY

When the groundwater appeared clear near completion of well development for each well, a water sample was taken. Table 2 summarizes the water quality results for each of the three wells. The laboratory report is included in Appendix C.

*Table 2: Summary of Water Quality for SC-21 Well Cluster*

	SC-21AAA (Deep)	SC-21AA (Intermediate)	SC-21A (Shallow)
<b>Sample Date</b>	March 5, 2012	March 5, 2012	March 5, 2012
<b>Specific Conductance, <math>\mu\text{mhos}/\text{cm}</math></b>	460	360	750
<b>TDS, mg/L</b>	320	350	540
<b>Calcium, mg/L</b>	34	34	63
<b>Magnesium, mg/L</b>	16	8.7	43
<b>Potassium, mg/L</b>	4.9	4.6	6.0
<b>Sodium, mg/L</b>	30	21	60
<b>Chloride, mg/L</b>	13	16	40
<b>Sulfate, mg/L</b>	33	14	220
<b>Bicarbonate (as <math>\text{HCO}_3</math>), mg/L</b>	230	180	120
<b>Iron, <math>\mu\text{g}/\text{L}</math></b>	180	220	<b>3,100</b>
<b>Manganese, <math>\mu\text{g}/\text{L}</math></b>	47	ND (20)	16
<b>Nitrate (<math>\text{NO}_3</math>), mg/L</b>	ND (1.0)	ND (1.0)	ND (1.0)

ND = non-detect, reporting limit in parenthesis, concentrations above the California Values exceeding Drinking Water Limits in italics.

### 3.4 WELL INSTRUMENTATION

QED Well Wizard bladder pumps and Schlumberger Mini Diver data loggers have been installed in each of the three monitoring wells. Details of the instrumentation are contained in Table 3 and Table 4.

*Table 3: Well Wizard Bladder Pump Specifications at SC-21 Well Cluster*

Well	Pump Model	Screen Interval (feet bgs)	Tubing Length (feet)	Drop Tube Length (feet)	Inlet Screen (feet bgs)
SC-21AAA	P1101M (300' max depth 3/8" discharge)	520 - 540	189.5	330.99	530
SC-21AA		255-315	185.7	91.85	285
SC-21A		80-140	131.5	0	135

*Table 4: Mini Diver Specifications at SC-21 Well Cluster*

Well	Screen Interval	DTW used as reference	Cable Length		Range	Accuracy	Resolution
	(feet bgs)	(feet)	(feet)	(meters)	(mH <sub>2</sub> O)	(cmH <sub>2</sub> O)	(cmH <sub>2</sub> O)
SC-21AAA	520 - 540	114.51	164.1	50	50	±2.5	±1.0
SC-21AA	255 - 315	110.65	164.1	50	50	±2.5	±1.0
SC-21A	80 - 140	106.92	124.7	38	20	±1.0	±0.4

The groundwater level loggers measure absolute pressure, and the associated cables are non-vented; therefore groundwater level data will require barometric correction. Barometric data are being collected by the District with a Baro Diver barometric pressure data logger. District staff has installed this instrument at the Rosedale well.

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## SECTION 4

### SC-A2 WELL CLUSTER (SUMNER AVE.)

#### 4.1 WELL DESTRUCTIONS

The three original nested wells (SC-A2A, SC-A2B, and SC-A2C) were destroyed on February 6-7, 2012. Permits for the destruction were obtained by the contractor and are included in Appendix A.

The destruction process took place according to the procedure described in Section 2.3. Before the destruction process started, the depth of each well was established by tagging the bottom of the hole. Table 5 summarizes the depths tagged prior to destruction and the hours required to remove sediment.

*Table 5: Well Destruction Details for SC-A2 Well Cluster*

Well	As-Built Depth (feet bgs)	Tagged Depth Prior to Destruction (feet bgs)	Hours of Airlifting
SC-A2 A (Deep)	480	480	0
SC-A2 B (Intermediate)	440	440	0
SC-A2 C (Shallow)	160	160	0

#### 4.2 BOREHOLE DRILLING

The replacement SC-A2 wells were not drilled in order of decreasing depth. Drilling, construction, and development took place from February 20 – March 6, 2012 as per the procedure outlined in Section 2.1. The names of the new wells in order of decreasing depth are SC-A2RA, SC-A2RB, and SC-A2RC. The R designation is given after A2 to denote that these are replacement wells. Logs of the deepest well, SC-A2RA, describing the lithology and photographs of the cuttings are included in Appendix A.

## **4.3 WELL CONSTRUCTION AND DEVELOPMENT**

Because these are replacement wells, the screened intervals were the same as the original wells. The deep borehole, SC-A2RA, was drilled to a depth of 500 feet. A geophysical survey of the borehole was undertaken immediately after completion of drilling. Appendix A contains the results of the geophysical survey.

A summary of well construction is provided in table form in Table 6 and graphically on Figure 12.

*Table 6: Well Construction Details for SC-A2R Well Cluster*

	<b>SC-A2RA (Deep)</b>	<b>SC-A2RB (Intermediate)</b>	<b>SC-A2RC (Shallow)</b>
<b>Date Constructed</b>	2/20/12-2/23/12	2/27/12-2/29/12	2/23/12-2/24/12
<b>Total Drilled Depth (feet)</b>	500	456	175
<b>Completed Depth (feet)</b>	490	450	170
<b>Casing Diameter (inches)</b>	2	2	2
<b>Screened Interval (feet)</b>	460-480	420-440	140-160
<b>Depth of Annular Seal (feet)</b>	455	410	130

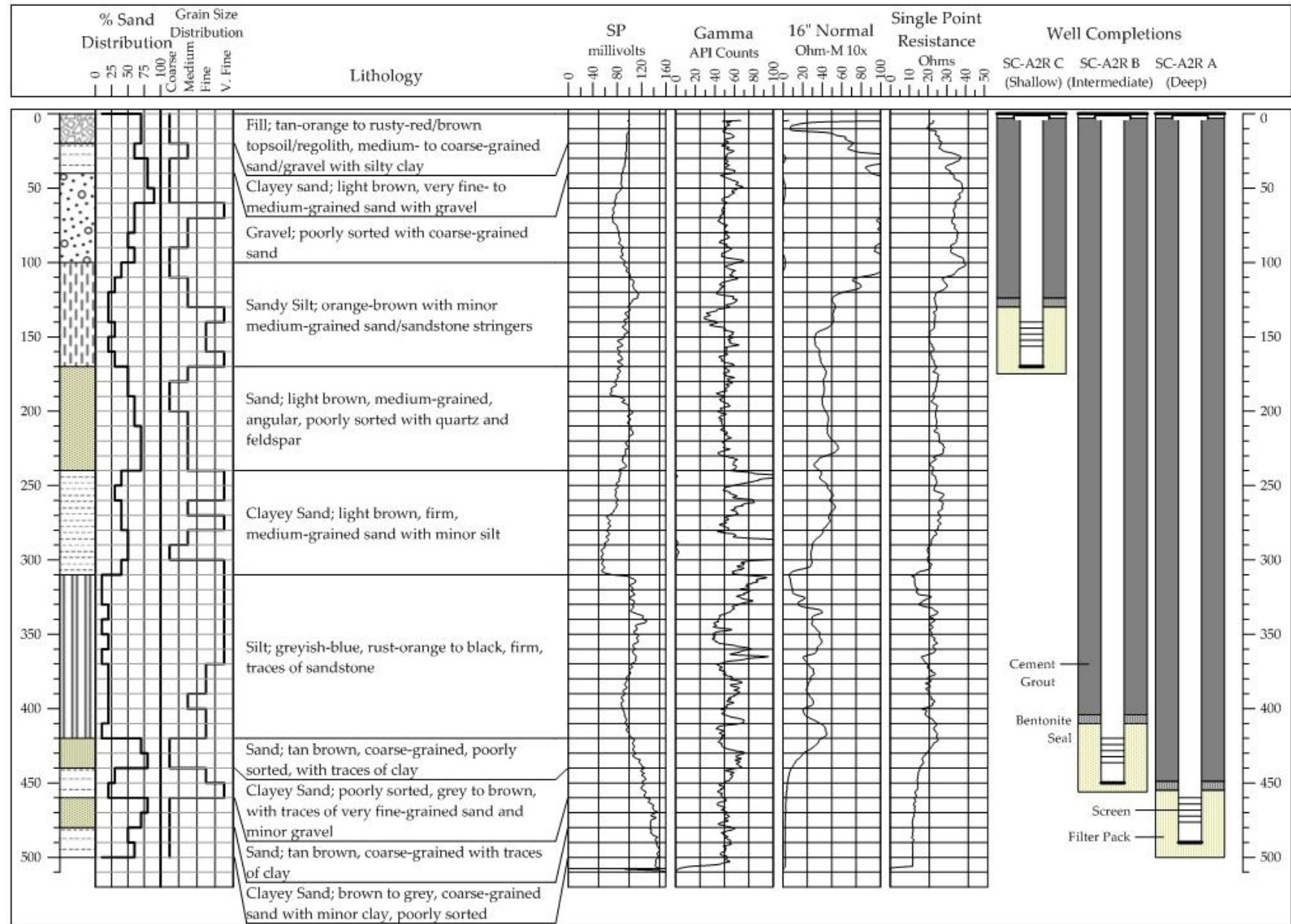


Figure 12: SC-A2R Well Cluster Construction and Lithology

## 4.4 WATER QUALITY

When the groundwater appeared clear near completion of well development for each well, a water sample was taken. Table 7 summarizes the water quality results for each of the three wells. The laboratory report is included in Appendix C.

*Table 7: Summary of Water Quality for SC-A2R Well Cluster*

	SC-A2RA (Deep)	SC-A2RB (Intermediate)	SC-A2RC (Shallow)
<b>Sample Date</b>	March 6, 2012	March 6, 2012	March 6, 2012
<b>Specific Conductance, <math>\mu\text{mhos}/\text{cm}</math></b>	<b>33,000</b>	1,600	540
<b>TDS, mg/L</b>	<b>38,000</b>	<b>1,300</b>	340
<b>Calcium, mg/L</b>	1,800	90	31
<b>Magnesium, mg/L</b>	1,600	83	3.2
<b>Potassium, mg/L</b>	50	5	2.9
<b>Sodium, mg/L</b>	3,700	59	66
<b>Chloride, mg/L</b>	<b>14,000</b>	380	57
<b>Sulfate, mg/L</b>	<b>1,800</b>	110	74
<b>Bicarbonate (as <math>\text{HCO}_3</math>), mg/L</b>	220	160	75
<b>Iron, <math>\mu\text{g}/\text{L}</math></b>	ND (50)	ND (50)	<b>1,800</b>
<b>Manganese, <math>\mu\text{g}/\text{L}</math></b>	<b>360</b>	<b>58</b>	<b>69</b>
<b>Nitrate (<math>\text{NO}_3</math>), mg/L</b>	ND (1.0)	ND (1.0)	16

ND = non-detect, reporting limit in parenthesis, concentrations above the California Values exceeding Drinking Water Limits in italics.

The geophysical log indicates that the fresh water – seawater interface is at approximately 425 feet bgs.

## 4.5 WELL INSTRUMENTATION

QED Well Wizard bladder pumps and Schlumberger Mini Diver data loggers have been installed in all three monitoring wells. Due to the salinity of the groundwater in SC-AR A and SC-AR B, these wells will have Cera Divers installed. The shallow monitoring well, SC-A2RC, will have a Mini Diver. The QED Well Wizard bladder pump from destroyed SC-A2 C will be redeployed in its replacement well. Details of the instrumentation are contained in Table 8 and Table 9.

*Table 8: Well Wizard Bladder Pump Specifications at SC-A2R Well Cluster*

Well	Pump Model	Screen Interval (feet bgs)	Tubing Length (feet)	Drop Tube Length (feet)	Inlet Screen (feet bgs)
SC-A2RA	P1101M (300' max depth 3/8" discharge)	460 - 480	203.0	257.5	470
SC-A2RB		420 – 440	199.8	220.7	430
SC-A2RC		140 - 160	146.5	0	150

*Table 9: Mini Diver Specifications at SC-A2R Well Cluster*

Well	Screen Interval (feet bgs)	DTW used as reference (feet)	Cable Length		Range (mH <sub>2</sub> O)	Accuracy (cmH <sub>2</sub> O)	Resolu-tion (cmH <sub>2</sub> O)
			(feet)	(meters)			
SC-A2RA	460 - 480	128.0	141.1	43	20	±1.0	±0.4
SC-A2RB	420 – 440	124.8	164.1	50	50	±2.5	±1.0
SC-A2RC	140 - 160	122.8	164.1	50	20	±1.0	±0.4

The water level loggers measure absolute pressure, and the associated cables are non-vented; therefore groundwater level data will require barometric correction. Barometric data are being collected by the District with a Baro Diver barometric pressure data logger. District staff has installed this instrument at the Rosedale well.

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## SECTION 5

### SC-9 WELL CLUSTER (SEACLIFF)

#### 5.1 WELL DESTRUCTIONS

The five original nested wells (SC-9A, SC-9B, SC-9C, SC-9D and SC-9E, in order of decreasing depth) were destroyed on March 21, 2012 after construction of the replacement wells. County permits for destruction were obtained by the contractor and are included in Appendix A.

The destruction process took place according to the procedure described in Section 2.3. Before the destruction process started, the depth of each well was established by tagging the bottom of the hole. Table 10 summarizes the depths tagged prior to destruction and the hours required to remove sediment.

*Table 10: Well Destruction Details for SC-9 Well Cluster*

Well	As-Built Depth (feet bgs)	Tagged Depth Prior to Destruction (feet bgs)	Hours of Airlifting
SC-9 A	900	99.5	2
SC-9 B	575	575	0
SC-9 C	380	380	0
SC-9 D	290	290	0
SC-9 E	140	100	2

#### 5.2 BOREHOLE DRILLING

Not all the destroyed SC-9 wells were replaced: only SC-9A, SC-9C, and SC-9 E were replaced. The reasoning for this is that the replacement SC-9RC is representative of the BC unit. The replacement SC-9 wells were not drilled in order of decreasing depth. Drilling, construction, and development took place from March 6 – March 20, 2012 as per the procedure outlined in Section 2.1. The names of the new wells in order of decreasing depth are SC-9RA, SC-9RC, and SC-9RE. The R designation is given after 9 to denote that these are replacement wells. Logs of the deepest well, SC-9RA, describing the lithology and photographs of the cuttings are included in Appendix A.

### **5.3 WELL CONSTRUCTION AND DEVELOPMENT**

Because these are replacement wells, the screened intervals were the same as the original wells. The deep borehole, SC-9RA, was drilled to a depth of 916 feet. A geophysical survey of the borehole was undertaken immediately after completion of drilling. Appendix A contains the results of the geophysical survey.

A summary of well construction is provided in table form in Table 11 and graphically on Figure 13.

*Table 11: Well Construction Details for SC-9R Well Cluster*

	<b>SC-9RA (Deep)</b>	<b>SC-9RC (Intermediate)</b>	<b>SC-9RE (Shallow)</b>
<b>Date Constructed</b>	3/12/12-3/16/12	3/6/12-3/8/12	3/6/12
<b>Total Drilled Depth (feet)</b>	916	395	155
<b>Completed Depth (feet)</b>	910	390	150
<b>Casing Diameter (inches)</b>	2	2	2
<b>Screened Interval (feet)</b>	625-900	315-380	25-140
<b>Depth of Annular Seal (feet)</b>	609	305	15

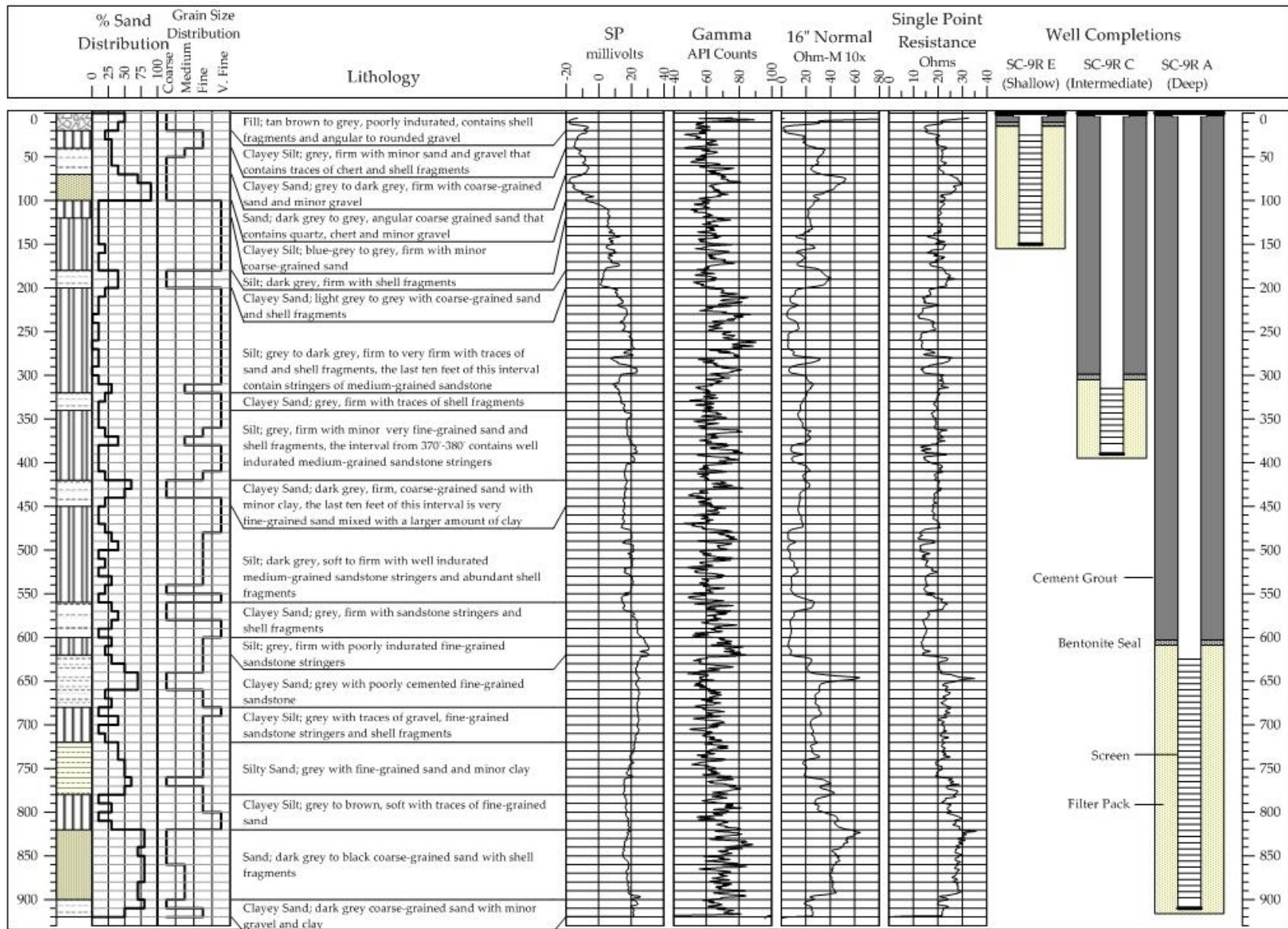


Figure 13: SC-9R Well Cluster Construction and Lithology

## 5.4 WATER QUALITY

When the groundwater appeared clear near completion of well development for each well, a water sample was taken. Table 12 summarizes the water quality results for each of the three wells. The laboratory report is included in Appendix C.

*Table 12: Summary of Water Quality for SC-9R Well Cluster*

	SC-9RA (Deep)	SC-9RC (Intermediate)	SC-9RE (Shallow)
<b>Sample Date</b>	March 20, 2012	March 20, 2012	March 20, 2012
<b>Specific Conductance, <math>\mu\text{mhos}/\text{cm}</math></b>	650	720	850
<b>TDS, mg/L</b>	440	450	580
<b>Calcium, mg/L</b>	7.7	29	72
<b>Magnesium, mg/L</b>	1.8	8.4	41
<b>Potassium, mg/L</b>	4.4	8.0	4.9
<b>Sodium, mg/L</b>	130	120	48
<b>Chloride, mg/L</b>	29	39	52
<b>Sulfate, mg/L</b>	73	69	160
<b>Bicarbonate (as <math>\text{HCO}_3</math>), mg/L</b>	250	310	270
<b>Iron, <math>\mu\text{g}/\text{L}</math></b>	<b>620</b>	<b>2,600</b>	<b>5,300</b>
<b>Manganese, <math>\mu\text{g}/\text{L}</math></b>	ND (50)	<b>74</b>	<b>110</b>
<b>Nitrate (<math>\text{NO}_3</math>), mg/L</b>	ND (1.0)	ND (1.0)	ND (1.0)

ND = non-detect, reporting limit in parenthesis, concentrations above the California Values exceeding Drinking Water Limits in italics.

## 5.5 WELL INSTRUMENTATION

QED Well Wizard bladder pumps and Schlumberger Mini Diver data loggers have been installed in each of the three monitoring wells. Details of the instrumentation are contained in Table 13 and Table 14. Due to the length of the screen in SC-9RA, electrical conductivity profiling was conducted for the length of the screen to optimize pump placement.

*Table 13: Well Wizard Bladder Pump Specifications at SC-9 Well Cluster*

Well	Pump Model	Screen Interval (feet bgs)	Tubing Length (feet)	Drop Tube Length (feet)	Inlet Screen (feet bgs)
SC-9RA	P1101M  (300' max depth 3/8" discharge)	625 – 900	104.3	642.84	762.5
SC-9RC		315 – 380	119.6	220.48	347.5
SC-9RE		25 – 140	79.0	0	82.5

*Table 14: Mini Diver Specifications at SC-9R Well Cluster*

Well	Screen Interval (feet bgs)	DTW used as reference (feet)	Cable Length		Range (mH <sub>2</sub> O)	Accuracy (cmH <sub>2</sub> O)	Resolution (cmH <sub>2</sub> O)
			(feet)	(meters)			
SC-9RA	625 – 900	4.26	98.4	30	50	±2.5	±1.0
SC-9RC	315 – 380	19.62	98.4	30	50	±2.5	±1.0
SC-9RE	25 – 140	1.11	49.5	15	20	±1.0	±0.4

The water level loggers measure absolute pressure, and the associated cables are non-vented; therefore groundwater level data will require barometric correction. Barometric data are being collected by the District with a Baro Diver barometric pressure data logger. District staff has installed this instrument at the Rosedale well.

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## SECTION 6

### SC-8F WELL (APTOS CREEK)

#### 6.1 WELL DESTRUCTION

The existing well (SC-8F) was destroyed and replaced by a new monitoring well. The SC-8F well vault contained six nested monitoring wells. Three of these had previously been destroyed. The remaining three wells were tagged at depths of 1,003 feet, 386 feet, and 117 feet prior to their destruction, including SC-8F. SC-8A, B, C, D, and E have been replaced previously. Permits for each well were obtained from the County.

The three nested wells were destroyed on April 26, 2012. Permits for the destruction were obtained by the contractor and are included in Appendix A.

The destruction process took place according to the procedure described in Section 2.3. Before the destruction process started, the depth of each well was established by tagging the bottom of the hole. Table 15 summarizes the depths tagged prior to destruction. No airlifting took place prior to sealing.

*Table 15: Well Destruction Details for SC-8F Well*

Well	As-Built Depth (feet bgs)	Tagged Depth Prior to Destruction (feet bgs)	Hours of Airlifting
SC-8F (Shallow)	200	117	0
SC-8 unknown designation (possibly SC-8E)	490 if SC-8E	386	0
SC-8A (Deep)	1,100	1,003	0

#### 6.2 BOREHOLE DRILLING

Drilling, construction and development for well SC-8RF took place from March 26 – March 27, 2012 as per the procedure outlined in Section 2.1. Logs of SC-8RF describing the lithology and photographs of the cuttings are included in Appendix A. The R designation is given after 8 to denote that this is a replacement well.

The borehole, SC-8R-F, was drilled to a depth of 217 feet. A geophysical survey of the borehole was undertaken immediately after completion of drilling. Appendix A contains the results of the geophysical survey.

## 6.3 WELL CONSTRUCTION AND DEVELOPMENT

Because this is a replacement well, the screened interval is the same as the original well. The borehole, SC-8R-F, was drilled to a depth of 217 feet. A geophysical survey of the borehole was undertaken immediately after completion of drilling. Appendix A contains the results of the geophysical survey.

A summary of well construction is provided in table form in Table 16 and graphically on Figure 14.

*Table 16: Well Construction Details for SC-8RF Well*

	<b>SC-8RF</b>
<b>Date Constructed</b>	3/26/12-3/27/12
<b>Total Drilled Depth (feet)</b>	217
<b>Completed Depth (feet)</b>	210
<b>Casing Diameter (inches)</b>	2
<b>Screened Interval (feet)</b>	20-200
<b>Depth of Annular Seal (feet)</b>	10

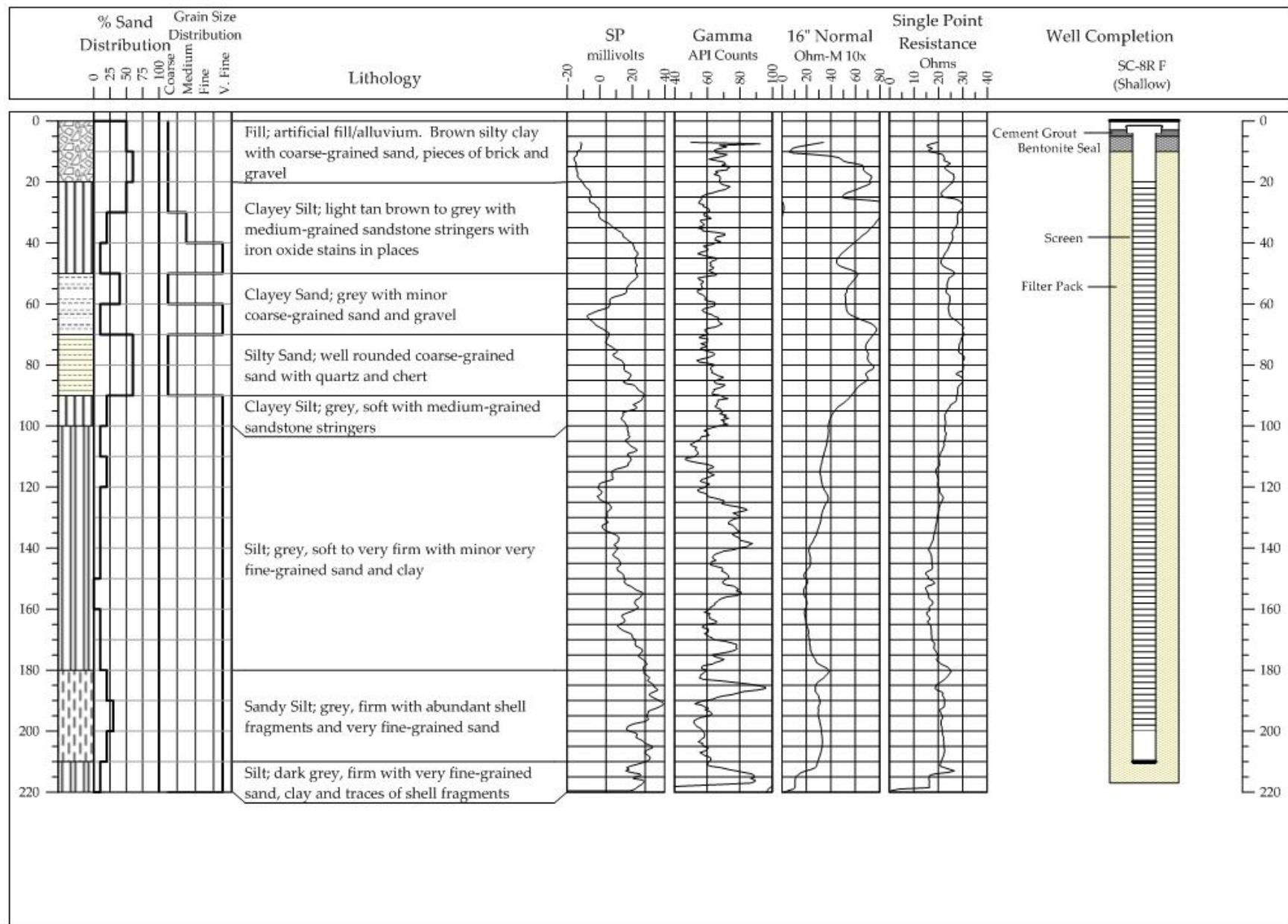


Figure 14: SC-8RF Well Construction and Lithology

## **6.4 WATER QUALITY**

When the groundwater appeared clear near completion of well development, a water sample was taken. Table 17 summarizes the results of the water quality for the well. The laboratory report is included in Appendix C.

*Table 17: Summary of Water Quality for SC-8RF Well Cluster*

<b>Sample Date</b>	March 28, 2012
<b>Specific Conductance, <math>\mu\text{mhos}/\text{cm}</math></b>	490
<b>TDS, mg/L</b>	300
<b>Calcium, mg/L</b>	20
<b>Magnesium, mg/L</b>	25
<b>Potassium, mg/L</b>	10
<b>Sodium, mg/L</b>	39
<b>Chloride, mg/L</b>	43
<b>Sulfate, mg/L</b>	22
<b>Bicarbonate (as <math>\text{HCO}_3</math>), mg/L</b>	210
<b>Iron, <math>\mu\text{g}/\text{L}</math></b>	<b>1,200</b>
<b>Manganese, <math>\mu\text{g}/\text{L}</math></b>	<b>90</b>
<b>Nitrate (<math>\text{NO}_3</math>), mg/L</b>	ND (1.0)

ND = non-detect, reporting limit in parenthesis,  
concentrations above the California Drinking Water  
Limits in italics.

## 6.5 WELL INSTRUMENTATION

A QED Well Wizard bladder pump and Schlumberger Mini Diver data loggers has been installed in the monitoring well. Details of the instrumentation are contained in Table 18 and Table 19. Due to the length of the screen in this well, electrical conductivity profiling was conducted for the length of the screen to optimize pump placement.

*Table 18: Well Wizard Bladder Pump Specifications at SC-8 Well Cluster*

Well	Pump Model	Screen Interval (feet bgs)	Tubing Length (feet)	Drop Tube Length (feet)	Inlet Screen (feet bgs)
SC-8RF	P1101M (300' max depth 3/8" discharge)	20 – 200	106.5	0	110

*Table 19: Diver Specifications at SC-8R Well Cluster*

Well	Screen Interval	DTW used as reference	Cable Length		Range	Accuracy	Resolution
	(feet bgs)	(feet)	(feet)	(meters)			
SC-8RF	20 – 200	6.22	65.6	20	20	±1.0	±0.4

The water level loggers measure absolute pressure, and the associated cables are non-vented; therefore groundwater level data will require barometric correction. Barometric data are being collected by the District with a Baro Diver barometric pressure data logger. District staff has installed this instrument at the Rosedale well.

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## **SECTION 7**

### **SC-22 WELL CLUSTER (41<sup>ST</sup> AVE)**

#### **7.1 BOREHOLE DRILLING**

The SC-22 wells were drilled in the following order; SC-22AAA, SC-22A, and SC-22AA, respectively. Logs of SC-22AAA describing the lithology and photographs of the cuttings are included in Appendix A.

The deep borehole, SC-22AAA, was drilled to a depth of 709 feet. A geophysical survey of the borehole was undertaken immediately after completion of drilling. Appendix A contains the results of the geophysical survey. Individual lithologic logs for each well are included in Appendix A.

#### **7.2 WELL CONSTRUCTION AND DEVELOPMENT**

SqCWD and the City of Santa Cruz (City) are planning to install new production wells (O'Neill Ranch and Beltz #12, respectively) in the western area of the Purisima Formation where this aquifer system is a shared resource for the two agencies. As part of its Well Master Plan EIR, SqCWD includes in Mitigation Measure 3.3-2b a plan for the two agencies to install monitoring wells at two inland locations between the City's planned Beltz #12 well and the District's planned and existing wells (ESA, 2011). The SC-22 well site at 1840 41<sup>st</sup> Ave in Capitola is the first of these two locations. The SC-22 monitoring wells are located between the Beltz #12 well and the District's existing Garnet well. The wells provide monitoring of interference between the two agencies' existing and planned production wells. Monitoring data from the wells will also be used to plan pumping redistributions if restrictive effects, such as coastal groundwater levels that decline below the protective elevations, are observed.

The Beltz #12 well is planned to be constructed to a depth of 700 feet bgs (Chambers Group, 2011) and is likely to produce from the unit underlying the Purisima Formation, either the Tu unit or Tsm unit (Hopkins, 2011). The deepest well, SC-22AAA, was screened in the interval most likely to correlate with the bottom of the Beltz #12 well. The pilot borehole for SC-22AAA was drilled until granitic basement rock was encountered at 709 feet bgs. SC-22AAA was screened from 620 to 700 feet bgs, the highly resistive interval above the granitic basement. Further interpretation will be required to classify this unit as Tu, Tsm, or Tm.

The Beltz #12 well will likely be screened in the AA unit. The intermediate well SC-22AA is screened in the AA unit distinct from the overlying A unit screened by SC-22A and the underlying unit screened by SC-22AAA. The screen was placed from 460 to 490 feet bgs, which is an interval with high resistivity below the full transition from the A unit.

SqCWD's Garnet well is screened in the lower part of the A unit. To monitor potential interference from deeper pumping at the Beltz #12 well on the Garnet well, the shallow well SC-22A is also screened in the lower part of the A unit from 150-230 feet bgs. A transition from this unit is interpreted to occur below approximately 250 feet bgs.

A summary of well construction is provided in table form in Table 20 and graphically on Figure 15.

*Table 20: Well Construction Details for SC-22 Well Cluster*

	SC-22AAA (Deep)	SC-22AA (Intermediate)	SC-22A (Shallow)
<b>Date Constructed</b>	4/2/12-4/5/12	4/10/12-4/12/12	4/9/12-4/10/12
<b>Total Drilled Depth (feet)</b>	709	510	250
<b>Completed Depth (feet)</b>	705	500	240
<b>Casing Diameter (inches)</b>	2	2	2
<b>Screened Interval (feet)</b>	640-700	460-490	150-230
<b>Depth of Annular Seal (feet)</b>	619	454	70

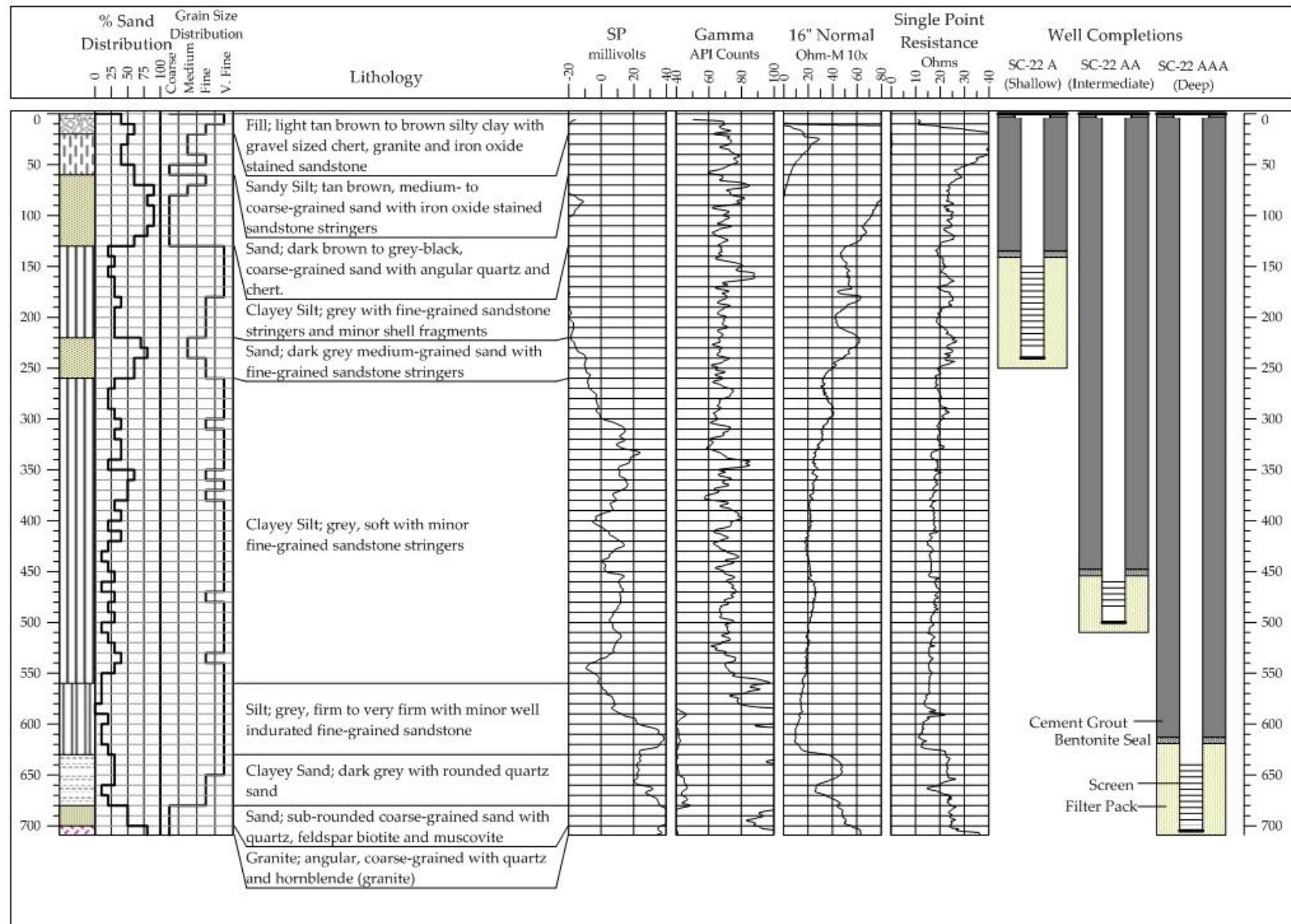


Figure 15: SC-22 Well Cluster Construction and Lithology

### **7.3 WATER QUALITY**

When the groundwater appeared clear near completion of well development for each well, a water sample was taken. Table 21 summarizes the water quality results for the wells. The laboratory report is included in Appendix C.

*Table 21: Summary of Water Quality for SC-22 Well Cluster*

	<b>SC-22AAA (Deep)</b>	<b>SC-22AA (Intermediate)</b>	<b>SC-22A (Shallow)</b>
<b>Sample Date</b>	4/12/2012	4/12/2012	4/12/2012
<b>Specific Conductance, <math>\mu\text{mhos}/\text{cm}</math></b>	1,100	1,100	550
<b>TDS, mg/L</b>	680	810	390
<b>Calcium, mg/L</b>	31	51	60
<b>Magnesium, mg/L</b>	13	33	15
<b>Potassium, mg/L</b>	9.1	17	4.3
<b>Sodium, mg/L</b>	190	150	31
<b>Chloride, mg/L</b>	68	41	21
<b>Sulfate, mg/L</b>	220	360	92
<b>Bicarbonate (as <math>\text{HCO}_3</math>), mg/L</b>	280	200	190
<b>Iron, <math>\mu\text{g}/\text{L}</math></b>	76	<b>920</b>	<b>370</b>
<b>Manganese, <math>\mu\text{g}/\text{L}</math></b>	22	<b>56</b>	<b>500</b>
<b>Nitrate (<math>\text{NO}_3</math>), mg/L</b>	ND (1.0)	ND (1.0)	ND (1.0)

ND = non-detect, reporting limit in parenthesis, concentrations above the California Drinking Water Limits in italics.

## 7.4 WELL INSTRUMENTATION

QED Well Wizard bladder pumps and Schlumberger Mini Diver data loggers have been installed in each of the three monitoring wells. Details of the instrumentation are contained in Table 22 and Table 23. Due to the length of the screen in SC-22A, electrical conductivity profiling was conducted for the length of the screen to optimize pump placement.

*Table 22: Well Wizard Bladder Pump Specifications at SC-22 Well Cluster*

Well	Pump Model	Screen Interval (feet bgs)	Tubing Length (feet)	Drop Tube Length (feet)	Inlet Screen (feet bgs)
SC-22AAA	P1101M  (300' max depth 3/8" discharge)	640-700	156.3	500.3	670
SC-22AA		460-490	151.2	314.45	475
SC-22A		150-230	148.4	36.18	190

*Table 23: Diver Specifications at SC-22 Well Cluster*

Well	Screen Interval	DTW used as reference	Cable Length		Range	Accuracy	Resolution
	(feet bgs)	(feet)	(feet)	(meters)	(mH <sub>2</sub> O)	(cmH <sub>2</sub> O)	(cmH <sub>2</sub> O)
SC-22AAA	640-700	56.73	98.4	30	20	±1.0	±0.4
SC-22AA	460-490	51.15	98.4	30	50	±2.5	±1.0
SC-22A	150-230	48.42	98.4	30	50	±2.5	±1.0

The water level loggers measure absolute pressure, and the associated cables are non-vented; therefore groundwater level data will require barometric correction. Barometric data are being collected by the District with a Baro Diver barometric pressure data logger. District staff has installed this instrument at the Rosedale well.

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## SECTION 8

### SC-5 WELL CLUSTER (NEW BRIGHTON)

#### 8.1 BACKGROUND

Five monitoring wells, designated SC-5A through E, were installed at New Brighton Beach State Park in 1985. The three deepest wells, SC-5A, 5B, and 5C, were replaced in 2003. We recommended destroying the remaining two shallow wells SC-5D and 5E because they do not produce useful data.

SC-5D appeared to be sanded up. The as-built diagram for this well shows a total depth of 190 feet. However, a sounder could not be lowered deeper than 63 feet in 2009. Groundwater levels have not been measured at the well since 2000 and water quality samples have not been collected since 1992.

No historical data were available from SC-5E. The as-built diagram showed a total depth of 45 feet and a sounder could not pass 42 feet in 2009. This well has apparently always been dry.

It may be useful to replace SC-5D and SC-5E with a single well completed in the unconfined Purisima DEF unit at a depth of approximately 90 feet, but this replacement is not a priority at this time.

#### 8.2 WELL DESTRUCTIONS

SC-5D and SC-5E were destroyed on March 12-14, 2012. Permits for the destruction were obtained by the contractor and are included in Appendix A. The destruction process took place according to the procedure described in Section 2.3. Before the destruction process started, depths of each well were established by tagging the bottom of the hole. Table 24 summarizes the depths tagged prior to destruction. There was no airlifting to clear the wells.

*Table 24: Well Destruction Details for SC-5D and E*

Well	As-Built Depth (feet bgs)	Tagged Depth Prior to Destruction (feet bgs)	Hours of Airlifting
SC-5D	190	63	0
SC-5E	45	42	0

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## SECTION 9 REFERENCES

- Chambers Group. 2011. *Beltz Well No. 12 Draft Environmental Impact Report*, prepared for City of Santa Cruz Water Department, August.
- Cloud, Mike. 2012. Email re: Cornwell intervals. To Cameron Tana, HydroMetrics WRI, March 1, 2012.
- ESA, 2010, *Soquel Creek Water District Well Master Plan Draft Environmental Impact Report*, State Clearinghouse No. 2006072018, prepared for Soquel Creek Water District, September 1.
- ESA, 2011, *Soquel Creek Water District Well Master Plan Responses to Comments Document*, State Clearinghouse No. 2006072018, prepared for Soquel Creek Water District, February 9.
- Hopkins Groundwater Consultants. 2009. *Hydrogeological Conditions Study of Live Oak – Capitola Area Soquel-Aptos Groundwater Basin*, prepared for City of Santa Cruz Water Department, October.
- Hopkins Groundwater Consultants. 2011. *City of Santa Cruz Beltz Well No. 12 125 Acre-Feet Per Year Project Well Interference and Streamflow Impact Analysis Live Oak-Capitola Area, California*, June.
- HydroMetrics WRI. 2011. *Water Year 2010 Annual Report and Review*, prepared for Soquel Creek Water District and Central Water District, May.
- Johnson, N.M., D. Williams, E.B. Yates, and G. Thrupp, 2004, *Groundwater assessment of alternative conjunctive use scenarios – technical memorandum #2: hydrogeological conceptual model*, prepared for Soquel Creek Water District, September.
- Soquel Creek Water District and Central Water District, 2007, *Groundwater management plan -2007 Soquel-Aptos area*, Santa Cruz County, California, April.

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## **APPENDIX A:      WELL PERMITS, WELL LOGS, AND LITHOLOGY**



## **SC-21AAA (Deep)**

*Previously called Cornwell Tu*

Well Permit  
Well Drillers Log  
Lithologic Logs  
Welenco Geophysical Log  
Detailed Lithologic Description  
Photographs of Borehole Cuttings

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

2441-48

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

12-014 SP-8620

(PERMIT #)

(ENVISION #)

4680

PROGRAM ELEMENT

SITE ADDRESS Cornwall Rd. Soquel, Ca. 95073

OWNER Soquel Creek Water ADDRESS 5180 Soquel Dr. Soquel, Ca. 95073

DRILLING CONTRACTOR Bradley J. Sons LICENSE # 4141178 PHONE 559-441-1401

DIRECTIONS TO SITE Hilltop rd. To Cornwall rd. To end

D1 Hwy 17942 S10311 000000

#8696 10:37AM E-Bill 0006

PE # CASH REGISTER VALIDATION 000000

CHECK 1 \$323.00

DESIGN SPECIFICATIONS:INTENDED USE

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System \_\_\_\_\_

DISTANCE FROM WELL SITE TO:

SEPTIC SYSTEMS \_\_\_\_\_

SEWER 300ft

NEAREST PROPERTY LINE \_\_\_\_\_

CASING \_\_\_\_\_

TYPE OF WELL CONSTRUCTION

ROTARY X

CABLE \_\_\_\_\_

DUG \_\_\_\_\_

OTHER \_\_\_\_\_

IRRIGATION \_\_\_\_\_

COMMERCIAL/INDUSTRIAL \_\_\_\_\_

MONITORING: X

GRDWTR X VADOSE \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY) \_\_\_\_\_

SINGLE X DOUBLE \_\_\_\_\_

MATERIAL PVC

TYPE OF JOINT Threaded

GRAVEL PACK X

ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA NO X YES NAME: Soquel Creek Water (FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) 165 DIAMETER (IN.) 2 DEPTH OF SEAL (FT.) 50 WIDTH OF SEAL (IN.) 3

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: 1 TYPES: DOMESTIC IRRIGATION COMMERCIAL USE OTHER Municipal
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE X TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
TO SUPPLEMENT NEW WELL TO BE DESTROYED OTHER \_\_\_\_\_

DESTRUCTION: DEPTH OF WELL \_\_\_\_\_ DEPTH OF SEAL \_\_\_\_\_ NUMBER OF WATER FORMATIONS PENETRATED \_\_\_\_\_  
 CLEANING OF WELL REQUIRED: YES:  NO:  SEALING MATERIAL \_\_\_\_\_

PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER JRWDRILLING CONTRACTOR Bradley 1123102FOR OFFICE USE ONLY:ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO METER REQUIRED YES  NO 

METER INSTALLED \_\_\_\_\_ DATE \_\_\_\_\_ READING \_\_\_\_\_

ANNULAR WELL SEAL WITNESSED:

SITE INSPECTION 1/30/12 HPAPPLICATION APPROVAL 2/2/12 SWD

PAD INSPECTION \_\_\_\_\_

RECEIPT OF WELL LOG \_\_\_\_\_

FINAL \_\_\_\_\_

YES DATE \_\_\_\_\_

NO DEPTH \_\_\_\_\_

SEAL MATERIAL \_\_\_\_\_

# SACKS CEMENT/YARD \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

2/1/12  
CW

DUPLICATE  
Driller's Copy

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**

Refer to Instruction Pamphlet

No. **EO147067**

Page 1 of 1  
Owner's Well No. CORNWELL T.U.

Date Work Began 2/7/2012, Ended 2/13/2012

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ

Permit No. 12-015 Permit Date 2/1/2012

DWR USE ONLY --- DO NOT FILL IN							
STATE WELL NO./STATION NO.							
LATITUDE				LONGITUDE			
APN/TRS/OTHER							

**GEOLOGIC LOG**

ORIENTATION (✓)		<input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> HORIZONTAL <input type="checkbox"/> ANGLE		(SPECIFY)			
DEPTH FROM SURFACE		DRILLING METHOD		ROTARY FLUID WATER			
Ft. to Ft.		DESCRIPTION					
Describe material, grain, size, color, etc.							
0	20	TOPSOIL, MEDIUM/FINE/COARSE SANDS, GRAVEL CLAY					
20	40	MEDIUM/FINE/COARSE SANDS					
40	60	MEDIUM/FINE/COARSE SANDS, SHALE WITH SOME CLAY					
60	80	MEDIUM/FINE/COARSE SANDS, SHALE WITH SOME CLAY					
80	100	MEDIUM/FINE SANDS, SOME COARSE, CLAY AND SHALE					
100	120	MEDIUM/FINE/COARSE SANDS, CLAY AND SHALE					
120	140	FINE BLACK SAND					
140	160	FINE BLACK SAND, BLUE SILTY CLAY WITH CLAYSTONE					
160	180	BLUE SANDY CLAY					
180	200	DARKER SANDY CLAY					
200	240	FINE SANDY CLAY					
240	260	SILTY CLAY					
260	280	SANDY CLAY, SHALE, STREAKS					
280	300	SANDY CLAY, WITH SOME SANDSTONE					
300	320	FINE SAND, WITH SOME CLAY					
320	380	FINE SANDY CLAY					
380	400	HARD STREAKS, DARK SANDY CLAY, WITH SANDY CLAY					
400	520	FINE SANDY CLAY					
520	540	FINE SANDS, CLAY, WITH SOME MEDIUM SAND					
540	600	FINE SANDY CLAY WITH SOME MEDIUM SAND					
TOTAL DEPTH OF BORING <u>600</u> (Feet)							
TOTAL DEPTH OF COMPLETED WELL <u>550</u> (Feet)							

**WELL OWNER**

Name **SOQUEL CREEK WATER**  
Mailing Address **5180 SOQUEL DRIVE**  
**SOQUEL** CA **95073**  
CITY STATE ZIP

**WELL LOCATION**

Address **CORNWELL ROAD**

City **SOQUEL CA 95073**

County **SANTA CRUZ**

APN Book **102** Page **441** Parcel **48**

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Latitude \_\_\_\_\_ DEG. MIN. SEC. DEG. MIN. SEC.

**LOCATION SKETCH**

NORTH ✓ NEW WELL

MODIFICATION/REPAIR  
— Deepen  
— Other (Specify)

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

**PLANNED USES (✓)**

WATER SUPPLY  
— Domestic — Public  
— Irrigation — Industrial

MONITORING ✓

TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDIATION

OTHER (Specify)

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER \_\_\_\_\_ (FT.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL \_\_\_\_\_ (FT.) & DATE MEASURED \_\_\_\_\_

ESTIMATED YIELD \* \_\_\_\_\_ (GPM) & TEST TYPE **AIR LIFT**

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (FT.)

*May not be representative of a well's long-term yield.*

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)							
		BLANK	SCREEN	CONDUIT	DUCTILE	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	Gauge OR WALL THICKNESS
0	520	8 3/4"	✓				PVC	2"	SCH 80
520	540	8 3/4"		✓			PVC	2"	SCH 80
540	550	8 3/4"	✓				PVC	2"	.030

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	TYPE			
Fl. to Fl.	CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	510	✓		
510	516		✓	

**ATTACHMENTS (✓)**

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

**CERTIFICATION STATEMENT**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.  
NAME **BRADLEY & SONS**

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS **3625 S. HIGHLAND**

Signed **Bradley**

WELL DRILLER/AUTHORIZED REPRESENTATIVE

**DEL REY**

**CA 93616**

CITY STATE ZIP

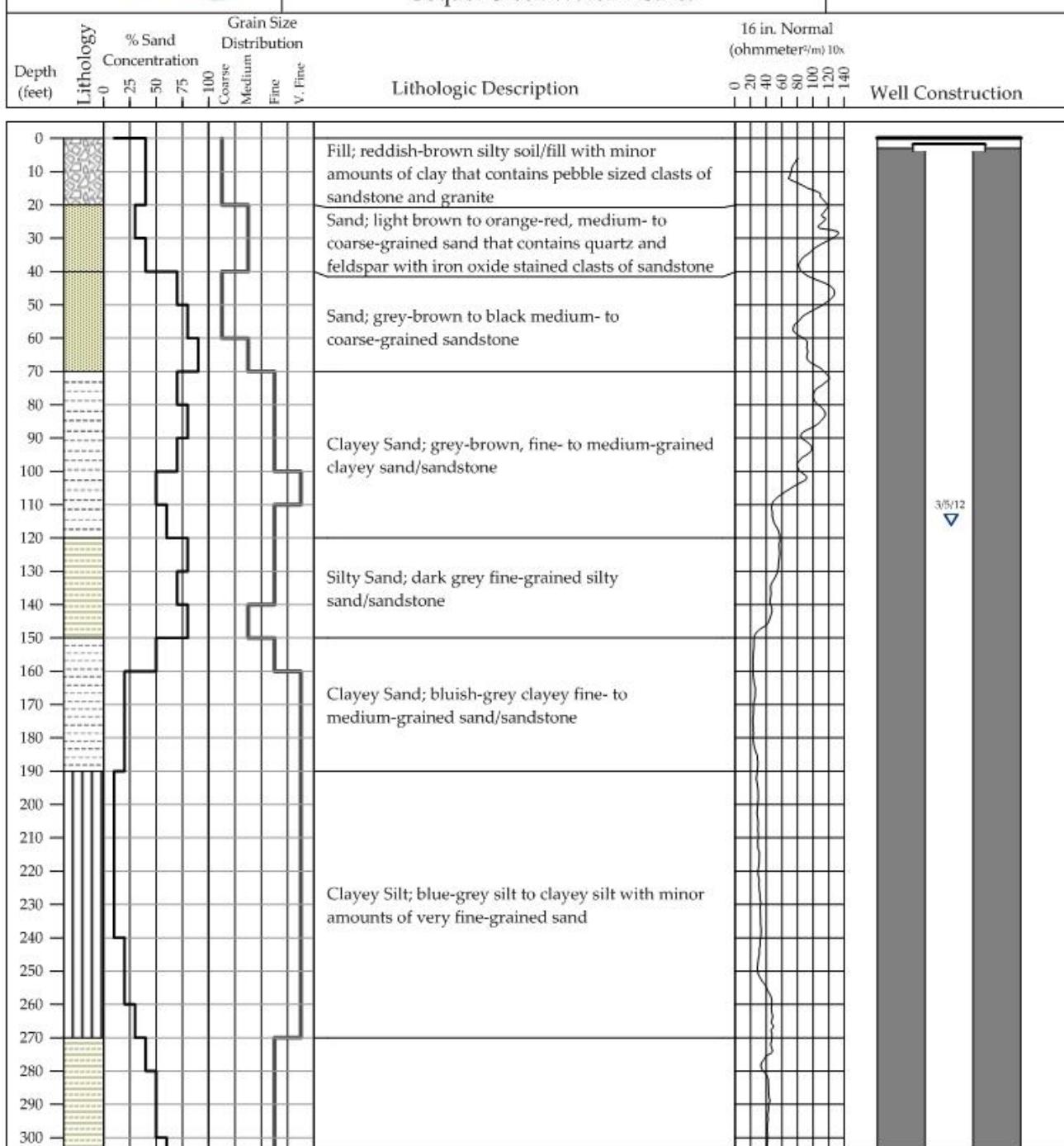
03/23/12 DATE SIGNED

414178 C-57 LICENSE NUMBER

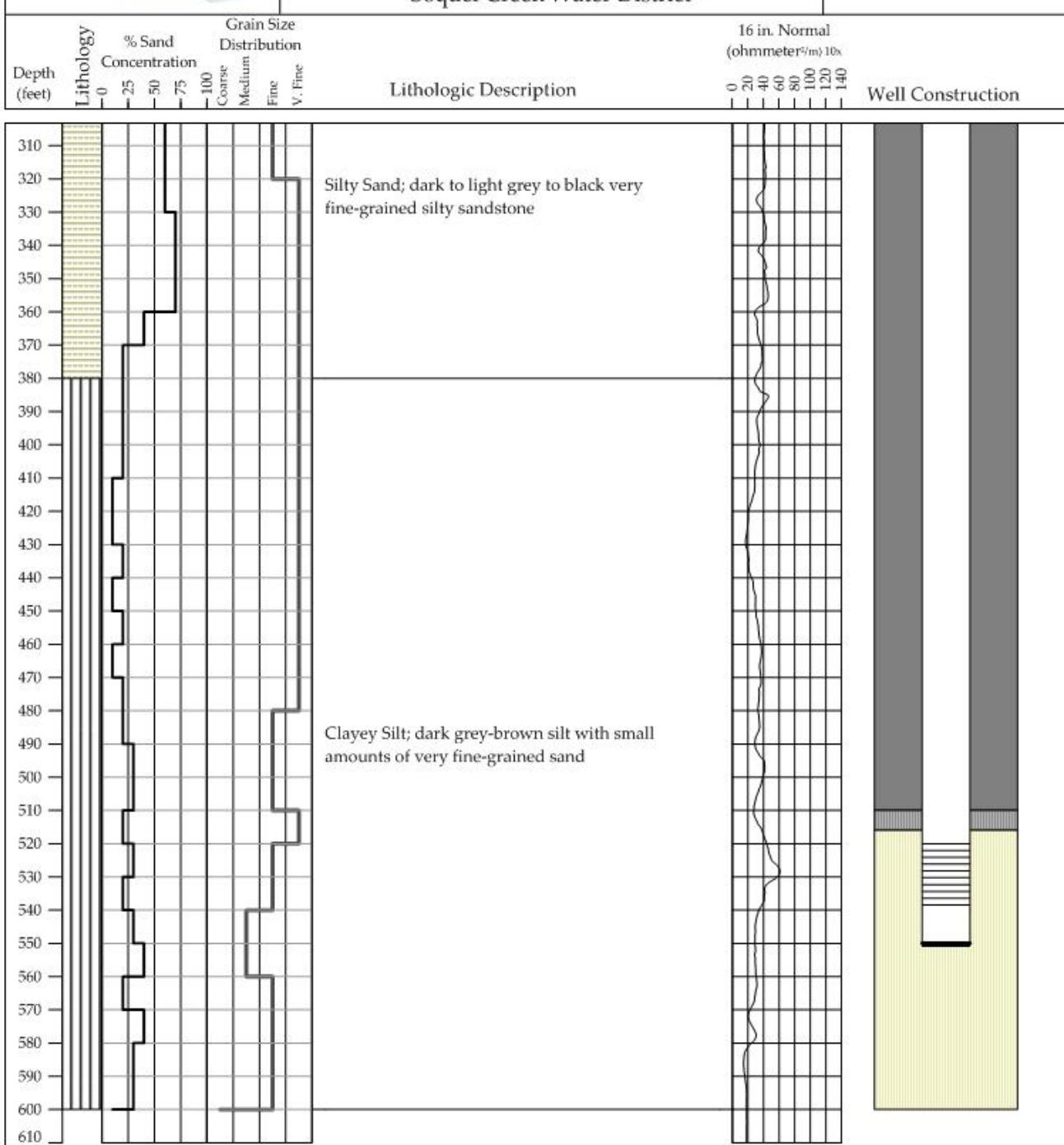
DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

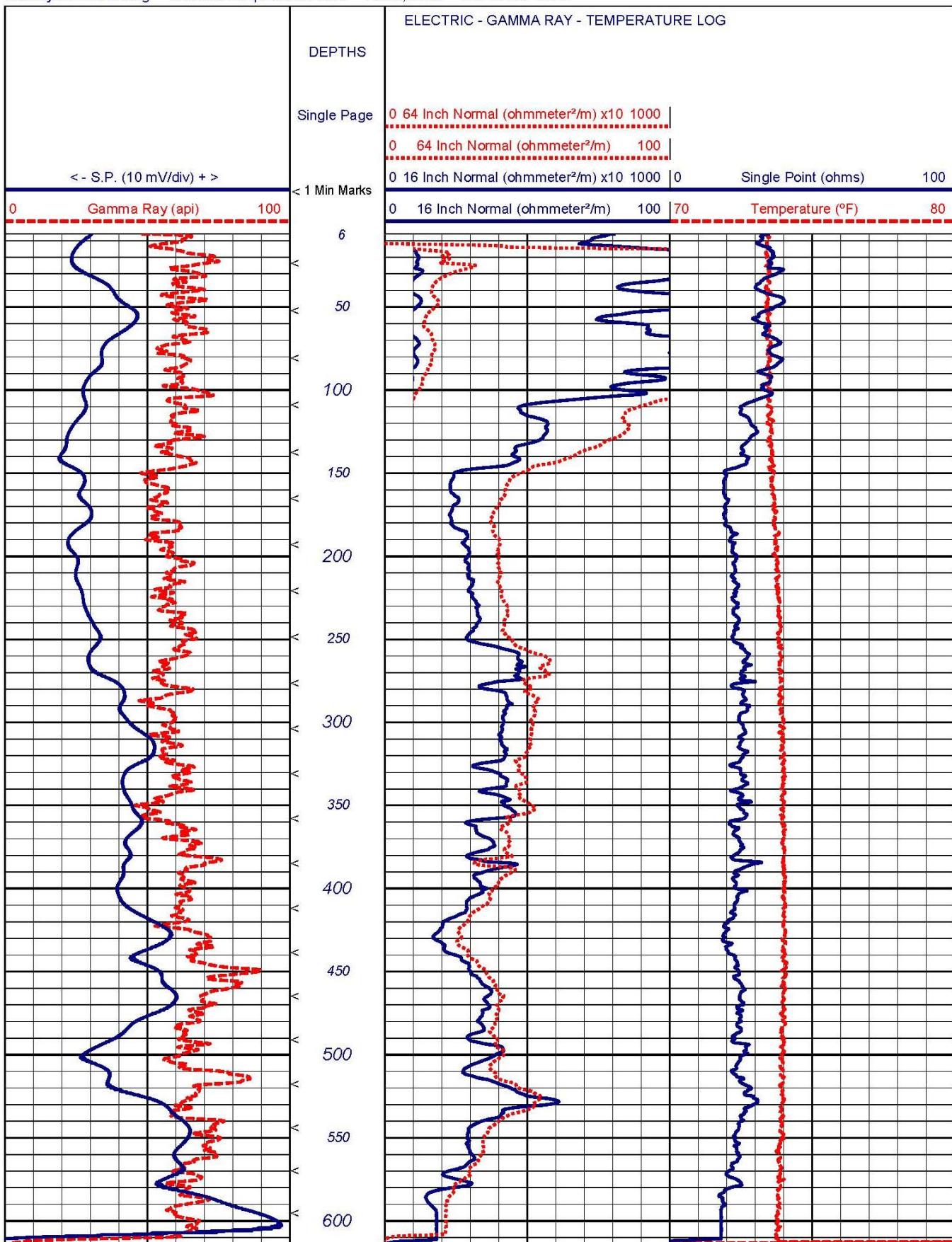
SC-21 AAA (Deep)



Logged By: Nick Byler/Martin Feeney Easting (X): 6134840.1 Northing (Y): 1827094.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 218.84 NAVD29, feet Location: Cornwell Tank Site Drilling Dates: 2/7/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 600	<b>Fill Materials</b> 0 - 510 Neat Cement 510 - 516 Bentonite 516 - 600 Cemex 8 x 16	Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material
		0 - 1	8.75	4	Sch. 80 PVC Blank
		1 - 520	8.75	2	Sch. 80 PVC Blank
		520 - 540	8.75	2	Sch. 80 PVC 0.040" Screen
		540 - 550	8.75	2	Sch. 80 PVC Blank



Logged By: Nick Byler/Martin Feeney Easting (X): 6134840.1 Northing (Y): 1827094.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 218.84 NAVD29, feet Location: Cornwell Tank Site Drilling Dates: 2/7/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 600	<b>Fill Materials</b> 0 - 510 Neat Cement 510 - 516 Bentonite 516 - 600 Cemex 8 x 16	<b>Borehole Depth, ft</b> <b>Casing Diam., in.</b> <b>Casing Diam., in.</b> <b>Casing Material</b> 0 - 1 8.75 4 Sch. 80 PVC Blank 1 - 520 8.75 2 Sch. 80 PVC Blank 520 - 540 8.75 2 Sch. 80 PVC 0.040" Screen 540 - 550 8.75 2 Sch. 80 PVC Blank
		Static Water Level

**welenco**

CA. Contractor's License: 722373

Phone: (800) 445-9914 Fax: (661) 834-2550 Email: [welenco@welenco.com](mailto:welenco@welenco.com) Web: [www.welenco.com](http://www.welenco.com)

(Prepared with Log Print, a professional software application developed by welenco, inc.)

## SC-21AAA

### Detailed Lithologic Description

<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
0	10	Fill; reddish-brown silty soil/fill with minor amounts of clay that contains pebble sized clasts of sandstone and granite
10	20	Fill; light brown clayey regolith/fill with pebble sized clasts of sandstone and minor amounts of granite
20	30	Sand; light brown to orange-red, medium- to coarse-grained sand that contains quartz and feldspar with iron oxide stained clasts of sandstone
30	40	Sand; reddish-brown to black, coarse-grained sand that contains quartz and feldspar
40	50	Sand; grey-brown to black medium- to coarse-grained sandstone
50	60	Sand; grey to brown medium- to coarse-grained sandstone
60	70	Sand; light brown medium-grained sandstone with iron oxide staining
70	80	Clayey Sand; brown fine- to medium-grained sandstone with minor amounts of clay
80	90	Clayey Sand; grey-brown fine- to medium-grained clayey sand/sandstone
90	100	Clayey Sand; brown fine- to medium-grained clayey sand/sandstone
100	110	Clayey Sand; light grey to brown, very fine- to medium-grained clayey sand/sandstone with traces of pyrite
110	120	Clayey Sand; black to brown fine- to medium-grained clayey sand/sandstone
120	130	Silty Sand; dark grey fine-grained silty sand/sandstone with minor iron oxide staining
130	140	Silty Sand; dark grey fine-grained silty sand
140	150	Silty Sand; dark grey fine- to medium-grained sandstone
150	160	Clayey Sand; bluish-grey clayey fine- to medium-grained sand/sandstone
160	170	Clayey Sand; bluish-grey clayey very fine-grained sand
170	180	Clayey Sand; dark grey-blue clayey very fine-grained sand
180	190	Clayey Sand; dark grey-blue clayey very fine-grained sand/sandstone
190	200	Silty Clay; bluish-grey silty clay with minor amounts of very fine-grained sand
200	210	Silty Clay; blue-grey clay with minor amounts of very fine-grained sand
210	220	Silty Clay; grey blue clay with very small amounts of very fine-grained sand
220	230	Silty Clay; grey to blue clay with minor very fine-grained sand
230	240	Silty Clay; dark grey to blue silty clay
240	250	Silty Clay; dark grey silty clay with trace amounts of very fine-grained sand
250	260	Silty Clay; grey to blue silty clay with traces of very fine-grained sand
260	270	Silty Clay; grey to light grey silty clay with minor fine-grained sand
270	280	Silty Sand; light grey, fine-grained sand to silt with quartz sandstone stringers
280	290	Silty Sand; white to light grey fine-grained sand to silty clay
290	300	Silty Sand; white fine-grained sand and silt mix
300	310	Silty Sand; dark grey to black fine-grained sand/silt mix
310	320	Silty Sand; black fine-grained sand and silt mix
320	330	Silty Sand; dark grey to black very fine-grained sandstone to siltstone/claystone

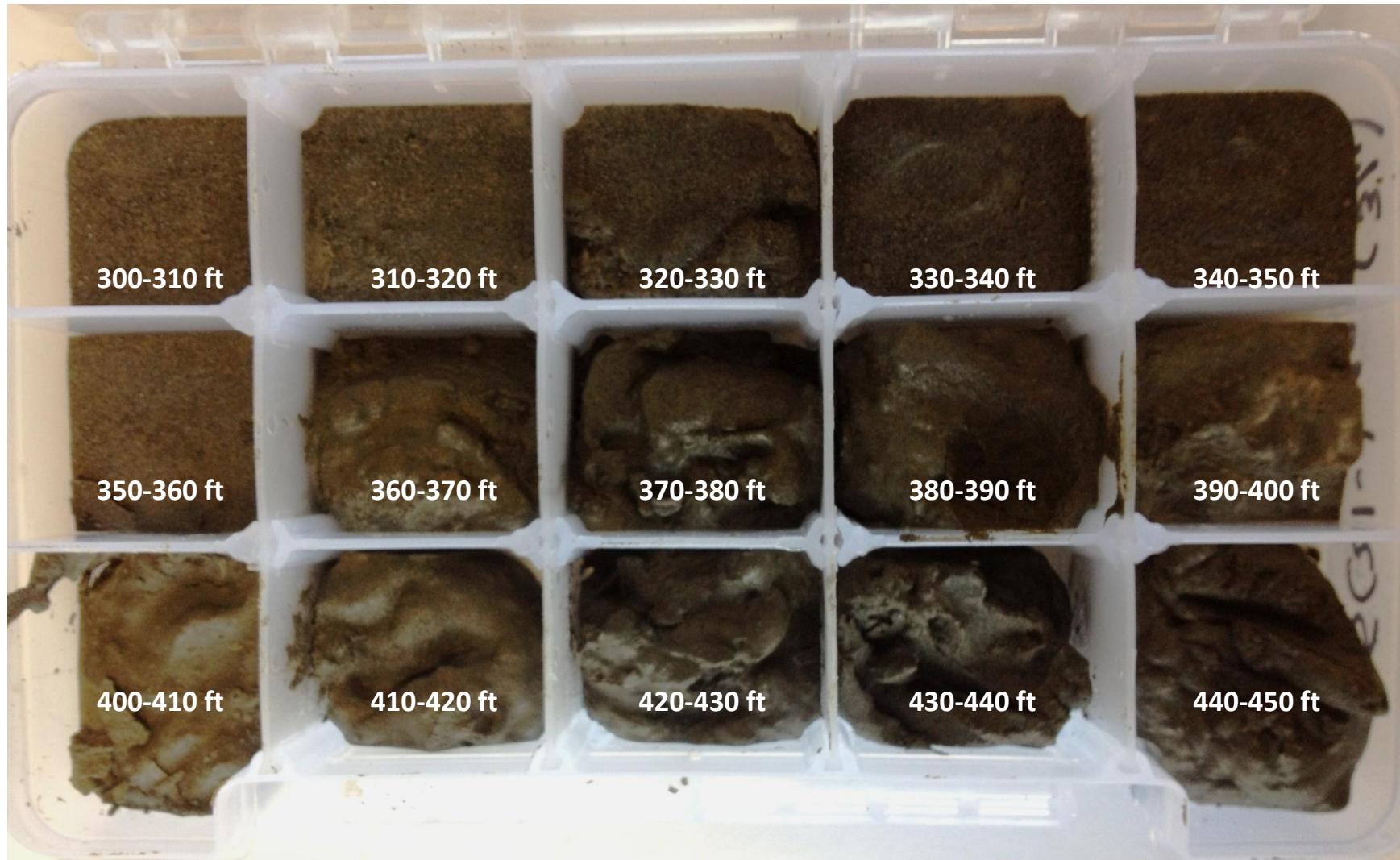
<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
330	340	Silty Sand; dark grey very fine-grained sandstone with traces of silt
340	350	Silty Sand; dark grey to black very fine-grained silty sandstone
350	360	Silty Sand; dark grey very fine-grained silty sandstone
360	370	Silty Sand; dark grey claystone to very fine-grained sandstone
370	380	Silty Sand; dark grey to black siltstone to claystone
380	390	Sandy Clay; brownish-grey clay with minor amounts of very fine-grained sand and silt
390	400	Sandy Clay; bluish grey with well indurated sandstone stringers
400	410	Sandy Clay; grey to dark grey clay with very fine-grained sandstone stringers
410	420	Sandy Clay; dark grey to brown with traces of very fine-grained sand
420	430	Sandy Clay; dark grey with traces of very fine-grained sand
430	440	Sandy Clay; dark grey with poorly indurated very fine-grained sandstone stringers
440	450	Sandy Clay; dark blue-grey clay with traces of very fine-grained sand
450	460	Sandy Clay; dark grey clay with stringers of very fine-grained sandstone
460	470	Sandy Clay; dark grey-brown clay with small amounts of very fine-grained sand
470	480	Sandy Clay; dark brown to grey clay with traces of very fine-grained sand
480	490	Sandy Clay; dark grey clay with stringers of very fine-grained sandstone
490	500	Sandy Clay; dark grey silty clay with very fine- to fine-grained sandstone lenses
500	510	Sandy Clay; grey with minor amounts of fine-grained sandstone
510	520	Sandy Clay; dark grey with traces very fine-grained sandstone and silt
520	530	Sandy Clay; grey to brown clay mixed with fine-grained sandstone
530	540	Sandy Clay; dark grey to brownish-black silty clay with fine-grained sandstone stringers
540	550	Sandy Clay; dark grey silty clay with trace amounts of fine-grained sandstone
550	560	Sandy Clay; dark grey silty clay to fine- to medium-grained sand
560	570	Sandy Clay; grayish-brown clay with minor silt and very fine- to fine-grained sand
570	580	Sandy Clay; brown to grey clay with lenses of fine-grained sandstone
580	590	Sandy Clay; brownish-grey clay with lesser amounts of fine-grained sandstone
590	600	Sandy Clay; grey brown clay with interbedded fine-grained sandstone



Cuttings from 0 – 150 feet  
SC-21AAA (Deep) at Cornwell Tank Site



**Cuttings from 150 – 300 feet  
SC-21AAA (Deep) at Cornwell Tank Site**



Cuttings from 300 – 450 feet  
SC-21AAA (Deep) at Cornwell Tank Site



Cuttings from 450 – 600 feet  
SC-21AAA (Deep) at Cornwell Tank Site

## **SC-21AA (Intermediate)**

Well Permit  
Well Drillers Log  
Lithologic Log

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

02-441-48

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

12-013 CP#86019

(PERMIT #)

(ENVISION #)

4680

PROGRAM ELEMENT

SITE ADDRESS Cornwell Rd. Soquel, Ca. 95073

OWNER Soquel Creek Water ADDRESS 5180 Soquel Dr. Soquel, Ca. 95073

DRILLING CONTRACTOR Bradley &amp; Sons LICENSE # 414178 PHONE 559-441-1401

DIRECTIONS TO SITE Hilltop rd. To Cornwell rd To end 994-5703 11

DESIGN SPECIFICATIONS:INTENDED USE

DOMESTIC: \_\_\_\_\_

# Homes Served: \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System: \_\_\_\_\_

IRRIGATION: \_\_\_\_\_

COMMERCIAL/INDUSTRIAL: \_\_\_\_\_

MONITORING: GRDWTR  VADOSE: \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY)

WITHIN WATER DISTRICT SERVICE AREA:  NO  YES NAME: Soquel Creek Water

CONSTRUCTION DEPTH (FT.) 375 DIAMETER (IN) 2" DEPTH OF SEAL (FT.) 290 WIDTH OF SEAL (IN.) 3"

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: 1 TYPES: DOMESTIC: \_\_\_\_\_ IRRIGATION: \_\_\_\_\_ COMMERCIAL USE: \_\_\_\_\_ OTHER: \_\_\_\_\_

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE  TO BE DESTROYED: \_\_\_\_\_

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER: \_\_\_\_\_

**DESTRUCTION:** DEPTH OF WELL \_\_\_\_\_ DEPTH OF SEAL: \_\_\_\_\_ NUMBER OF WATER FORMATIONS PENETRATED: \_\_\_\_\_  
 CLEANING OF WELL REQUIRED YES:  NO:  SEALING MATERIAL: \_\_\_\_\_

PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER: \_\_\_\_\_ POLICY #: \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER JRWDRILLING CONTRACTOR Koddeh 10812FOR OFFICE USE ONLY:ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO METER REQUIRED YES  NO 

METER INSTALLED \_\_\_\_\_

DATE \_\_\_\_\_

READING \_\_\_\_\_

SITE INSPECTION: \_\_\_\_\_

DATE 1/30/12EHS SPECIALIST HJH

ANNULAR WELL SEAL WITNESSED: \_\_\_\_\_

APPLICATION APPROVAL: \_\_\_\_\_

DATE 2/1/12EHS SPECIALIST HJH

YES DATE: \_\_\_\_\_

PAD INSPECTION: \_\_\_\_\_

NO DEPTH: \_\_\_\_\_

RECEIPT OF WELL LOG: \_\_\_\_\_

SEAL MATERIAL: \_\_\_\_\_

FINAL: \_\_\_\_\_

# SACKS CEMENT/YARD: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

(W)  
2/1/12

TRIPPLICATE  
Owner's Copy

**STATE OF CALIFORNIA**  
**WELL COMPLETION REPORT**  
*Refer to Instruction Pamphlet*  
**No. EO147066**

Page 1 of 1

Owner's Well No. CORNWELL "AA"

Date Work Began 2/13/2012, Ended 2/17/2012

Local Permit Agency **ENVIRO HEALTH, SANTA CRUZ**  
Permit No. **12-013** Permit Date **2/2/2012**

DWR USE ONLY -- DO NOT FILL IN											
STATE WELL NO./STATION NO.											
LATITUDE						LONGITUDE					
APN/TRS/OTHER											

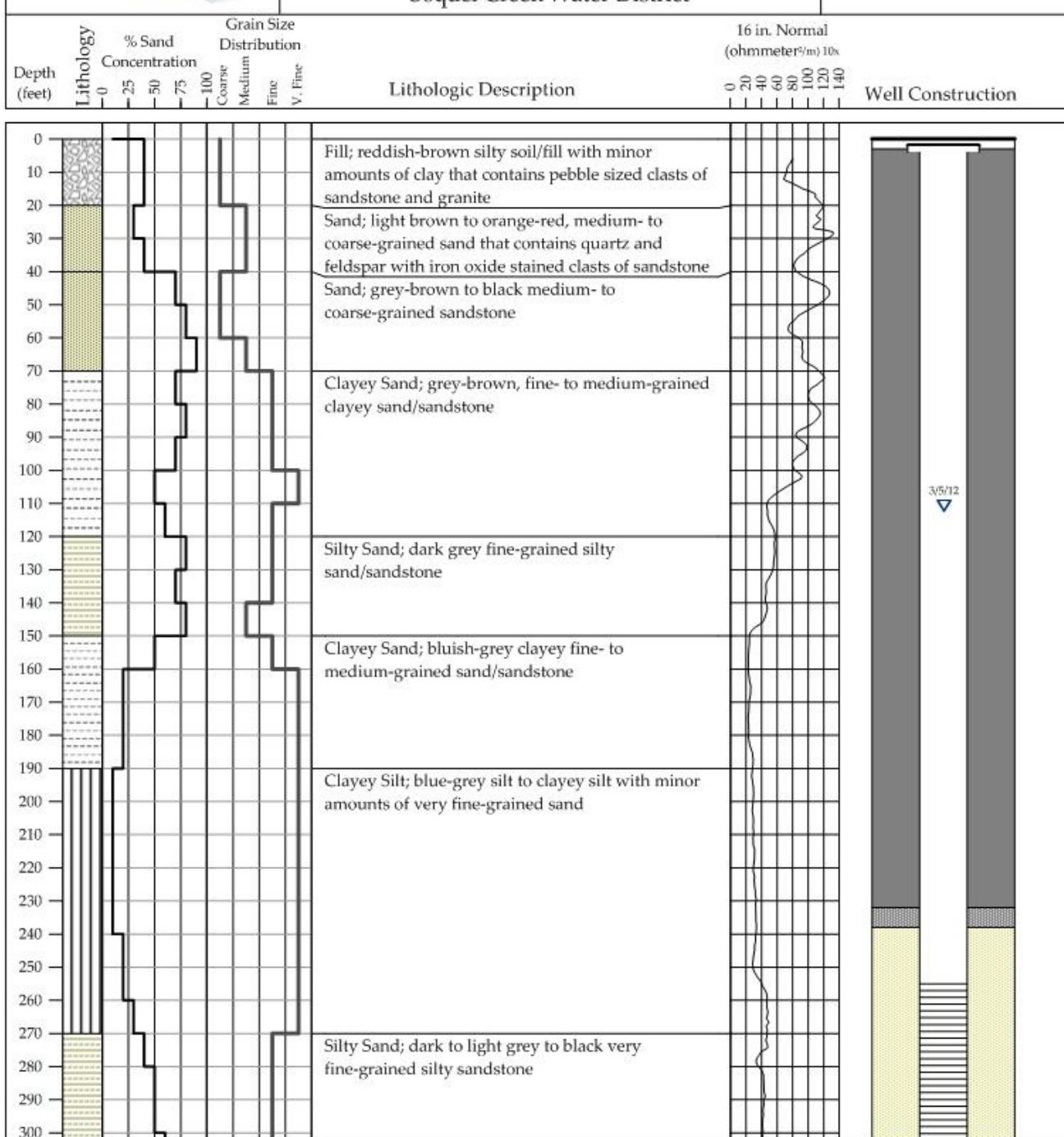
## - GEOLOGIC LOG

<b>ATTACHMENTS (✓)</b>	<b>CERTIFICATION STATEMENT</b>				
<input type="checkbox"/> Geologic Log <input type="checkbox"/> Well Construction Diagram <input type="checkbox"/> Geophysical Log(s) <input type="checkbox"/> Soil/Water Chemical Analysis <input type="checkbox"/> Other	I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief. <b>NAME</b> <u>BRADLEY &amp; SONS</u> <small>(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)</small> <b>ADDRESS</b> <u>3625 S. HIGHLAND</u> Signed  <b>WELL DRILLER/AUTHORIZED REPRESENTATIVE</b>				
	<u>DEL REY</u>	CA	93616		
	CITY	STATE	ZIP		
	<u>07/19/12</u>	DATE SIGNED	<u>414178</u>		
				C-57 LICENSE NUMBER	

DWR 188 REV. 11-97

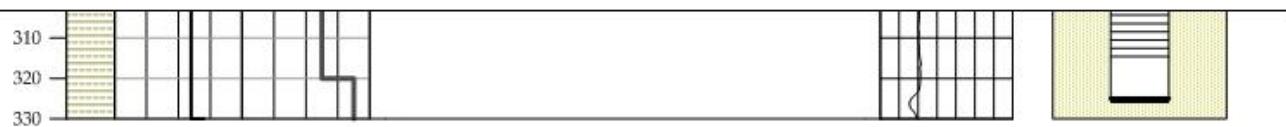
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

*Monitoring Well Destruction, Replacement, and New Installations*  
October 2, 2012 A-15



Logged By: Nick Byler/Martin Feeney Easting (X): 6134849.2 Northing (Y): 1827101.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation: amsl: 218.63 NAVD29, feet Location: Cornwell Tank Site Drilling Dates: 2/13/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 330	Fill Materials 0 - 232 Neat Cement 232 - 238 Bentonite 238 - 330 Cemex 8 x 16	Borehole Diam., in.      Casing Diam., in.      Casing Material 0 - 1      8.75      4 Sch. 80 PVC Blank 1 - 255      8.75      2 Sch. 80 PVC Blank 255 - 315      8.75      2 Sch. 80 PVC 0.040" Screen 315 - 325      8.75      2 Sch. 80 PVC Blank
Static Water Level		

Depth (feet)	Lithology	% Sand Concentration	Grain Size Distribution	Lithologic Description	16 in. Normal (ohmmeter <sup>1/m</sup> ) 10x	0 20 40 60 80 100 120 140	Well Construction	
	0	25	50	75	100	Coarse	Medium	Fine



Logged By: Nick Byler/Martin Feeney Easting (X): 6134849.2 Northing (Y): 1827101.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 218.63 NAVD29, feet Location: Cornwell Tank Site Drilling Dates: 2/13/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 330	<b>Fill Materials</b> 0 - 232 Neat Cement 232 - 238 Bentonite 238 - 330 Cemex 8 x 16	Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material
		0 - 1	8.75	4	Sch. 80 PVC Blank
		1 - 255	8.75	2	Sch. 80 PVC Blank
		255 - 315	8.75	2	Sch. 80 PVC 0.040" Screen
		315 - 325	8.75	2	Sch. 80 PVC Blank



Static Water Level

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## **SC-21A (Shallow)**

Well Permit  
Well Drillers Log  
Lithologic Log

**APPLICATION FOR WELL PERMIT**

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

102-441-48  
 (ASSESSOR'S PARCEL NUMBER) 12-015 1A-8621 4680  
 (PARCEL SIZE) (PERMIT #) (ENVISION #) PROGRAM ELEMENT  
 SITE ADDRESS Cornwell rd. Soquel, Ca 95073  
 OWNER Sequel Creek Water ADDRESS 5180 Soquel Dr. Soquel, Ca 95073  
 DRILLING CONTRACTOR Bradley & Sons LICENSE # 414178 PHONE 559-441-1401  
 DIRECTIONS TO SITE Hilltop rd. to Cornwell rd. To end " 994503"

**DESIGN SPECIFICATIONS:**

INTENDED USE DOMESTIC: _____ # Homes Served _____ WATER SYSTEM WELL: Name of Water System _____	DISTANCE FROM WELL SITE TO: SEPTIC SYSTEMS _____ SEWER 300' + NEAREST PROPERTY LINE _____ CASING SINGLE <input checked="" type="checkbox"/> DOUBLE _____	TYPE OF WELL CONSTRUCTION ROTARY <input checked="" type="checkbox"/> CABLE _____ DUG _____ OTHER _____	01/24 CASH REGISTER VALIDATION 00000 #6699 10:37AM E-Beth 0008 \$323.00 \$323.00
IRRIGATION _____ COMMERCIAL/INDUSTRIAL _____ MONITORING: <input checked="" type="checkbox"/> GRDWTR <input checked="" type="checkbox"/> VADOSE _____ OTHER: (SPECIFY) _____	MATERIAL PVC TYPE OF JOINT Thread GRAVEL PACK <input checked="" type="checkbox"/>	ESTIMATED WORK DATES: START 2-6-12 COMPLETION 2-17-12	

WITHIN WATER DISTRICT SERVICE AREA  NO  YES NAME: Sequel Creek Water (FORM HSA-579-REQUIRED)  
 CONSTRUCTION DEPTH (FT.) 525 DIAMETER (IN.) 2" DEPTH OF SEAL (FT.) 460 WIDTH OF SEAL (IN.) 3"

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: 1 TYPES: DOMESTIC \_\_\_\_ IRRIGATION \_\_\_\_ COMMERCIAL USE \_\_\_\_ OTHER Municipal
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE  TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_

**V DESTRUCTION:** DEPTH OF WELL \_\_\_\_\_ DEPTH OF SEAL \_\_\_\_\_ NUMBER OF WATER FORMATIONS PENETRATED \_\_\_\_\_  
 CLEANING OF WELL REQUIRED YES:  NO:  SEALING MATERIAL \_\_\_\_\_

**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

**WORKER'S COMPENSATION CERTIFICATE**

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
 INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER John DRILLING CONTRACTOR Bradley 108102

**FOR OFFICE USE ONLY:**

ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO

METER REQUIRED YES <input type="checkbox"/> NO <input type="checkbox"/> METER INSTALLED _____	DATE _____	READING _____
SITE INSPECTION <u>1/30/12</u>	EHS SPECIALIST <u>(RP)</u>	ANNULAR WELL SEAL WITNESSED: _____
APPLICATION APPROVAL <u>2/1/12</u>	<u>(HJ)</u>	YES DATE _____
PAD INSPECTION _____	_____	NO DEPTH _____
RECEIPT OF WELL LOG _____	_____	SEAL MATERIAL _____
FINAL _____	_____	# SACKS CEMENT/YARD _____

CLIENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT  
 Well Permit Application - PHD-133.WPD (REV. 9/03)

02/11/12

**DUPLICATE**  
Driller's Copy

**STATE OF CALIFORNIA**  
**WELL COMPLETION REPORT**

Page 1 of 1

Owner's Well No. CORNWELL A

Date Work Began 2/15/2012 Ended 2/20/2012

**Local Permit Agency** **ENVIRO HEALTH, SANTA CRUZ**  
**Permit No.** 12-013      **Permit Date** 2/2/2012

DWR USE ONLY -- DO NOT FILL IN									
STATE WELL NO./STATION NO.									
LATITUDE					LONGITUDE				
APARTS/OTHER									

## **GEOLOGIC LOG**

GEOLOGIC LOG				WELL OWNER	
ORIENTATION (✓)		✓ VERTICAL — HORIZONTAL — ANGLE (SPECIFY)		Name <b>SOQUEL CREEK WATER</b>	
DEPTH FROM SURFACE		DRILLING METHOD <b>ROTARY</b>		Mailing Address <b>5180 SOQUEL DRIVE</b> <b>SOQUEL</b>	
Ft. to Ft.		DESCRIPTION Describe material, grain, size, color, etc.		CA <b>95073</b>	
0	20	TOPSOIL, MEDIUM/FINE/COARSE SAND GRAVEL CLAY		CITY <b>CORNWELL ROAD</b>	
20	40	MEDIUM/FINE/COARSE SANDS		City <b>SOQUEL CA 95073</b>	
40	80	MEDIUM/FINE/COARSE SANDS, SHALE WITH SOME CLAY		County <b>SANTA CRUZ</b>	
80	100	MEDIUM/FINE/COARSE SANDS, CLAY WITH SOME SHALE		APN Book 102 Page 441 Parcel 48	
100	120	MEDIUM/FINE/COARSE SANDS/ BLACK FINE SAND, CLAY		Township _____ Range _____ Section _____	
120	140	FINE BLACK SAND		Latitude _____ DEG. MIN. SEC.	
140	160	FINE BLACK SAND WITH SOME CLAY		DEG. MIN. SEC.	
				LOCATION SKETCH	
				ACTIVITY (✓) ✓ NEW WELL	
				MODIFICATION/REPAIR — Deepen — Other (Specify)	
				DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")	
				PLANNED USES (✓) WATER SUPPLY — Domestic _____ Public _____ — Irrigation _____ Industrial _____	
				MONITORING TEST WELL	
				CATHODIC PROTECTION	
				HEAT EXCHANGE DIRECT PUSH INJECTION	
				VAPOR EXTRACTION SPARGING	
				REMEDIATION	
				OTHER (SPECIFY)	
				WEST	
				EAST	
				SOUTH	
Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.					
WATER LEVEL & YIELD OF COMPLETED WELL					
DEPTH TO FIRST WATER _____ (FT.) BELOW SURFACE					
DEPTH OF STATIC					
WATER LEVEL _____ (FT.) & DATE MEASURED					
ESTIMATED YIELD * _____ (GPM) & TEST TYPE <b>AIR LIFT</b>					
TEST LENGTH <b>4</b> (Hrs.) TOTAL DRAWDOWN _____ (FT.)					
<i>May not be representative of a well's long-term yield</i>					
TOTAL DEPTH OF BORING <b>160</b> (Feet)					
TOTAL DEPTH OF COMPLETED WELL <b>150</b> (Feet)					

**ATTACHMENTS (✓)**

- Geologic Log
  - Well Construction Diagram
  - Geophysical Log(s)
  - Soil/Water Chemical Analysis
  - Other

**CERTIFICATION STATEMENT**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME BRADLEY & SONS

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

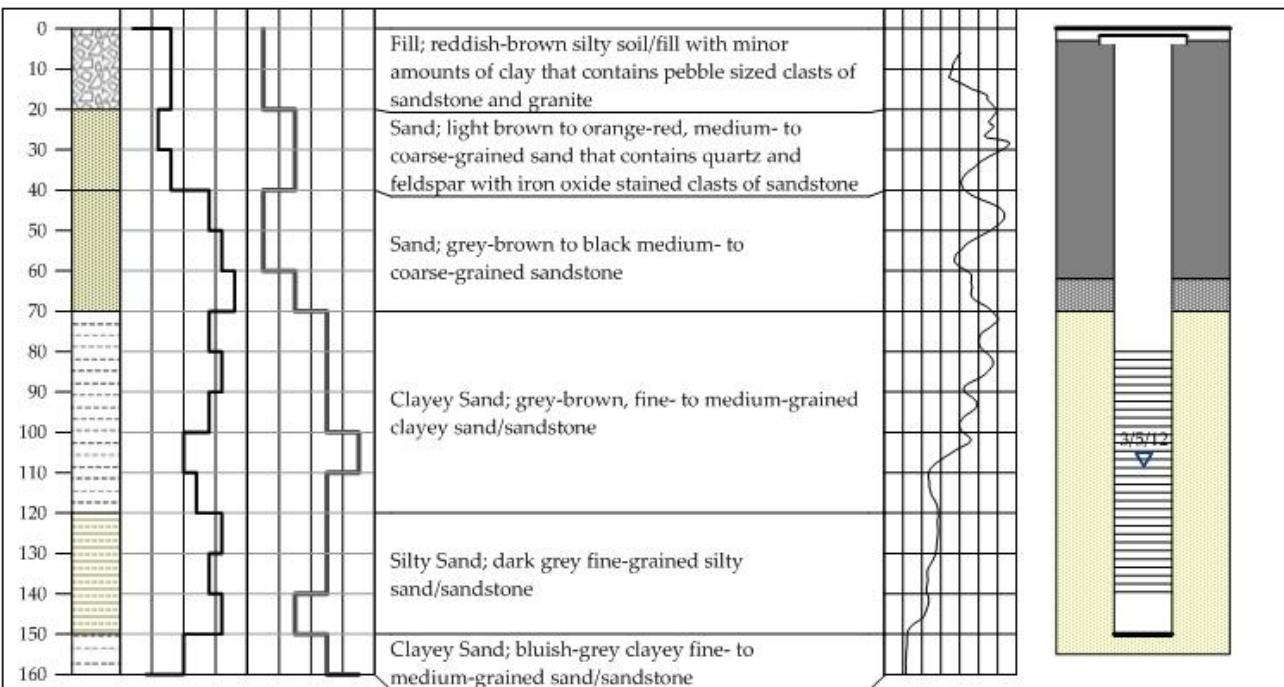
DEI BEY CA 93616

**CA** 95816  
**STATE** **ZIP**

**ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.**

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Depth (feet)	Lithology	% Sand Concentration	Grain Size Distribution	Lithologic Description	16 in. Normal (ohmmeter <sup>1/m</sup> ) 10x	Well Construction									
					0	25	50	75	100	Coarse	Medium	Fine	V. Fine	0	25



Note: Lithology, % Sand Concentration, Grain Size Distribution, Lithologic Description, and Geophysical Log are from SC-21 AAA (Deep)

Logged By: Nick Byler/Martin Feeney Easting (X): 6134859.5 Northing (Y): 1827107.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 218.43 NAVD29, feet Location: Cornwell Tank Site Drilling Dates: 2/15/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 155	<b>Fill Materials</b> 0 - 62 Neat Cement 62 - 70 Bentonite 70 - 155 Cemex 8 x 16	Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material
		0 - 1	8.75	4	Sch. 80 PVC Blank
		1 - 80	8.75	2	Sch. 80 PVC Blank
		80 - 140	8.75	2	Sch. 80 PVC 0.040" Screen
		140 - 150	8.75	2	Sch. 80 PVC Blank

Static Water Level

## **SC-A2 A, B and C**

Well Destruction Permits  
Well Drillers Logs

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

\_\_\_\_\_  
 (ASSESSOR'S PARCEL NUMBER) (PARCEL SIZE) (PERMIT #) (ENVISION #) (PROGRAM ELEMENT)  
 SITE ADDRESS in front of 2320 Summer Ave Aptos, Ca. 95003 (054-251-73)  
 OWNER County of Santa Cruz ADDRESS 701 Ocean St. Room 410 Santa Cruz Ca. 95060  
 DRILLING CONTRACTOR Bradley & Sons LICENSE # 414178 PHONE 559-441-1401  
 DIRECTIONS TO SITE dead end of Summers Ave

DESIGN SPECIFICATIONS:

INTENDED USE DOMESTIC: _____ #Homes Served _____ WATER SYSTEM WELL: _____ Name of Water System _____	DISTANCE FROM WELL SITE TO: SEPTIC SYSTEMS _____ SEWER _____ NEAREST PROPERTY LINE _____ CASING SINGLE _____ DOUBLE _____ MATERIAL _____	TYPE OF WELL CONSTRUCTION ROTARY _____ CABLE _____ DUG _____ OTHER _____	PE # 4681 CASH REGISTER VALIDATION #6701 10:40AM E-Bath 0008 \$115.00 CHECK 1 -\$1 15 = 00
IRRIGATION _____ COMMERCIAL/INDUSTRIAL _____ MONITORING: _____ GRDWTR VADOSE _____ OTHER: _____ (SPECIFY)	TYPE OF JOINT _____ GRAVEL PACK _____	ESTIMATED WORK DATES: START <u>2-6-12</u> COMPLETION <u>2-10-12</u>	

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)  
**CONSTRUCTION** DEPTH (FT.) DIAMETER (IN.) DEPTH OF SEAL (FT.) WIDTH OF SEAL (IN.)

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
 TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_

**L DESTRUCTION:** DEPTH OF WELL 480 DEPTH OF SEAL: 480 NUMBER OF WATER FORMATIONS PENETRATED 1  
 CLEANING OF WELL REQUIRED YES  NO  SEALING MATERIAL Portland Cement

PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER \_\_\_\_\_

DRILLING CONTRACTOR Bradley 1-23-12

FOR OFFICE USE ONLY:

ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO

METER REQUIRED YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	METER INSTALLED _____	DATE _____	READING _____
SITE INSPECTION <u>1/26/12</u>	EHS SPECIALIST <u>(HP)</u>	ANNULAR WELL SEAL WITNESSED:	
APPLICATION APPROVAL <u>2/1/12</u>	<u>(HP)</u>	YES	DATE _____
PAD INSPECTION _____	_____	NO	DEPTH _____
RECEIPT OF WELL LOG _____	_____	SEAL MATERIAL _____	_____
FINAL _____	_____	# SACKS CEMENT/YARD _____	_____

COMMENTS: monitoring well destruction

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

2/1/12

**APPLICATION FOR WELL PERMIT**

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

*Summer Ave Right-of-way* 12-018 SR# 8618 4681  
 (ASSESSOR'S PARCEL NUMBER) (PARCEL SIZE) (PERMIT #) (ENVISION #) PROGRAM ELEMENT  
 SITE ADDRESS *in front of 2320 Summer Ave. Aptos Ca. 95003 (054-25173)*  
 OWNER *County of Santa Cruz* ADDRESS *701 Ocean St. Room 410 Santa Cruz Ca. 95060*  
 DRILLING CONTRACTOR *Bradley & Sons* LICENSE # *414178* PHONE *539-441-1401*  
 DIRECTIONS TO SITE *dead end of Summers Ave*

**DESIGN SPECIFICATIONS:**

INTENDED USE	DISTANCE FROM WELL SITE TO:	TYPE OF WELL CONSTRUCTION	01/24/2012	CASH REGISTER VALIDATION
DOMESTIC: _____	SEPTIC SYSTEMS _____	ROTARY _____	10:40AM	E-Beth 0008
# Homes Served _____	SEWER _____	CABLE _____	PE # 4681	\$115.00
WATER SYSTEM WELL: _____	NEAREST PROPERTY LINE _____	DUG _____	CHECK 1	\$115.00
Name of Water System _____	CASING _____	OTHER _____		
IRRIGATION _____	SINGLE _____ DOUBLE _____			
COMMERCIAL/INDUSTRIAL _____	MATERIAL _____			
MONITORING: _____	TYPE OF JOINT _____			
GRDWTR VADOSE _____	GRAVEL PACK _____			
OTHER: _____ (SPECIFY) _____		ESTIMATED WORK DATES: START _____ COMPLETION _____		

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-578-REQUIRED)  
**CONSTRUCTION** DEPTH (FT.) \_\_\_\_\_ DIAMETER (IN.) \_\_\_\_\_ DEPTH OF SEAL (FT.) \_\_\_\_\_ WIDTH OF SEAL (IN.) \_\_\_\_\_

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
 \_\_\_\_\_ TO SUPPLEMENT NEW WELL \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_ OTHER \_\_\_\_\_

**DESTRUCTION:** DEPTH OF WELL *440* DEPTH OF SEAL: *440* NUMBER OF WATER FORMATIONS PENETRATED *1*  
 CLEANING OF WELL REQUIRED YES:  NO:  SEALING MATERIAL *Neat Cement*

**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

**WORKER'S COMPENSATION CERTIFICATE**

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER: \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER *Bradley* DRILLING CONTRACTOR *Bradley* 10/29/12

**FOR OFFICE USE ONLY:**

ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO

METER REQUIRED YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	METER INSTALLED _____	DATE _____	READING _____
SITE INSPECTION	DATE <i>1/26/12</i>	EHS SPECIALIST <i>(Signature)</i>	ANNULAR WELL SEAL WITNESSED: _____
APPLICATION APPROVAL	DATE <i>2/1/12</i>	EHS SPECIALIST <i>(Signature)</i>	YES DATE _____
PAD INSPECTION	_____	_____	NO DEPTH _____
RECEIPT OF WELL LOG	_____	_____	SEAL MATERIAL _____
FINAL	_____	_____	# SACKS CEMENT/YARD _____

MENTS: *monitoring well destruction*

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

*CD 2/1/12*

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

Inner Ave. Right-of-way (ASSESSOR'S PARCEL NUMBER) 12-016 50086014 (PARCEL SIZE) 4681 (PERMIT #) (ENVISION #) PROGRAM ELEMENT  
 SITE ADDRESS in front of 2302 Summer Ave Aptos Ca 95003 (054-251-73)  
 OWNER County of Santa Cruz ADDRESS 701 Ocean St Room 410 Santa Cruz  
 DRILLING CONTRACTOR Brodley & Sons LICENSE # 414178 PHONE 559-441-1401  
 DIRECTIONS TO SITE

DESIGN SPECIFICATIONS:

INTENDED USE DOMESTIC: _____ #Homes Served _____ WATER SYSTEM WELL: _____ Name of Water System _____  IRRIGATION _____ COMMERCIAL/INDUSTRIAL _____ MONITORING: _____ GRDWTR VADOSE _____ OTHER: _____ (SPECIFY)	DISTANCE FROM WELL SITE TO: SEPTIC SYSTEMS _____ SEWER _____ NEAREST PROPERTY LINE _____ CASING _____ SINGLE _____ DOUBLE _____ MATERIAL _____ TYPE OF JOINT _____ GRAVEL PACK _____	TYPE OF WELL CONSTRUCTION: ROTARY _____ CABLE _____ DUG _____ OTHER _____	ESTIMATED WORK DATES: START _____ COMPLETION _____
---	--	---	--

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)  
**CONSTRUCTION** DEPTH (FT.) \_\_\_\_\_ DIAMETER (IN.) \_\_\_\_\_ DEPTH OF SEAL (FT.) \_\_\_\_\_ WIDTH OF SEAL (IN.) \_\_\_\_\_

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
 \_\_\_\_ TO SUPPLEMENT NEW WELL \_\_\_\_ TO BE DESTROYED \_\_\_\_ OTHER \_\_\_\_\_

**DESTRUCTION:** DEPTH OF WELL 160 DEPTH OF SEAL: 160 NUMBER OF WATER FORMATIONS PENETRATED 1  
 CLEANING OF WELL REQUIRED YES: NO SEALING MATERIAL Neat Cement

PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
 INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR Brodley & Sons 1/23/12

FOR OFFICE USE ONLY:

ENVIRONMENTAL ASSESSMENT REQUIRED YES NO

METER REQUIRED YES <u>NO</u>	METER INSTALLED _____	DATE _____	READING _____
SITE INSPECTION	DATE <u>1/26/12</u>	EHS SPECIALIST <u>(HP)</u>	ANNULAR WELL SEAL WITNESSED: _____
APPLICATION APPROVAL	DATE <u>2/1/12</u>	EHS SPECIALIST <u>(HP)</u>	YES DATE _____
PAD INSPECTION	_____	_____	NO DEPTH _____
RECEIPT OF WELL LOG	_____	_____	SEAL MATERIAL _____
FINAL	_____	_____	# SACKS CEMENT/YARD _____

COMMENTS: Monitoring well destruction

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

2/1/12



**DUPLICATE**  
Driller's Copy

**STATE OF CALIFORNIA**  
**WELL COMPLETION REPORT**

Page 1 of 1

Owner's Well No. DESTROY

Date Work Began 3/3/2012      Ended 3/5/2012

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ

Permit No. 12-018 Permit Date 2/2/2012

DWR USE ONLY ~~ DO NOT FILL IN			
STATE WELL NO./STATION NO.			
LATITUDE		LONGITUDE	
APN/TRS/OTHER			

**GEOLOGIC LOG**

ORIENTATION ( / )       VERTICAL       HORIZONTAL       UPRIGHT       SPECIMEN Name SOQUEL

## **GEOLOGIC LOG**

ORIENTATION (✓)		✓ VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)	WELL OWNER					
DEPTH FROM SURFACE		DRILLING METHOD	FLUID			Name SOQUEL CREEK WATER					
Ft.	to	Ft.	DESCRIPTION Describe material, grain, size, color, etc.			Mailing Address 5180 SOQUEL DRIVE SOQUEL					
0		440	WELL DESTRUCTION			CA	95073				
						STATE	ZIP				
						WELL LOCATION					
Address 2320 SUMNER AVE.											
City APTOS CA 95003											
County SANTA CRUZ											
APN Book 054 Page 251 Parcel 73											
Township _____ Range _____ Section _____											
Latitude _____						DEG.	MIN.	SEC.	DEG.	MIN.	SEC.
						LOCATION SKETCH		ACTIVITY (✓)			
						NORTH		NEW WELL			
								MODIFICATION/REPAIR			
								Deepen			
								Other (Specify)			
								✓ DESTROY (Describe Procedures and Material Under "GEOLOGIC LOG")			
								PLANNED USES (✓)			
								WATER SUPPLY			
								Domestic	Public		
								Irrigation	Industry		
								MONITORING			
								TEST WELL			
								CATHODIC PROTECTION			
								HEAT EXCHANGE			
								DIRECT PUSH			
								INJECTION			
								VAPOR EXTRACTION			
								SPARGING			
								REMEDIATION			
								OTHER (SPECIFY)			
						WEST		SOUTH			
								Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.			
						EAST					
WATER LEVEL & YIELD OF COMPLETED WELL											
DEPTH TO FIRST WATER						(Ft.) BELOW SURFACE					
DEPTH OF STATIC											
WATER LEVEL						(Ft.) & DATE MEASURED					
ESTIMATED YIELD * (GPM)						& TEST TYPE					
TEST LENGTH (Hrs.)						TOTAL DRAWDOWN (Ft.)					
May not be representative of a well's long-term yield.											
TOTAL DEPTH OF BORING (Feet)											
TOTAL DEPTH OF COMPLETED WELL 440 (Feet)											

**ATTACHMENTS (✓)**

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other \_\_\_\_\_

<b>CERTIFICATION STATEMENT</b>				
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.				
<b>NAME</b> <u>BRADLEY &amp; SONS</u> (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)				
<b>ADDRESS</b> <u>3625 S. HIGHLAND</u>		<b>DEL REY</b>	<b>CA</b>	<b>93616</b>
		<b>CITY</b>	<b>STATE</b>	<b>ZIP</b>
<b>Signed</b>	<u>D. Bradley</u>		<b>04/03/12</b>	<b>414178</b>
<b>WELL DRILLER/AUTHORIZED REPRESENTATIVE</b>			<b>DATE SIGNED</b>	<b>C-57 LICENSE NUMBER</b>

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

*Monitoring Well Destruction, Replacement, and New Installations*  
October 2, 2012 A-28



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## **SC-A2RA (Deep)**

Well Permits  
Well Drillers Log  
Lithologic Logs  
Welenco Geophysical Log  
Detailed Lithologic Description  
Photographs of Borehole Cuttings

**APPLICATION FOR WELL PERMIT**

NEW    REPLACEMENT    SUPPLEMENTAL    DESTRUCTION    OTHER \_\_\_\_\_  MONITORING WELL

Summer Ave Right-of-Way (ASSESSOR'S PARCEL NUMBER) 12-044 (PARCEL SIZE) 8x42 (PERMIT #) 41a80 (ENVISION #) 41a80  
 SITE ADDRESS In front of 2320 Summer Ave Aptos Ca. 95003  
 OWNER County of Santa Cruz ADDRESS 701 Ocean St. room 410 Santa Cruz Ca 95060  
 DRILLING CONTRACTOR Bradley B Sons LICENSE # 4141178 PHONE 559-444-1401  
 DIRECTIONS TO SITE S.E. dead end of Summer Ave

**DESIGN SPECIFICATIONS:**

Bradley B Sons 3625 S. Highland Del Rey Ca. 93616 CASH REGISTER VALIDATION

INTENDED USE	DISTANCE FROM WELL SITE TO:	TYPE OF WELL CONSTRUCTION	0000000
DOMESTIC:	SEPTIC SYSTEMS	ROTARY X	19082 9:38AM E-Beth 0008
#Homes Served	SEWER	CABLE	PE # 4680 \$323.00
WATER SYSTEM WELL:	NEAREST PROPERTY LINE	DUG	CHECK1 \$323.00
Name of Water System	CASING	OTHER	
IRRIGATION	SINGLE X DOUBLE		
COMMERCIAL/INDUSTRIAL	MATERIAL PVC		
MONITORING:	TYPE OF JOINT Thread		
GRDWTR	GRAVEL PACK X		

ESTIMATED WORK DATES: START 2/20 COMPLETION 3/2

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: Soquel Creek Water (FORM HSA-579-REQUIRED)  
**CONSTRUCTION** DEPTH (FT.) 475 DIAMETER (IN.) 2" DEPTH OF SEAL (FT.) 460 WIDTH OF SEAL (IN.) 3"

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: 0 TYPES: DOMESTIC IRRIGATION COMMERCIAL USE OTHER
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE TO BE DESTROYED
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
TO SUPPLEMENT NEW WELL TO BE DESTROYED OTHER destroyed

**DESTRUCTION:** DEPTH OF WELL DEPTH OF SEAL NUMBER OF WATER FORMATIONS PENETRATED  
CLEANING OF WELL REQUIRED YES: NO: SEALING MATERIAL

**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

**WORKER'S COMPENSATION CERTIFICATE**

X A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR *Bradley 2/8/12*

**FOR OFFICE USE ONLY:**

ENVIRONMENTAL ASSESSMENT REQUIRED YES NO \_\_\_\_\_

METER REQUIRED YES NO	METER INSTALLED	DATE	READING
SITE INSPECTION	DATE 2/7/12	EHS SPECIALIST <i>(HR)</i>	ANNULAR WELL SEAL WITNESSED: _____
APPLICATION APPROVAL	DATE 2/9/12	<i>(HR)</i>	YES DATE _____
PAD INSPECTION			NO DEPTH _____
RECEIPT OF WELL LOG			SEAL MATERIAL _____
FINAL			# SACKS CEMENT/YARD _____

MENTS: Encroachment permit #12-028

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

DUPLICATE  
Driller's Copy

Page 1 of 1

Owner's Well No. SC-A2RA

Date Work Began 2/20/2012, Ended 2/27/2012

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ

Permit No. 12-044

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet

No. **EO147062**

Permit Date 2/9/2012

DWR	USE ONLY	— DO NOT FILL IN —
STATE WELL NO./STATION NO.		
LATITUDE	LONGITUDE	
APN/TRS/OTHER		

GEOLOGIC LOG		WELL OWNER	
ORIENTATION (✓)	✓ VERTICAL    HORIZONTAL    ANGLE (SPECIFY)	Name <b>SOQUEL CREEK WATER</b>	
DEPTH FROM SURFACE	DRILLING METHOD <b>ROTARY</b> FLUID <b>WATER</b>	Mailing Address <b>5180 SOQUEL DRIVE SOQUEL</b> CITY <b>CA 95073</b>	
Ft. to Ft.	DESCRIPTION Describe material, grain, size, color, etc.	WELL LOCATION Address <b>2320 IN FRONT OF SUMNER AVE</b> City <b>APTOS CA 95003</b> County <b>SANTA CRUZ</b>	
0    20	<b>TOPSOIL, CANDY CLAY</b>	APN Book _____ Page _____ Parcel _____	
20    40	<b>SANDY CLAY, WITH SOME SMALL/MEDIUM GRAVEL AND SAND</b>	Township _____ Range _____ Section _____	Latitude DEG. MIN. SEC. DEG. MIN. SEC.
40    80	<b>MEDIUM/FINE/COARSE SAND AND GRAVEL</b>	<b>LOCATION SKETCH</b>	
80    120	<b>MEDIUM/FINE/COARSE SANDS, WITH SOME GRAVEL, SILTY CLAY</b>	NORTH ✓ NEW WELL	
120    140	<b>MEDIUM/FINE/COARSE SANDS, SILTY CLAY</b>	MODIFICATION/REPAIR — Deepen — Other (Specify)	
140    180	<b>MEDIUM/FINE/COARSE SANDS, SANDY CLAY</b>	DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")	
180    220	<b>FINE SAND</b>	PLANNED USES (✓) WATER SUPPLY — Domestic    Public — Irrigation    Industrial	
220    240	<b>MEDIUM/FINE/COARSE SANDS, SANDY CLAY</b>	MONITORING ✓ TEST WELL — CATHODIC PROTECTION — HEAT EXCHANGE — DIRECT PUSH — INJECTION — VAPOR EXTRACTION — SPARGING — REMEDIATION —	
240    260	<b>SANDY CLAY, WITH SOME MEDIUM/FINE SANDS</b>	OTHER (SPECIFY)	
260    280	<b>MEDIUM/FINE SANDS, SANDY CLAY</b>		
280    300	<b>MEDIUM/FINE/CORARSE SANDS, SOME GRAVEL, SANDY CLAY</b>		
300    320	<b>MEDIUM/FINECOARSE SANDS, BLACK CLAY, BLUE/GREEN CLAY</b>		
320    340	<b>BLUE/GREEN CLAY, WHITE CLAY, MEDIUM/FINE SANDS</b>		
340    360	<b>BLUE CLAY, BROWN SAND, CLAY</b>		
360    380	<b>MEDIUM/FINE SANDS, SANDY CLAY</b>		
380    400	<b>MEDIUM/FINE SANDS, SANDY CLAY</b>		
400    420	<b>MEDIUM/FINE/COARSE SANDS WITH SOME SANDY CLAY</b>		
420    440	<b>MEDIUM/FINE/COARSE SANDS WITH SOME SMALL GRAVEL</b>		
440    460	<b>MEDIUM/FINE/COARSE SANDS</b>		
460    480	<b>MEDIUM/FINE/COARSE SANDS WITH SOME SANDY CLAY</b>		
480    500	<b>MEDIUM/FINE/COARSE SANDS</b>		
TOTAL DEPTH OF BORING <b>500</b> (Feet)		SOUTH Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc., and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.	
TOTAL DEPTH OF COMPLETED WELL <b>490</b> (Feet)		WEST EAST	
		WATER LEVEL & YIELD OF COMPLETED WELL	
		DEPTH TO FIRST WATER _____ (FT) BELOW SURFACE	
		DEPTH OF STATIC WATER LEVEL _____ (FT) & DATE MEASURED _____	
		ESTIMATED YIELD * _____ (GPM) & TEST TYPE <b>AIR LIFT</b>	
		TEST LENGTH <b>4</b> (Hrs.) TOTAL DRAWDOWN _____ (FT)	
		May not be representative of a well's long-term yield.	

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)					DEPTH FROM SURFACE	ANNULAR MATERIAL				DEPTH FROM SURFACE	ANNULAR MATERIAL			
		TYPE (✓)	SCREEN	CON-	DUCTOR	FILL/P-PE		MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)		CEMENT (✓)	BENTONITE (✓)	FILL (✓)	TYPE
Ft. to Ft.																
0    460	<b>8 3/4"</b>	✓						PVC	2"	SCH 80		0	450	✓		
460    480	<b>8 3/4"</b>		✓					PVC	2"	SCH 80	.030	450	455		✓	
480    490	<b>8 3/4"</b>	✓						PVC	2"	SCH 80						

ATTACHMENTS (✓)

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME **BRADLEY & SONS**

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

3625 S. HIGHLAND

ADDRESS

Signed *D. Bodie* WELL DRILLER/AUTHORIZED REPRESENTATIVE

**DEL REY**

**CA 93616**

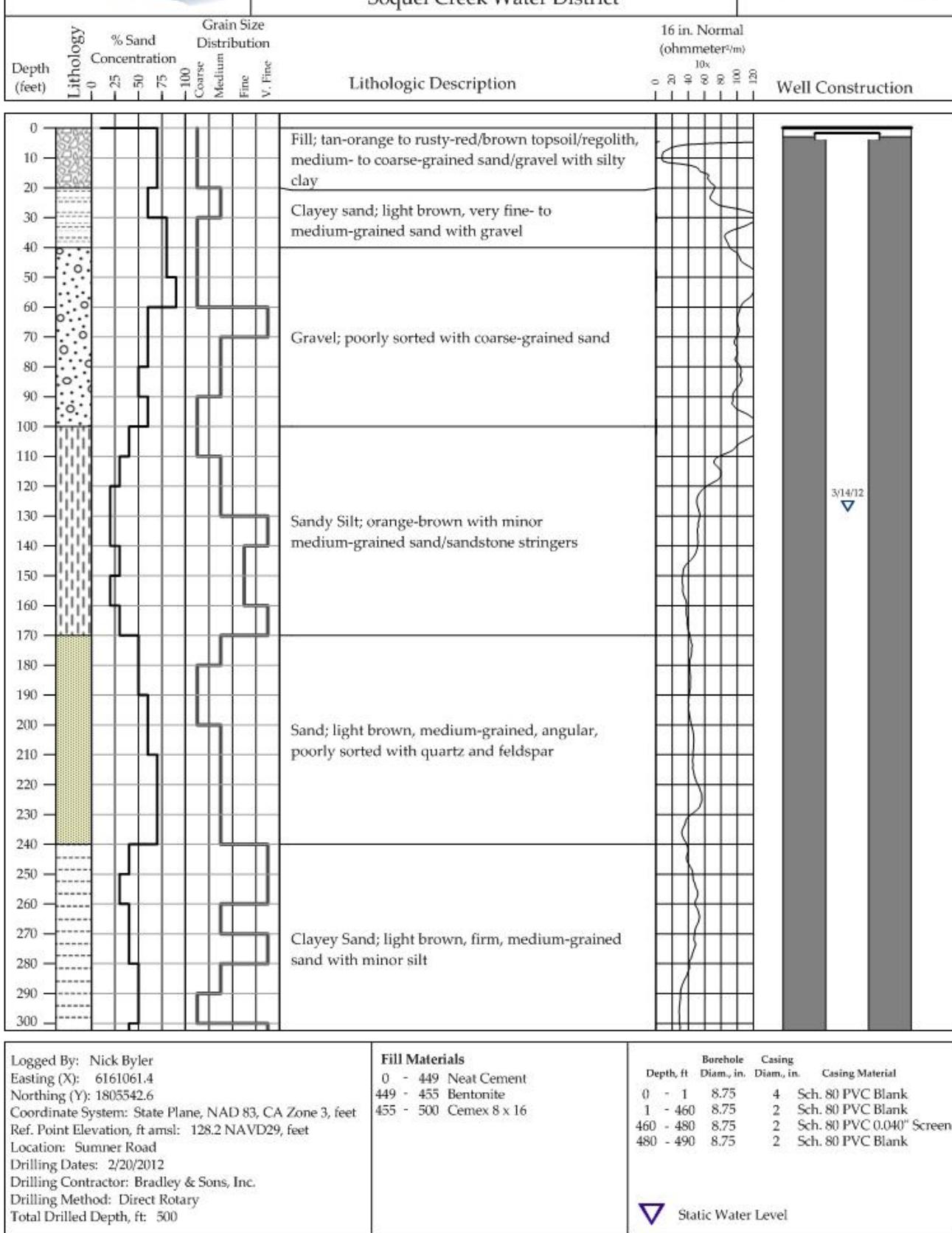
CITY STATE ZIP

03/30/12 DATE SIGNED

414178 C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM



Logged By: Nick Byler

Easting (X): 6161061.4

Northing (Y): 1805542.6

Coordinate System: State Plane, NAD 83, CA Zone 3, feet

Ref. Point Elevation, ft amsl: 128.2 NAVD29, feet

Location: Sumner Road

Drilling Dates: 2/20/2012

Drilling Contractor: Bradley & Sons, Inc.

Drilling Method: Direct Rotary

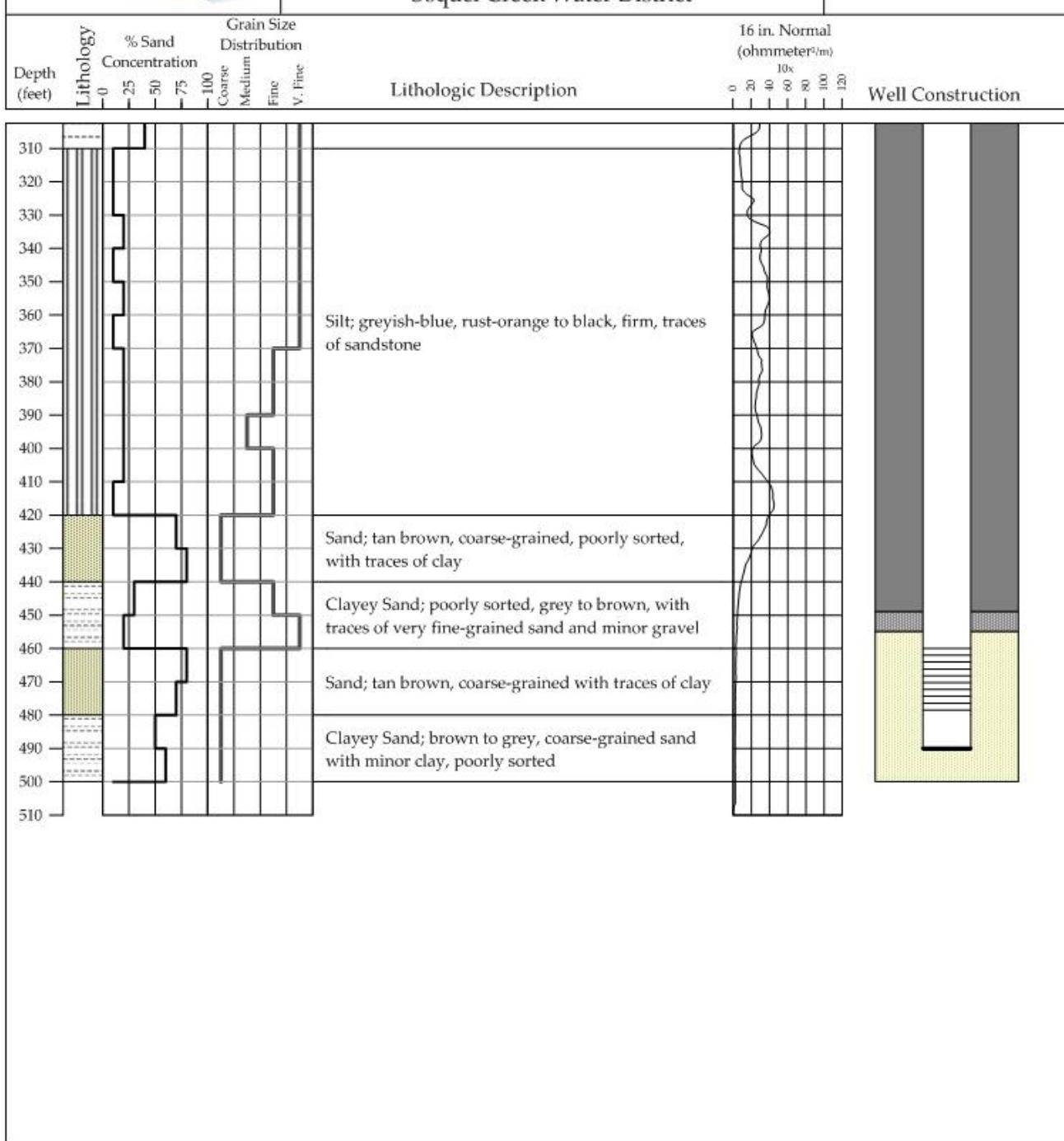
Total Drilled Depth, ft: 500

#### Fill Materials

0 - 449 Neat Cement  
449 - 455 Bentonite  
455 - 500 Cemex 8 x 16

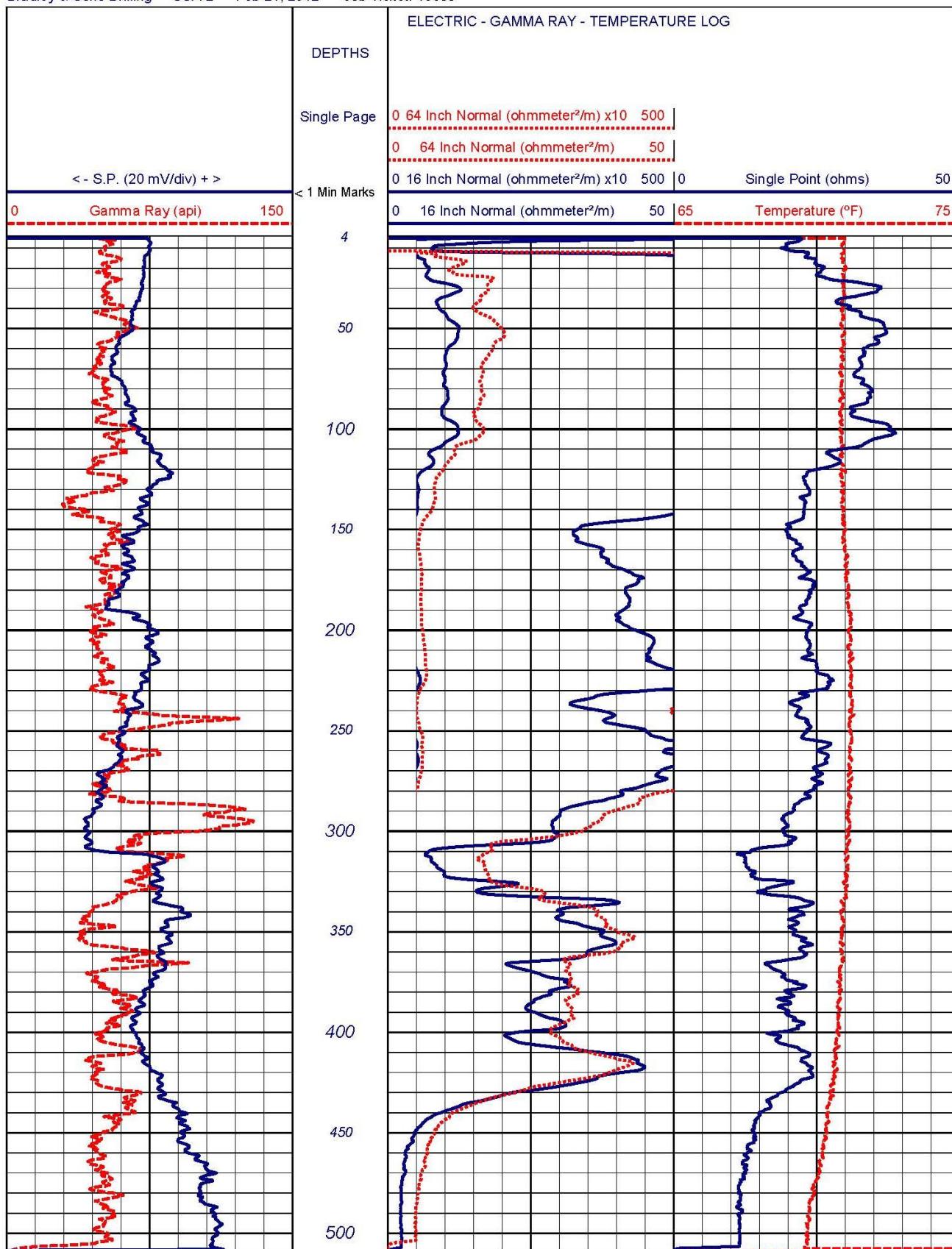
Depth, ft	Borehole Diam., in.	Casing Diam., in.	Casing Material
0 - 1	8.75	4	Sch. 80 PVC Blank
1 - 460	8.75	2	Sch. 80 PVC Blank
460 - 480	8.75	2	Sch. 80 PVC 0.040" Screen
480 - 490	8.75	2	Sch. 80 PVC Blank

Static Water Level



Logged By: Nick Byler Easting (X): 6161061.4 Northing (Y): 1805542.6 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 128.2 NAVD29, feet Location: Sumner Road Drilling Dates: 2/20/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 500	<b>Fill Materials</b> 0 - 449 Neat Cement 449 - 455 Bentonite 455 - 500 Cemex 8 x 16	<b>Borehole</b> Depth, ft      Diam., in.      Diam., in.      Casing Material
		0 - 1      8.75      4      Sch. 80 PVC Blank
		1 - 460      8.75      2      Sch. 80 PVC Blank
		460 - 480      8.75      2      Sch. 80 PVC 0.040" Screen
		480 - 490      8.75      2      Sch. 80 PVC Blank

Static Water Level



**welenco**  
CA. Contractor's License: 722373

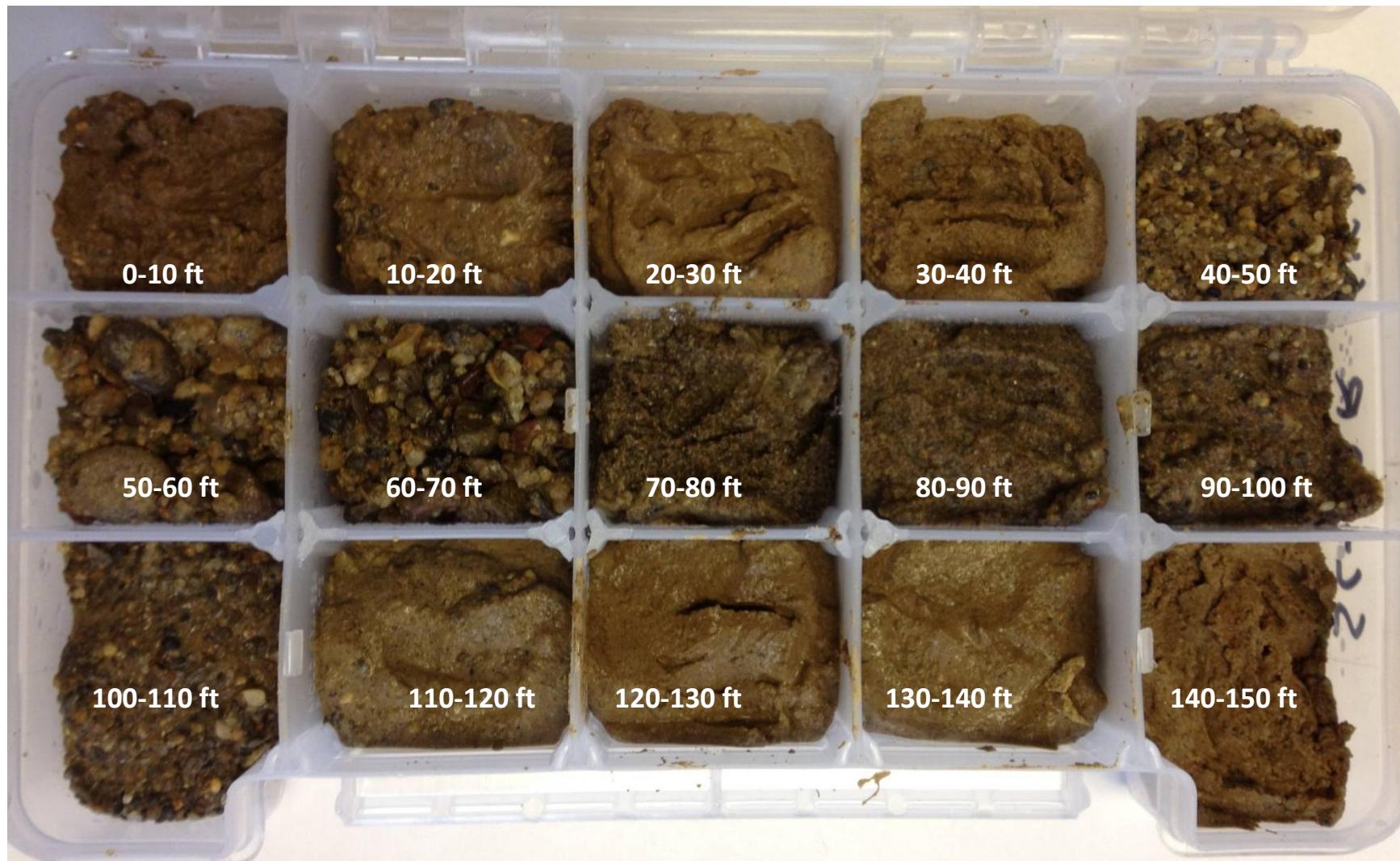
Phone: (800) 445-9914 Fax: (661) 834-2550 Email: [welenco@welenco.com](mailto:welenco@welenco.com) Web: [www.welenco.com](http://www.welenco.com)  
(Prepared with Log Print, a professional software application developed by welenco, Inc.)

## SC-A2RA

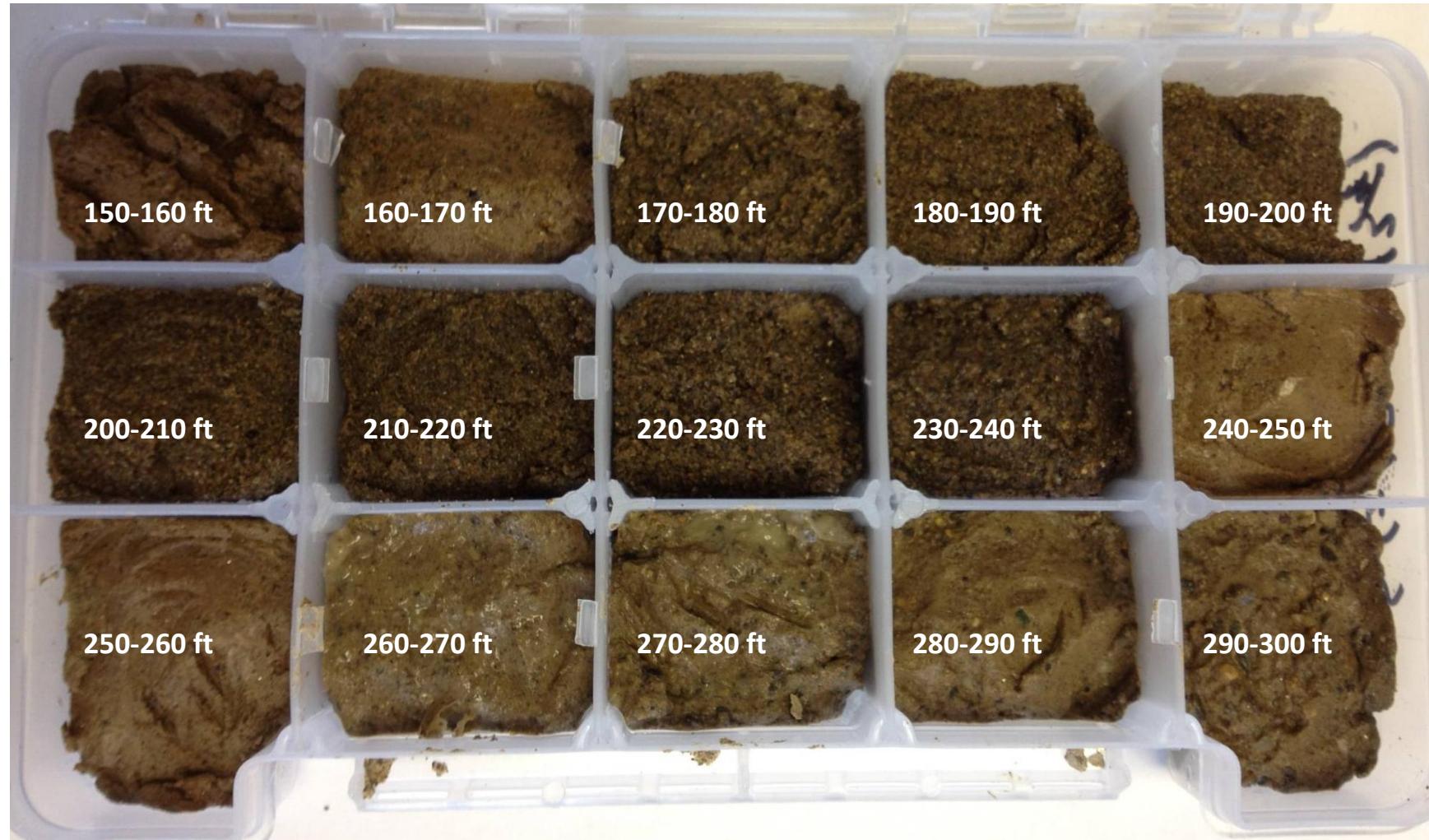
### Detailed Lithologic Description

<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
0	10	Fill; rusty red brown topsoil, medium- to coarse-grained sand mixed with clay
10	20	Fill; tan orange brown regolith , coarse grained sand/gravel with silty clay
20	30	Silty Clay; light brown with minor fine- to medium-grained sand
30	40	Sandy Clay; very fine-grained sand with gravel
40	50	Sand; coarse-grained with minor clay
50	60	Gravel; with coarse-grained sand
60	70	Gravel; poorly sorted with coarse-grained sand
70	80	Silty Sand; brown, very fine-grained
80	90	Sand; brown, medium- to coarse-grained with minor clay
90	100	Sand; fine- to coarse-grained, poorly sorted
100	110	Sand; coarse-grained, poorly sorted
110	120	Silty Clay; brown, minor medium-grained sand
120	130	Silty Clay; minor medium-grained sand/sandstone stringers
130	140	Silty Clay; orange brown
140	150	Silty Clay; contains fine-grained sands
150	160	Silty Clay; with minor very fine-grained sand
160	170	Silty Sand; contains pebbles of chert
170	180	Sand; brown, fine- to medium-grained
180	190	Silty Sand; very fine- to fine-grained
190	200	Silty Sand; brown, fine-grained beach deposits
200	210	Sand; brown, medium-grained with minor silt
210	220	Sand; brown, medium-grained, angular
220	230	Sand; brown, fine- to medium-grained with quartz and feldspar
230	240	Sand; brown, medium-grained, angular, poorly sorted
240	250	Sandy Clay; light brown, firm
250	260	Silty Clay; light brown, firm
260	270	Sandy Clay; light brown, medium-grained sand
270	280	Sandy Clay; light brown, firm
280	290	Clayey Sand; brown medium-grained sand with minor silt
290	300	Clayey Sand; brown medium- to coarse-grained sand, poorly sorted
300	310	Silty Sand; very fine-grained, dark brown with sandstone stringers
310	320	Clay; grayish-blue and rust orange to black, firm
320	330	Clay; rust-orange to blue-grey, firm
330	340	Clay; dark brown to black, firm with traces of sandstone
340	350	Silty Clay; light brown, firm, with traces of sandstone

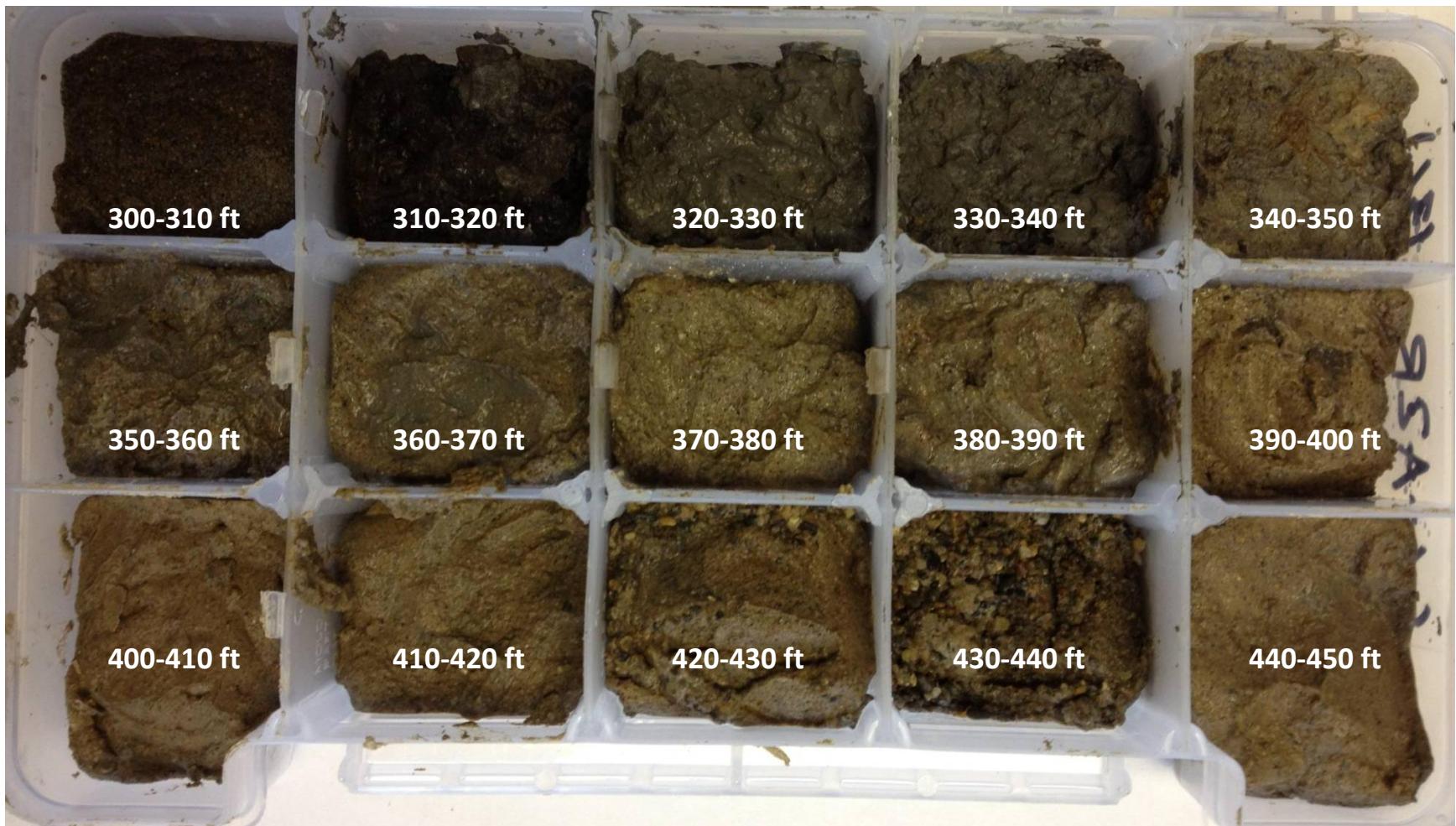
<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
350	360	Sandy Clay; fine-grained, light brown to grey, firm
360	370	Silty Clay; light grey with traces of sand
370	380	Sandy Clay; light brown to grey, firm, fine-grained sand
380	390	Sandy Clay; brown to light grey, fine-grained sand
390	400	Clayey Sand; light brown, fine- to medium-grained sand
400	410	Clay; brown to grey, soft, fine-grained sand
410	420	Clay; brown to grey, soft, fine-grained sand with traces of silt
420	430	Sand; tan brown, coarse-grained, with minor clay
430	440	Sand; coarse-grained, poorly sorted, with traces of clay
440	450	Silty Clay; poorly sorted, brown, with minor gravel
450	460	Clay; grey to brown with traces of very fine-grained sand
460	470	Sand; tan brown, coarse-grained, with traces of clay
470	480	Sand; tan brown, coarse-grained with minor clay
480	490	Clayey Sand; brown to grey, coarse-grained sand with minor clay
490	500	Silty Sand; tan brown, coarse-grained, poorly sorted



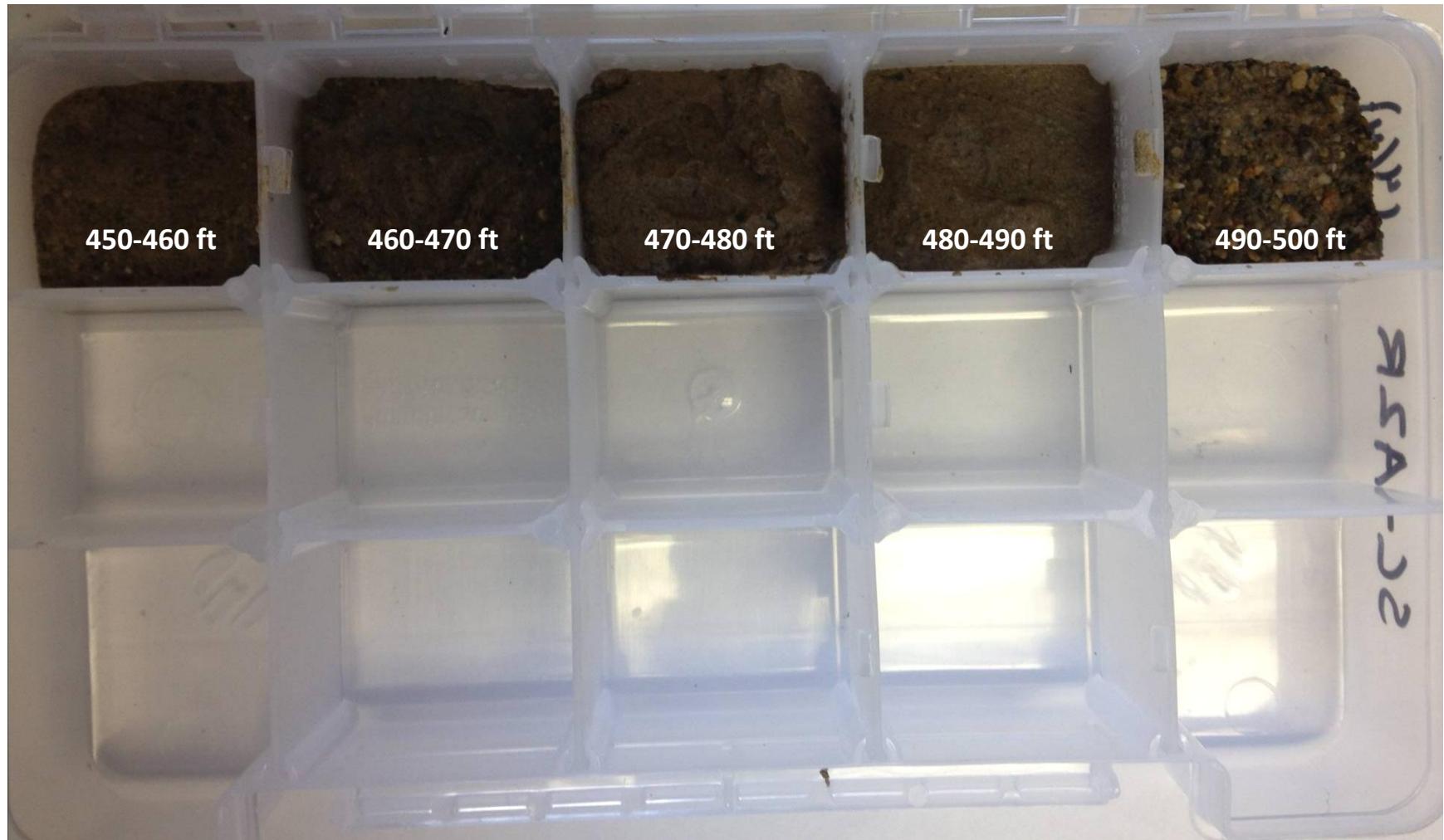
**Cuttings from 0 – 150 feet  
SC-A2RA (Deep) at Sumner Road**



Cuttings from 150 – 300 feet  
SC-A2RA (Deep) at Sumner Road



Cuttings from 300 – 450 feet  
SC-A2RA (Deep) at Sumner Road



Cuttings from 450 – 500 feet  
SC-A2RA (Deep) at Sumner Road

## **SC-A2RB (Intermediate)**

Well Permit  
Well Drillers Log  
Lithologic Log

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_

MONITORING WELL

Summer Ave Right-of-Way (ASSESSOR'S PARCEL NUMBER) (PARCEL SIZE)

12-0415 SEC 8 Lot 11 (PERMIT #) (ENVISION #)

4080 (PROGRAM ELEMENT)

SITE ADDRESS in front of 2320 Summer Ave Aptos Ca 95060

OWNER County of Santa Cruz ADDRESS 701 Ocean St room 410 Santa Cruz Ca. 95060

DRILLING CONTRACTOR Bradley & Sons LICENSE # 414478 PHONE 559-441-1401

DIRECTIONS TO SITE SE dead end of summer Ave

DESIGN SPECIFICATIONS:

INTENDED USE  
DOMESTIC: \_\_\_\_\_  
# Homes Served \_\_\_\_\_

WATER SYSTEM WELL:  
Name of Water System \_\_\_\_\_

DISTANCE FROM WELL SITE TO:  
SEPTIC SYSTEMS \_\_\_\_\_

TYPE OF WELL CONSTRUCTION  
ROTARY

SEWER \_\_\_\_\_  
NEAREST PROPERTY LINE \_\_\_\_\_

CABLE \_\_\_\_\_  
DUG \_\_\_\_\_

CASING  
SINGLE  DOUBLE \_\_\_\_\_

OTHER \_\_\_\_\_

IRRIGATION  
COMMERCIAL/INDUSTRIAL \_\_\_\_\_

MATERIAL PVC

TYPE OF JOINT Micad

MONITORING: \_\_\_\_\_  
GRDWTR VADOSE \_\_\_\_\_

GRAVEL PACK

ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY)

WITHIN WATER DISTRICT SERVICE AREA NO  YES NAME: Sequel Creek Water

(FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) 375 DIAMETER (IN.) 3 DEPTH OF SEAL (FT.) 290 WIDTH OF SEAL (IN.) 3

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: 0 TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_ OTHER destroyed

V DESTRUCTION: DEPTH OF WELL \_\_\_\_\_ DEPTH OF SEAL \_\_\_\_\_ NUMBER OF WATER FORMATIONS PENETRATED \_\_\_\_\_

CLEANING OF WELL REQUIRED YES: NO SEALING MATERIAL \_\_\_\_\_

PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR Bradley & Sons 28110

FOR OFFICE USE ONLY:

ENVIRONMENTAL ASSESSMENT REQUIRED YES NO \_\_\_\_\_

METER REQUIRED YES NO \_\_\_\_\_

METER INSTALLED \_\_\_\_\_

DATE \_\_\_\_\_

READING \_\_\_\_\_

SITE INSPECTION

DATE 2/7/12

EHS SPECIALIST (HJD)

ANNULAR WELL SEAL WITNESSED:

APPLICATION APPROVAL

DATE 2/9/12

EHS SPECIALIST (HJD)

YES

DATE \_\_\_\_\_

PAD INSPECTION

DATE \_\_\_\_\_

NO

DEPTH \_\_\_\_\_

RECEIPT OF WELL LOG

DATE \_\_\_\_\_

SEAL MATERIAL \_\_\_\_\_

FINAL

DATE \_\_\_\_\_

# SACKS CEMENT/YARD \_\_\_\_\_

COMMENTS: Encroachment permit # 12-028

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

DUPLICATE  
Driller's Copy

Page 1 of 1

Owner's Well No. SC-A2RB

Date Work Began 2/27/2012, Ended 3/2/2012

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ  
Permit No. 12-045

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet  
No. **EO147063**

Permit Date 2/9/2012

DWR USE ONLY — DO NOT FILL IN							
STATE WELL NO./STATION NO.							
LATITUDE				LONGITUDE			
APN/TRS/OTHER							

**GEOLOGIC LOG**

ORIENTATION (✓)		VERTICAL — HORIZONTAL — ANGLE (SPECIFY)					
DEPTH FROM SURFACE		METHOD ROTARY FLUID WATER					
Ft. to Ft.		DESCRIPTION Describe material, grain, size, color, etc.					
0	20	TOPSOIL, SANDY CLAY					
20	40	SANDY CLAY, SMALL GROUND					
40	120	MEDIUM/FINE/COARSE SANDS WITH SOME GRAVEL					
120	140	MEDIUM/FINE/COARSE SANDS WITH SILTY CLAY					
140	160	MEDIUM/FINE/COARSE SANDS WITH SANDY CLAY					
160	220	FINE SANDS, WITH MEDIUM/FINE/COARSE SANDS					
220	240	MEDIUM/FINE/COARSE SANDS, SANDY CLAY					
240	260	SANDY CLAY, WITH SOME SANDS					
260	280	MEDIUM/FINE SANDS, SANDY CLAY					
280	300	MEDIUM/FINE SANDS, SANDY CLAY					
300	320	MEDIUM/FINE/COARSE SANDS, BLACK CLAY, BLUE GREEN CLAY					
320	340	BLUE GREEN CLAY					
340	360	BLUE CLAY, BROWN SANDY CLAY					
360	420	MEDIUM/FINE SANDS, SANDY CLAY					
420	440	MEDIUM/FINE/COARSE SANDS WITH SOME GRAVEL					
440	455	MEDIUM/FINE/COARSE SANDS					
TOTAL DEPTH OF BORING 455 (Feet)							
TOTAL DEPTH OF COMPLETED WELL 450 (Feet)							

**WELL OWNER**

Name SOQUEL CREEK WATER  
Mailing Address 5180 SOQUEL DRIVE  
CITY SOQUEL STATE CA ZIP 95073

WELL LOCATION  
Address 2320 IN FRONT OF SUMNER AVE.

City APTOS CA 95003

County SANTA CRUZ

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Latitude \_\_\_\_\_

DEG. MIN. SEC. LOCATION SKETCH

DEG. MIN. SEC.

ACTIVITY (✓)

✓ NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify) \_\_\_\_\_

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

**PLANNED USES (✓)**

WATER SUPPLY

— Domestic — Public

— Irrigation — Industrial

MONITORING ✓

TEST WELL \_\_\_\_\_

CATHODIC PROTECTION \_\_\_\_\_

HEAT EXCHANGE \_\_\_\_\_

DIRECT PUSH \_\_\_\_\_

INJECTION \_\_\_\_\_

VAPOR EXTRACTION \_\_\_\_\_

SPARGING \_\_\_\_\_

REMEDIATION \_\_\_\_\_

OTHER (SPECIFY) \_\_\_\_\_

SOUTH  
Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER \_\_\_\_\_ (FT.) BELOW SURFACE

DEPTH OF STATIC

WATER LEVEL \_\_\_\_\_ (FT.) & DATE MEASURED

ESTIMATED YIELD \* \_\_\_\_\_ (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (FT.)

*May not be representative of a well's long-term yield.*

DEPTH FROM SURFACE		BORE-HOLE DIA. (Inches)	CASING (S)				DEPTH FROM SURFACE	ANNULAR MATERIAL				
Ft.	to Ft.		BLANK	SCREEN	CONDUCTOR	FILL PIPE		MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE
0	420	8 3/4"	✓				PVC	2"	SCH 80			
420	440	8 3/4"	✓				PVC	2"	SCH 80	.030		
440	450	8 3/4"	✓				PVC	2"	SCH 80			

**ATTACHMENTS (✓)**

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other \_\_\_\_\_

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME BRADLEY & SONS

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 3625 S. HIGHLAND

Signed

WELL DRILLER/AUTHORIZED REPRESENTATIVE

DEL REY

CA 93616

CITY STATE ZIP

04/11/12

DATE SIGNED 414178

C-57 LICENSE NUMBER

DWR 188 REV. 11-97

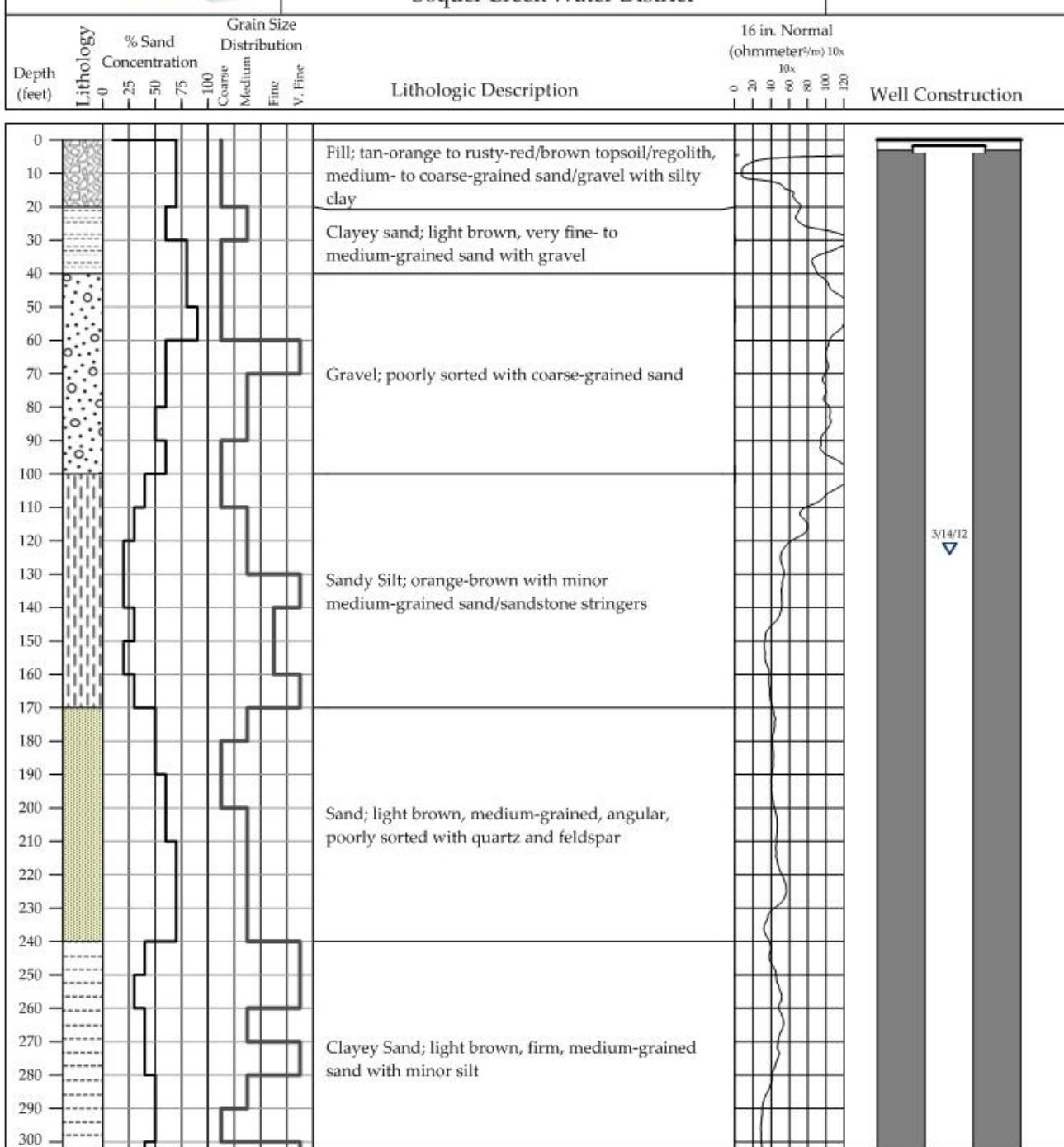
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Monitoring Well Destruction, Replacement, and New Installations

October 2, 2012

A-45





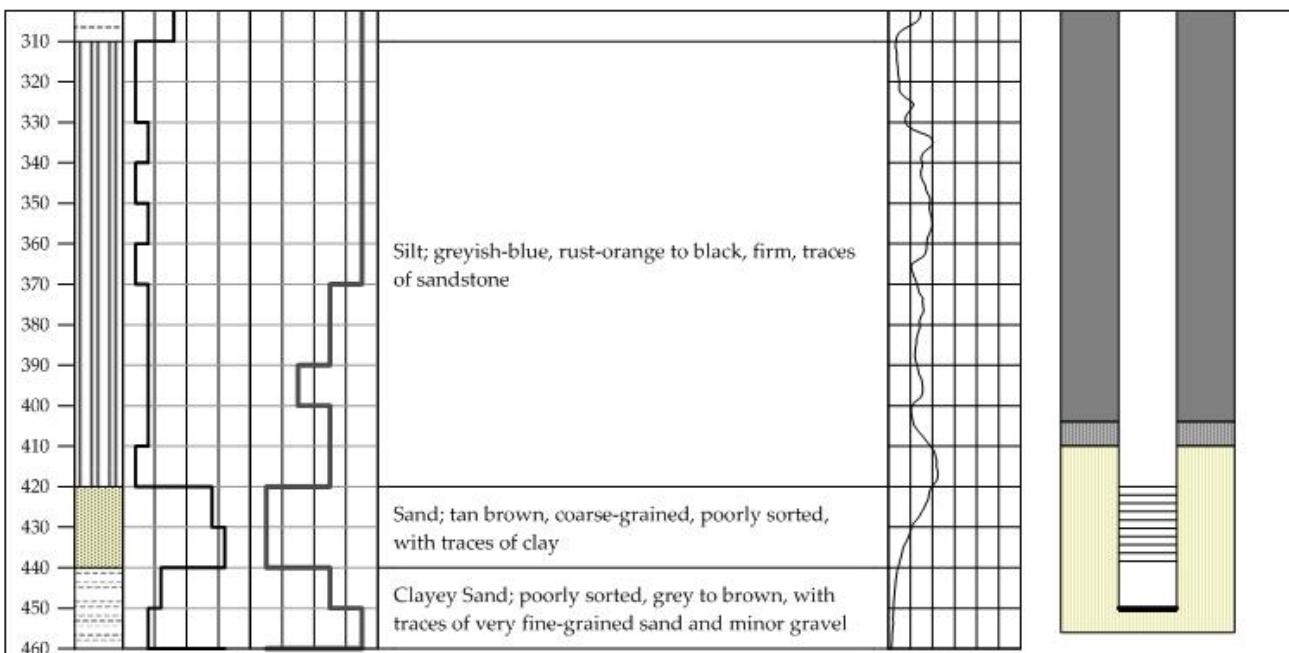
Logged By: Nick Byler  
 Easting (X): 6161077.6  
 Northing (Y): 1805517.6  
 Coordinate System: State Plane, NAD 83, CA Zone 3, feet  
 Ref. Point Elevation, ft amsl: 128.28 NAVD29, feet  
 Location: Sumner Road  
 Drilling Dates: 2/27/2012  
 Drilling Contractor: Bradley & Sons, Inc.  
 Drilling Method: Direct Rotary  
 Total Drilled Depth, ft: 456

**Fill Materials**  
 0 - 404 Neat Cement  
 404 - 410 Bentonite  
 410 - 456 Cemex 8 x 16

Depth, ft	Borehole Diam., in.	Casing Diam., in.	Casing Material
0 - 1	8.75	4	Sch. 80 PVC Blank
1 - 420	8.75	2	Sch. 80 PVC Blank
420 - 440	8.75	2	Sch. 80 PVC 0.040" Screen
440 - 450	8.75	2	Sch. 80 PVC Blank

Static Water Level

Depth (feet)	Lithology	% Sand Concentration	Grain Size Distribution	Lithologic Description	Well Construction							
					0	25	50	75	100	Coarse	Medium	Fine



Note: Lithology, % Sand Concentration, Grain Size Distribution, Lithologic Description, and Geophysical Log are from SC-A2R A (Deep)

Logged By: Nick Byler Easting (X): 6161077.6 Northing (Y): 1805517.6 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 128.28 NAVD29, feet Location: Sumner Road Drilling Dates: 2/27/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 456	<b>Fill Materials</b> 0 - 404 Neat Cement 404 - 410 Bentonite 410 - 456 Cemex 8 x 16	Borehole Casing Depth, ft Diam., in. Diam., in. Casing Material 0 - 1 8.75 4 Sch. 80 PVC Blank 1 - 420 8.75 2 Sch. 80 PVC Blank 420 - 440 8.75 2 Sch. 80 PVC 0.040" Screen 440 - 450 8.75 2 Sch. 80 PVC Blank
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▼ Static Water Level

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## **SC-A2RC (Shallow)**

Well Permit  
Well Drillers Log  
Lithologic Log

**APPLICATION FOR WELL PERMIT**

NEW    REPLACEMENT    SUPPLEMENTAL    DESTRUCTION    OTHER \_\_\_\_\_

MONITORING WELL

S Summer Ave Right of Way  
 (ASSESSOR'S PARCEL NUMBER) 12-044 SR# 8L2410  
 (PARCEL SIZE) (PERMIT #) (ENVISION #) 4/680  
 SITE ADDRESS IN FRONT OF 2320 Summer Ave Apt 5 Cn 95020-3  
 OWNER County of Santa Cruz ADDRESS 701 Ocean St room 410 Santa Cruz Ca 95060  
 DRILLING CONTRACTOR Bradley B Sons LICENSE # 449178 PHONE 551-441-1401  
 DIRECTIONS TO SITE E. dead end of Summer Ave  
 Bradley B 3425 South Highland, Del Rey CA 93616

**DESIGN SPECIFICATIONS:**

INTENDED USE DOMESTIC: _____	DISTANCE FROM WELL SITE TO: SEPTIC SYSTEMS _____	TYPE OF WELL CONSTRUCTION: PE # 4680 ROTARY <input checked="" type="checkbox"/> CHECK1 \$323.00
#Homes Served _____	SEWER _____	CABLE _____
WATER SYSTEM WELL: Name of Water System _____	NEAREST PROPERTY LINE _____	DUG _____
IRRIGATION _____	CASING SINGLE <input checked="" type="checkbox"/> DOUBLE	OTHER _____
COMMERCIAL/INDUSTRIAL _____	MATERIAL PVC	
MONITORING: _____	TYPE OF JOINT Threaded	
GRDWTR VADOSE _____	GRAVEL PACK <input checked="" type="checkbox"/>	ESTIMATED WORK DATES: START _____ COMPLETION _____
OTHER: _____ (SPECIFY)		

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: (FORM HSA-579-REQUIRED)  
**CONSTRUCTION** DEPTH (FT.) 170 DIAMETER (IN.) 2" DEPTH OF SEAL (FT.) 125 WIDTH OF SEAL (IN.) 3"

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: 0 TYPES: DOMESTIC IRRIGATION COMMERCIAL USE OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
 TO SUPPLEMENT NEW WELL TO BE DESTROYED OTHER destroyed

**V DESTRUCTION:** DEPTH OF WELL DEPTH OF SEAL NUMBER OF WATER FORMATIONS PENETRATED  
 CLEANING OF WELL REQUIRED YES: NO: SEALING MATERIAL \_\_\_\_\_

**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

**WORKER'S COMPENSATION CERTIFICATE**

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
 INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR J. Collier LLC 2/8/12

**FOR OFFICE USE ONLY:**

ENVIRONMENTAL ASSESSMENT REQUIRED YES NO \_\_\_\_\_

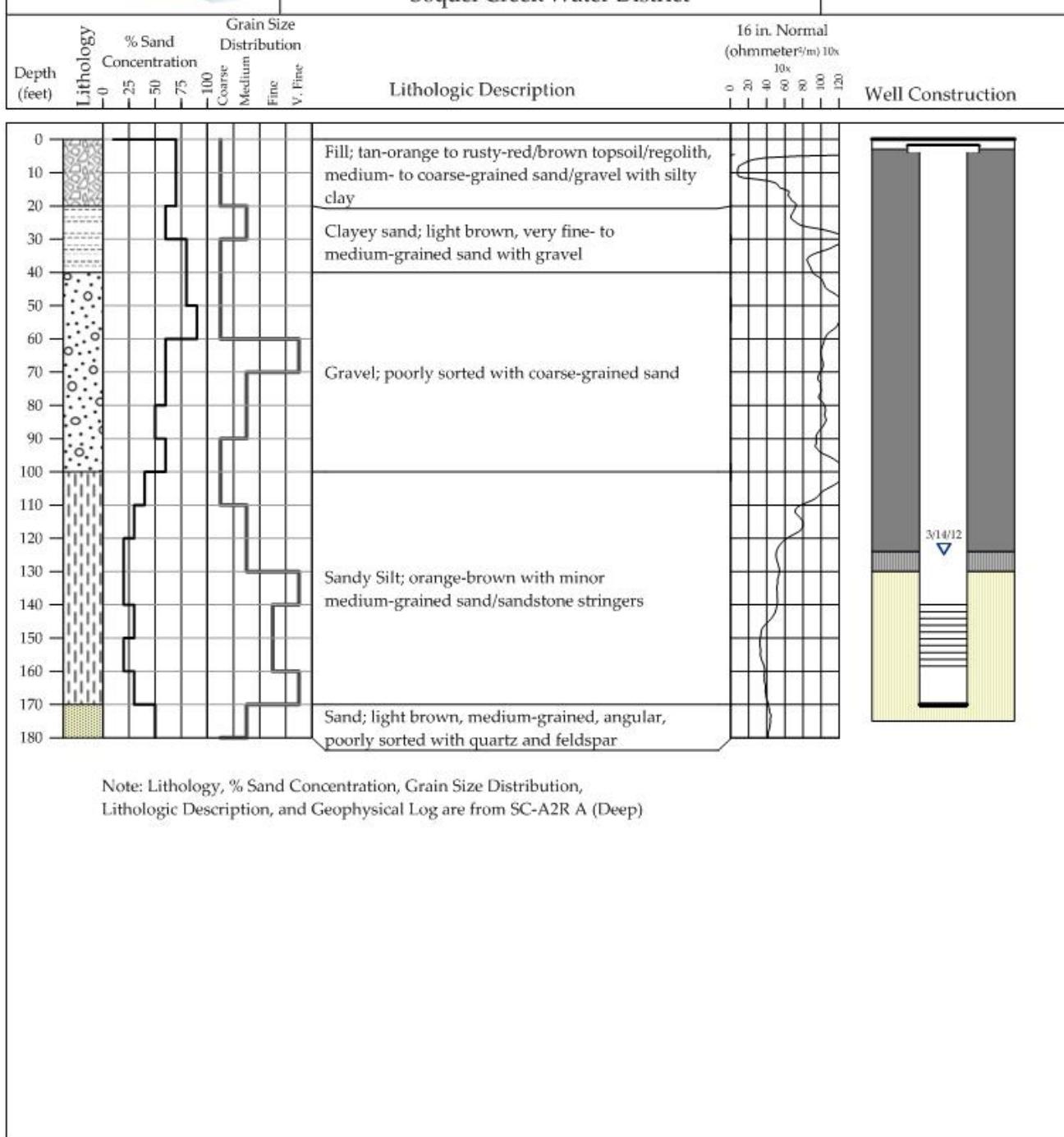
METER REQUIRED YES NO _____	METER INSTALLED _____	DATE _____	READING _____
	DATE	EHS SPECIALIST	ANNULAR WELL SEAL WITNESSED:
SITE INSPECTION	2/7/12	HJD	YES DATE _____
APPLICATION APPROVAL	2/9/12	HJD	NO DEPTH _____
PAD INSPECTION	_____	_____	SEAL MATERIAL _____
RECEIPT OF WELL LOG	_____	_____	# SACKS CEMENT/YARD _____
FINAL	_____	_____	_____

C.ENTS: Encroachment permit # 12-028

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)





Logged By: Nick Byler  
 Easting (X): 6161069.4  
 Northing (Y): 1805530.2  
 Coordinate System: State Plane, NAD 83, CA Zone 3, feet  
 Ref. Point Elevation, ft amsl: 128.22 NAVD29, feet  
 Location: Sumner Road  
 Drilling Dates: 2/23/2012  
 Drilling Contractor: Bradley & Sons, Inc.  
 Drilling Method: Direct Rotary  
 Total Drilled Depth, ft: 175

**Fill Materials**

0 - 124	Neat Cement
124 - 130	Bentonite
130 - 175	Cemex 8 x 16

Depth, ft	Borehole Diam., in.	Casing Diam., in.	Casing Material
0 - 1	8.75	4	Sch. 80 PVC Blank
1 - 140	8.75	2	Sch. 80 PVC Blank
140 - 160	8.75	2	Sch. 80 PVC 0.040" Screen
160 - 170	8.75	2	Sch. 80 PVC Blank

Static Water Level

## **SC-9 A, B, C, D, and E**

Well Destruction Permits  
Well Drillers Logs

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

38-201-01

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

12047 92<sup>8</sup> 8051  
(PERMIT #) (ENVISION #)4681  
PROGRAM ELEMENT

SITE ADDRESS Las Olas dr Camp St 1801

OWNER Cal. State Parks ADDRESS 144 School St Santa Cruz Ca 95060

DRILLING CONTRACTOR Bradley &amp; Sons LICENSE # 414178 PHONE 559-441-1401

DIRECTIONS TO SITE State Park dr west to Las Olas Dr

DESIGN SPECIFICATIONS:INTENDED USE

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System: \_\_\_\_\_

IRRIGATION: \_\_\_\_\_

COMMERCIAL/INDUSTRIAL: \_\_\_\_\_

MONITORING: \_\_\_\_\_

GRDWTR VADOSE: \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY)

WITHIN WATER DISTRICT SERVICE AREA  NO  YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)CONSTRUCTION DEPTH (FT.) \_\_\_\_\_ DIAMETER (IN.) \_\_\_\_\_ DEPTH OF SEAL (FT.) \_\_\_\_\_ WIDTH OF SEAL (IN.) \_\_\_\_\_EXISTING WELLS ON PROPERTY:1. OTHER WELLS ON PROPERTY: NUMBER: 4 TYPES: DOMESTIC  IRRIGATION  COMMERCIAL USE  OTHER Sample2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE  TO BE DESTROYED 

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_DESTRUCTION: DEPTH OF WELL 000 DEPTH OF SEAL: 000 NUMBER OF WATER FORMATIONS PENETRATEDCLEANING OF WELL REQUIRED YES:  NO:  SEALING MATERIAL DEATCement / smooth grout BentonitePLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
INSURANCE CARRIER: \_\_\_\_\_ POLICY #: \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA.

PROPERTY OWNER: BradleyDRILLING CONTRACTOR: BradleyENVIRONMENTAL ASSESSMENT REQUIRED YES  NO FOR OFFICE USE ONLY:

METER REQUIRED YES <input type="checkbox"/> NO <input type="checkbox"/>	METER INSTALLED _____	DATE <u>2/14/12</u>	EHS SPECIALIST <u>HP</u>	DATE _____	READING _____	ANNULAR WELL SEAL WITNESSED: YES <input type="checkbox"/> DATE _____
SITE INSPECTION	<u>2/16/12</u>					
APPLICATION APPROVAL						
PAD INSPECTION	<u>2/16/12</u>					
RECEIPT OF WELL LOG						
FINAL						

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

02/20/12

APPLICATION FOR WELL PERMIT

New  Replacement  Supplemental  Destruction  Other  Geothermal  Monitoring Well

738-20101

12-048 BLOSO

4681

S. Parcel Number Other Parcels Served (Permit#) (Envision #) Program Element

Site Address Las Olas Dr Campsite B31

Owner California State Parks Address 1444 School St Santa Cruz Ca 95060

Drilling Contractor Bradley &amp; Sons License # 4P4H78 Phone 559-444-1401

Directions To Site STATE Park Dr west To Las Olas Dr ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

Mail Correspondence To: 3625 Si Highland Del Rey Ca. 93616

DESIGN SPECIFICATIONS:INTENDED USE

DOMESTIC: \_\_\_\_\_

#Homes Served: \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System

IRRIGATION Acres: \_\_\_\_\_

Crop: \_\_\_\_\_

Water Use: af/yd

COMMERCIAL/INDUSTRIAL Type: \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) DIAMETER (IN.) DEPTH OF SEAL (FT.) WIDTH OF SEAL (IN.)EXISTING WELLS ON PROPERTY:1. OTHER WELLS ON PROPERTY: NUMBER: 4 TYPES: DOMESTIC  IRRIGATION  COMMERCIAL USE  OTHER Sample2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE  TO BE DESTROYED 

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_

WELL DESTRUCTION: Depth Of Well 575 Depth Of Seal: 575 Number Of Water Formations Penetrated 1 Perforation? 175  
 Cleaning Of Well Required Yes: No  Sealing Material Cement Other measures: Bentonite

Plot Plan: Attach 2 copies of plot plan (see reverse for requirements)

I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance. I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a permit to install such system will be granted.

WORKER'S COMPENSATION CERTIFICATE

A. CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER: \_\_\_\_\_ POLICY #: \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED, I SHALL NOT EMPLOY ANY

PROPERTY OWNER: John BradleyDRILLING CONTRACTOR: John BradleyFOR OFFICE USE ONLY:

SITE INSPECTION

DATE: 2/11/12

EHS SPECIALIST: CHD

MGR: \_\_\_\_\_

ANNULAR WELL SEAL WITNESSED: \_\_\_\_\_

YES DATE: \_\_\_\_\_

NO DEPTH: \_\_\_\_\_

SEAL MATERIAL: \_\_\_\_\_

# SACKS CEMENT/YARD: \_\_\_\_\_

WATER QUALITY DATA RECEIVED: \_\_\_\_\_ OK? \_\_\_\_\_

SUPPLEMENTAL WATER USE SHEET

DATE: 2/11/12

EHS SPECIALIST: CHD

MGR: \_\_\_\_\_

APPLICATION APPROVAL

DATE: 2/11/12

EHS SPECIALIST: CHD

MGR: \_\_\_\_\_

PAD INSPECTION

DATE: \_\_\_\_\_

EHS SPECIALIST: \_\_\_\_\_

MGR: \_\_\_\_\_

RECEIPT OF WELL LOG

DATE: \_\_\_\_\_

EHS SPECIALIST: \_\_\_\_\_

MGR: \_\_\_\_\_

FINAL

DATE: \_\_\_\_\_

EHS SPECIALIST: \_\_\_\_\_

MGR: \_\_\_\_\_

WATER EFFICIENCY EVALUATION REQUIRED YES  NO  COMPLETE: \_\_\_\_\_ INSTALLATION VERIFIED: \_\_\_\_\_GEOGRAPHICAL LOG REQUIRED YES  NO  RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

CDS 2/29/12

APPLICATION FOR WELL PERMIT

New  Replacement  Supplemental  Destruction  Other \_\_\_\_\_  Geothermal  Monitoring Well

02-201-01

12-049 8049 4081

Site Parcel Number Other Parcels Served (Permit #) (Envision #) Program Element

Site Address LAS Clas de Campero B21

Owner CAL STATE PARKS Address 144 SCHOOL ST Santa Cruz Ca 95060

Drilling Contractor Bradley J. Morris License # 414178 Phone 559 741-1101

Directions To Site STATE PARK DR WEST TO LAS CLAS DR ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

Mail Correspondence To: 3625 S. Highland Del Rey Ca 93616 02/09/2012 000000

DESIGN SPECIFICATIONS:

<b>INTENDED USE</b>	<b>DISTANCE FROM WELL SITE TO:</b>	<b>TYPE OF WELL CONSTRUCTION</b>
DOMESTIC: _____	SEPTIC SYSTEMS _____	ROTARY _____ PE # 4681 \$115.00
# Homes Served _____	SEWER _____	CABLE _____ CHECK1 \$115.00
WATER SYSTEM WELL: _____	NEAREST PROPERTY LINE _____	DUG _____
Name of Water System		
IRRIGATION _____ Acres: _____	MONITORING WELL: _____	OTHER _____
Crop: _____	GRDWTR VADOSE _____	CASING: _____
Water Use: afyr	OTHER: (SPECIFY) _____	SINGLE _____ DOUBLE _____
COMMERCIAL/INDUSTRIAL _____ Type: _____	MATERIAL: _____	TYPE OF JOINT: _____
WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: _____	(FORM HSA-579-REQUIRED)	

**CONSTRUCTION** DEPTH (FT.) DIAMETER (IN.) DEPTH OF SEAL (FT.) WIDTH OF SEAL (IN.)

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: 4 TYPES: DOMESTIC \_\_\_\_ IRRIGATION \_\_\_\_ COMMERCIAL USE \_\_\_\_ OTHER Sample
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_ TO BE DESTROYED X
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
TO SUPPLEMENT NEW WELL \_\_\_\_ TO BE DESTROYED X OTHER \_\_\_\_\_

**WELL DESTRUCTION** Depth Of Well: 380 Depth Of Seal: 300 Number Of Water Formations Penetrated / Perforation? 70  
Cleaning Of Well Required Yes: No: Sealing Material: CEMENT Other measures: Bentonite

**Plot Plan:** Attach 2 copies of plot plan (see reverse for requirements).  
I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance. I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a permit to install such system will be granted.

**WORKER'S COMPENSATION CERTIFICATE**  
A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
INSURANCE CARRIER: \_\_\_\_\_ POLICY #: \_\_\_\_\_  
I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY

PROPERTY OWNER: \_\_\_\_\_ DRILLING CONTRACTOR: \_\_\_\_\_

<b>FOR OFFICE USE ONLY:</b>		
<b>EHS SPECIALIST</b>	<b>MGR</b>	<b>ANNUAL WELL SEAL WITNESSED:</b>
SITE INSPECTION 2/14/12	(AP)	YES DATE _____
SUPPLEMENTAL WATER USE SHEET 2/16/12	(AP)	NO DEPTH _____
APPLICATION APPROVAL 2/16/12	(AP)	SEAL MATERIAL _____
PAD INSPECTION _____	_____	# SACKS CEMENT/YARD _____
RECEIPT OF WELL LOG _____	_____	WATER QUALITY DATA RECEIVED OK?
FINAL _____	_____	_____

WATER EFFICIENCY EVALUATION REQUIRED YES \_\_\_\_ NO \_\_\_\_ COMPLETE \_\_\_\_ INSTALLATION VERIFIED \_\_\_\_

GEOGRAPHICAL LOG REQUIRED YES \_\_\_\_ NO \_\_\_\_ RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL/GOLDENROD - RECEIPT

CDW 2/29/12

APPLICATION FOR WELL PERMIT

New  Replacement  Supplemental  Destruction  Other \_\_\_\_\_  Geothermal  Monitoring Well

020201-01

12050 32 8048 4081

S. Parcel Number Other Parcels Served

(Permit #) (Revision #) Program Element

Site Address LAS Olas Dr, Campsite 1521

Owner CAL STATE PARKS Address: 1441 School St Santa Cruz Ca 95060

Drilling Contractor Penetech V &amp; Sons License # 474178 Phone 539-447-1401

Directions To Site State Park Dr west to Las Olas Dr ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

Mail Correspondence To: 3605 S. Highland Del-Rey Ca. 93616

DESIGN SPECIFICATIONS:INTENDED USE

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System

DISTANCE FROM WELL SITE TO:

SEPTIC SYSTEMS \_\_\_\_\_

SEWER \_\_\_\_\_

NEAREST PROPERTY LINE \_\_\_\_\_

TYPE OF WELL CONSTRUCTION

ROTARY \_\_\_\_\_

CABLE \_\_\_\_\_

DUG \_\_\_\_\_

OTHER \_\_\_\_\_

CASING

SINGLE \_\_\_\_\_

DOUBLE \_\_\_\_\_

MATERIAL \_\_\_\_\_

TYPE OF JOINT \_\_\_\_\_

GRAVEL PACK \_\_\_\_\_

02/09/2012

000000

0122 4:17PM

E-Beth 0008

PE # 4681

\$115.00

CHECK1

\$115.00

IRRIGATION

Acres: \_\_\_\_\_

Crop: \_\_\_\_\_

Water Use: \_\_\_\_\_

MONITORING WELL:

GRDWTR VADOSE \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY) \_\_\_\_\_

COMMERCIAL/INDUSTRIAL

Type: \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_

CONSTRUCTION

DEPTH (FT.) \_\_\_\_\_

DIAMETER (IN.) \_\_\_\_\_

DEPTH OF SEAL (FT.) \_\_\_\_\_

WIDTH OF SEAL (IN.) \_\_\_\_\_

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: 4 TYPES: DOMESTIC \_\_\_\_\_

IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED X

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL

TO BE DESTROYED X OTHER \_\_\_\_\_

WELL DESTRUCTION:

Depth Of Well: 200

Depth Of Seal: 200

Number Of Water Formations Penetrated: 1

Perforation? 100

Cleaning Of Well Required Yes: No: X

Sealing Material: \_\_\_\_\_

Other measures: \_\_\_\_\_

Plot Plan: Attach 2 copies of plot plan (see reverse for requirements)

I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and

declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health

service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work

performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance.

I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a

permit to install such system will be granted.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER: \_\_\_\_\_

POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY

PROPERTY OWNER: \_\_\_\_\_

DRILLING CONTRACTOR: \_\_\_\_\_

FOR OFFICE USE ONLY:

SITE INSPECTION

DATE: 2/14/12

EHS SPECIALIST: (HP)

MGR: \_\_\_\_\_

ANNUAL WELL SEAL WITNESSED: \_\_\_\_\_

SUPPLEMENTAL WATER USE SHEET

DATE: 2/14/12

EHS SPECIALIST: (HP)

MGR: \_\_\_\_\_

YES DATE: \_\_\_\_\_

APPLICATION APPROVAL

DATE: 2/14/12

EHS SPECIALIST: (HP)

MGR: \_\_\_\_\_

NO DEPTH: \_\_\_\_\_

PAD INSPECTION

DATE: 2/14/12

EHS SPECIALIST: (HP)

MGR: \_\_\_\_\_

SEAL MATERIAL: \_\_\_\_\_

RECEIPT OF WELL LOG

DATE: 2/14/12

EHS SPECIALIST: (HP)

MGR: \_\_\_\_\_

# SACKS CEMENT/YARD: \_\_\_\_\_

FINAL

DATE: 2/14/12

EHS SPECIALIST: (HP)

MGR: \_\_\_\_\_

WATER QUALITY DATA RECEIVED: OK?

WATER EFFICIENCY EVALUATION REQUIRED YES: NO: COMPLETE: \_\_\_\_\_

INSTALLATION VERIFIED: \_\_\_\_\_

GEOPHYSICAL LOG REQUIRED YES: NO: RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

2/20/12

**APPLICATION FOR WELL PERMIT**

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

1820101 120518047 4680  
 (ASSESSOR'S PARCEL NUMBER) (PARCEL SIZE) (PERMIT #) (ENVISION #) PROGRAM ELEMENT

SITE ADDRESS Las Olas Dr Camino Te Koel

OWNER Cal State Parks ADDRESS 194 School St Santa Cruz Ca 95060

DRILLING CONTRACTOR Bradley B Sons LICENSE # 444178 PHONE 559-441-1401

DIRECTIONS TO SITE State Park west To Las Olas dr

02/09/2012 000000

#9123 CASH REGISTER VALIDATION 0008

PE # 4681 \$115.00

**DESIGN SPECIFICATIONS:**

INTENDED USE DOMESTIC: _____	DISTANCE FROM WELL SITE TO: SEPTIC SYSTEMS _____	TYPE OF WELL CONSTRUCTION ROTARY _____
#Homes Served _____	SEWER _____	CABLE _____
WATER SYSTEM WELL: Name of Water System: _____	NEAREST PROPERTY LINE CASING: SINGLE _____ DOUBLE _____	DUG _____
IRRIGATION _____	MATERIAL _____	OTHER _____
COMMERCIAL/INDUSTRIAL _____	TYPE OF JOINT _____	ESTIMATED WORK DATES: START _____ COMPLETION _____
MONITORING: _____	GRAVEL PACK _____	
GRDWTR _____ VADOSE _____		
OTHER: _____ (SPECIFY)		

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) DIAMETER (IN.) DEPTH OF SEAL (FT.) WIDTH OF SEAL (IN.)

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: 4 TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER Sample
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED X
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
TO SUPPLEMENT NEW WELL \_\_\_\_\_ TO BE DESTROYED X OTHER \_\_\_\_\_

DESTRUCTION: DEPTH OF WELL 140 DEPTH OF SEAL 140 NUMBER OF WATER FORMATIONS PENETRATED 1  
CLEANING OF WELL REQUIRED YES: NO: X SEALING MATERIAL Cement / Bitonite

**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

**WORKER'S COMPENSATION CERTIFICATE**

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INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR \_\_\_\_\_

**FOR OFFICE USE ONLY:**

ENVIRONMENTAL ASSESSMENT REQUIRED YES NO \_\_\_\_\_

METER REQUIRED YES NO _____	METER INSTALLED _____	DATE _____	READING _____
SITE INSPECTION	DATE 2/14/12	EHS SPECIALIST (H2)	ANNULAR WELL SEAL WITNESSED: _____
APPLICATION APPROVAL	2/16/12	(H2)	YES DATE _____
PAD INSPECTION			NO DEPTH _____
RECEIPT OF WELL LOG			SEAL MATERIAL _____
FINAL			# SACKS CEMENT/YARD _____
COMMENTS: _____			

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

CDW 2/29/12







DUPPLICATE  
Driller's Copy

**STATE OF CALIFORNIA**  
**WELL COMPLETION REPORT**

Page 1 of 1

Owner's Well No. DESTROY

Date Work Began 2/17/2012      Ended 2/20/2012

**Local Permit Agency** ENVIRO HEALTH, SANTA CRUZ  
**Permit No.** 12-050 **Permit Date** 2/16/201

DWR USE ONLY -- DO NOT FILL IN	
STATE WELL NO./STATION NO.	
LATITUDE	LONGITUDE
APN/TRS/OTHER	

## - GEOLOGIC LOG

GEOLOGIC LOG				WELL OWNER					
ORIENTATION (✓)		✓ VERTICAL    HORIZONTAL    ANGLE (SPECIFY)		Name <u>SOQUEL CREEK WATER</u>					
DEPTH FROM SURFACE		DRILLING METHOD		Mailing Address <u>5180 SOQUEL DRIVE</u> <u>SOQUEL</u>		CA	95073		
FT. to	FT.	DESCRIPTION		CITY		STATE	ZIP		
0	290	Describe material, grain, size, color, etc.		WELL LOCATION					
WELL DESTRUCTION				Address <u>LAS OLAS DR. CAMPSITE B21</u>					
				City <u>SANTA CRUZ CA 95060</u>					
				County <u>SANTA CRUZ</u>					
				APN Book <u>038</u> Page <u>201</u> Parcel <u>01</u>					
				Township _____ Range _____ Section _____					
				Latitude _____					
				DEG.	MIN.	SEC.	DEG.	MIN.	SEC.
				LOCATION SKETCH		ACTIVITY (✓)			
				NORTH		NEW WELL			
				WEST		MODIFICATION/REPAIR			
				EAST		Deepen	Other (Specify) _____		
				SOUTH		DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")			
				Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.		PLANNED USES (✓)			
						WATER SUPPLY			
						Domestic	Public		
						Irrigation	Industrial		
						MONITORING			
						TEST WELL			
						CATHODIC PROTECTION			
						HEAT EXCHANGE			
						DIRECT PUSH			
						INJECTION			
						VAPOR EXTRACTION			
						SPARGING			
						REMEDIATION			
						OTHER (SPECIFY) _____			
WATER LEVEL & YIELD OF COMPLETED WELL									
DEPTH TO FIRST WATER _____ (FT.) BELOW SURFACE									
DEPTH OF STATIC									
WATER LEVEL _____ (FT.) & DATE MEASURED									
ESTIMATED YIELD * _____ (GPM) & TEST TYPE									
TEST LENGTH _____ (HRS.) TOTAL DRAWDOWN _____ (FT.)									
May not be representative of a well's long-term yield.									
TOTAL DEPTH OF BORING _____ (Feet)									
TOTAL DEPTH OF COMPLETED WELL <u>290</u> (Feet)									

<b>ATTACHMENTS (✓)</b>	<b>CERTIFICATION STATEMENT</b>		
<input type="checkbox"/> Geologic Log <input type="checkbox"/> Well Construction Diagram <input type="checkbox"/> Geophysical Log(s) <input type="checkbox"/> Soil/Water Chemical Analysis <input type="checkbox"/> Other _____	I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief. <b>NAME</b> <u>BRADLEY &amp; SONS</u> (PERSON/FIRM, OR CORPORATION) (TYPED OR PRINTED)		
	ADDRESS <u>3625 S. HIGHLAND</u> Signed <u>D. Bodie</u>	<b>DEL REY</b> CITY <u>CA</u>	93616 STATE <u>ZIP</u> <u>414178</u> DATE SIGNED <u>04/03/12</u> C-57 LICENSE NUMBER
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.			

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

*Monitoring Well Destruction, Replacement, and New Installations*  
October 2, 2012 A-62



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## **SC-9RA (Deep)**

Well Permits  
Well Drillers Log  
Lithologic Logs  
Welenco Geophysical Log  
Detailed Lithologic Description  
Photographs of Borehole Cuttings

**APPLICATION FOR WELL PERMIT**

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

038-201-01

12-054 0652

4080

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

(PERMIT #)

(ENVISION #)

PROGRAM ELEMENT

SITE ADDRESS Las Olas dr Camp Site B21

OWNER CAL STATE Parks ADDRESS 144 School st Santa Cruz Co. 95060

DRILLING CONTRACTOR Bradley Sons Inc LICENSE # 414178 PHONE 559-441-1401

DIRECTIONS TO SITE State Park dr west to Las Olas dr

**DESIGN SPECIFICATIONS:****INTENDED USE**

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System \_\_\_\_\_

IRRIGATION \_\_\_\_\_

COMMERCIAL/INDUSTRIAL \_\_\_\_\_

MONITORING: GRDWTR  VADOSE \_\_\_\_\_OTHER: \_\_\_\_\_ (SPECIFY) WITHIN WATER DISTRICT SERVICE AREA  NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)**CONSTRUCTION** DEPTH (FT.) 910 DIAMETER (IN.) 2" DEPTH OF SEAL (FT.) 610' WIDTH OF SEAL (IN.) 3"**EXISTING WELLS ON PROPERTY:**1. OTHER WELLS ON PROPERTY: NUMBER: 5 TYPES: DOMESTIC \_\_\_\_ IRRIGATION \_\_\_\_ COMMERCIAL USE \_\_\_\_ OTHER  Sample2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_ TO BE DESTROYED 

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_**DESTRUCTION:** DEPTH OF WELL \_\_\_\_\_ DEPTH OF SEAL: \_\_\_\_\_ NUMBER OF WATER FORMATIONS PENETRATED \_\_\_\_\_  
CLEANING OF WELL REQUIRED YES:  NO:  SEALING MATERIAL \_\_\_\_\_**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

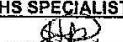
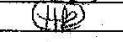
**WORKER'S COMPENSATION CERTIFICATE**

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER DRILLING CONTRACTOR **FOR OFFICE USE ONLY:**ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO 

METER REQUIRED YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	METER INSTALLED DATE <input type="checkbox"/>	EHS SPECIALIST <input type="checkbox"/>	DATE <input type="checkbox"/>	READING <input type="checkbox"/>	ANNULAR WELL SEAL WITNESSED: <input type="checkbox"/>
SITE INSPECTION	2/14/12				
APPLICATION APPROVAL	2/16/12				YES <input type="checkbox"/> DATE _____
PAD INSPECTION					NO <input type="checkbox"/> DEPTH _____
RECEIPT OF WELL LOG					SEAL MATERIAL _____
FINAL					# SACKS CEMENT/YARD _____

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

CW/ 2/20/12

TRIPPLICATE  
Owner's Copy

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet

No. **EO147070**

Page 1 of 1  
Owner's Well No. SC-9RA

Date Work Began 3/12/2012, Ended 3/18/2012

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ  
Permit No. 12-054 Permit Date 2/16/2012

DWR USE ONLY	-- DO NOT FILL IN	
STATE WELL NO./STATION NO.		
LATITUDE	LONGITUDE	
APN/TRS/OTHER		

GEOLOGIC LOG		WELL OWNER	
ORIENTATION (✓)	✓ VERTICAL    HORIZONTAL    ANGLE (SPECIFY)	Name SOQUEL CREEK WATER	
DEPTH FROM SURFACE	DRILLING METHOD ROTARY FLUID WATER	Mailing Address 5180 SOQUEL DRIVE SOQUEL CA 95073	
Ft. to Ft.	DESCRIPTION Describe material, grain, size, color, etc.	CITY STATE ZIP	
0 20	TOPSOIL, BLACK SAND	WELL LOCATION	
20 60	DARK CLAY WITH SAND	Address LAS OLAS DR CAMP SITE B21	
60 80	DARK SANDY CLAY, MEDIUM/FINE/COARSE SANDS	City SANTA CRUZ CA 95060	
80 100	MEDIUM/FINE/COARSE SANDS	County SANTA CRUZ	
100 120	MEDIUM/FINE/COARSE SANDS, SILTY CLAY	APN Book 038 Page 201 Parcel 01	
120 180	SILTY CLAY WITH SHALE	Township Range Section	
180 200	DARK SANDY CLAY WITH SOME WHITE CLAY	Latitude DEG. MIN. SEC.	
200 240	DARK SANDY CLAY	LOCATION SKETCH ACTIVITY (✓)	
240 280	DARK CLAY	NORTH ✓ NEW WELL	
280 320	DARK CLAY WITH FINE SAND	MODIFICATION/REPAIR — Deepen — Other (Specify)	
320 360	FINE SAND	DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")	
360 400	SANDY CLAY, BLACK SHALE	PLANNED USES (✓)	
400 420	SANDY CLAY, WITH STREAKS & SANDSTONE	WATER SUPPLY	
420 440	SANDY CLAY, MEDIUM/FINE/COARSE SAND, SAND CLAY	Domestic    Public Irrigation    Industrial	
440 460	FINE SANDY CLAY	MONITORING ✓ TEST WELL	
460 480	FINE SANDY CLAY WITH SOME MEDIUM/FINE SAND	CATHODIC PROTECTION	
480 500	MUDSTONE AND CLAY	HEAT EXCHANGE	
500 520	CLAY	DIRECT PUSH	
520 540	CALY WITH SOME SHALE	INJECTION	
540 640	CLAY, FINE SAND	VAPOR EXTRACTION	
640 660	CLAY WITH SOME SAND	SPARGING	
660 740	CLAY WITH FINE SANDS	REMEDIALION	
740 760	FINE SANDS	OTHER (SPECIFY)	
760 780	FINE SAND	SOUTH	
780 820	FINE SAND WITH CLAY	Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.	
820 920	MEDIUM/FINE SAND WITH SOME CLAY	WATER LEVEL & YIELD OF COMPLETED WELL	
TOTAL DEPTH OF BORING 920 (Feet)		DEPTH TO FIRST WATER (Ft.) BELOW SURFACE	
TOTAL DEPTH OF COMPLETED WELL 920 (Feet)		DEPTH OF STATIC WATER LEVEL (Ft.) & DATE MEASURED	
		ESTIMATED YIELD * (GPM) & TEST TYPE AIR LIFT	
		TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN (Ft.)	
		May not be representative of a well's long-term yield.	

DEPTH FROM SURFACE	BORE - HOLE DIA. (Inches)	CASING (S)					DEPTH FROM SURFACE	ANNULAR MATERIAL				
		BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE		INTERNAL DIAMETER (Inches)	GUAGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE	CEMENT
Ft. to Ft.	(Inches)							(✓)	(✓)	(✓)	(✓)	
0 625	8 3/4"	✓			PVC	2"	SCH 80					
625 900	8 3/4"	✓			PVC	2"	SCH 80	.030				
900 920	8 3/4"	✓			PVC	2"	SCH 80					

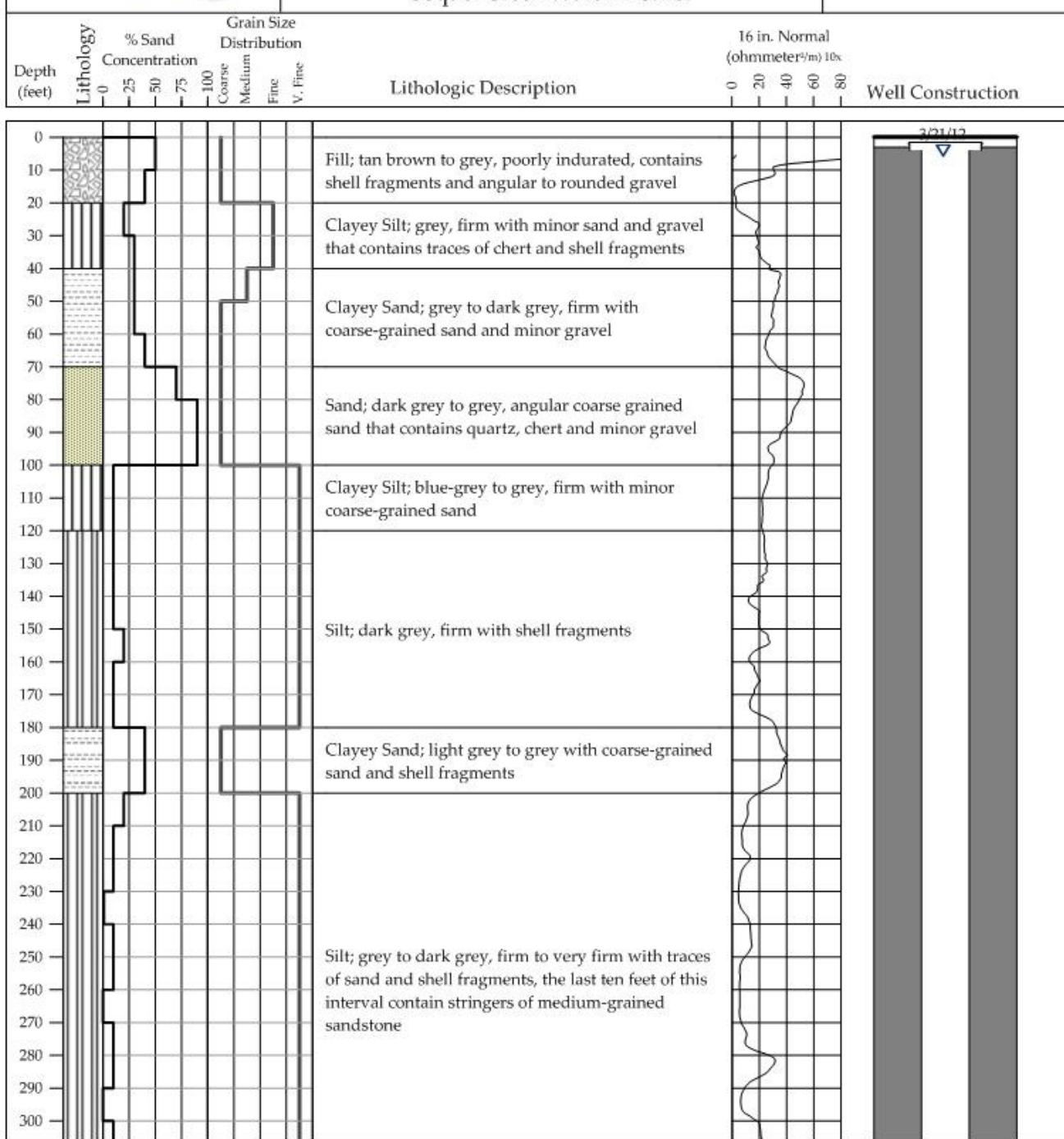
ATTACHMENTS (✓)

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other \_\_\_\_\_

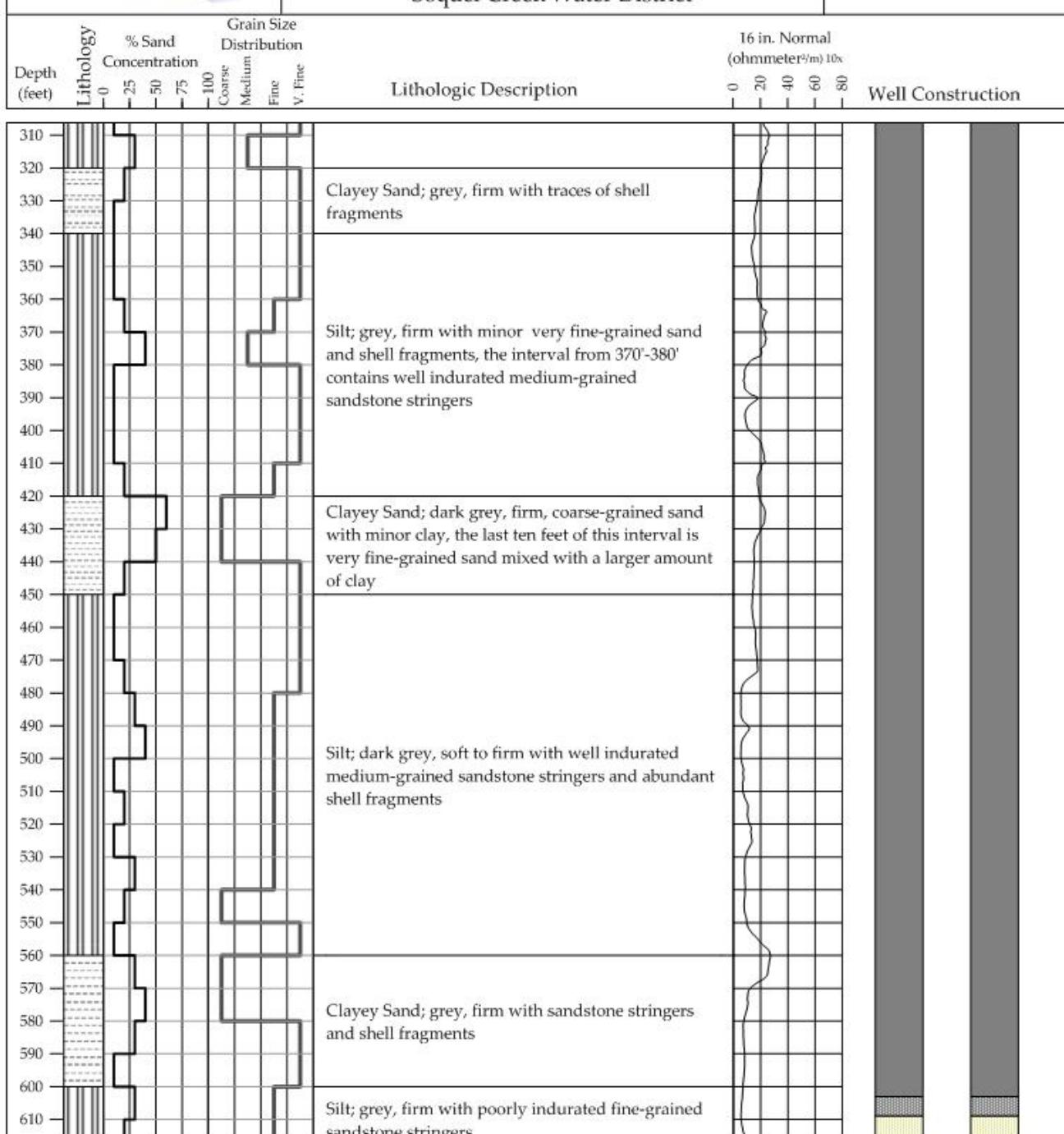
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.  
NAME **BRADLEY & SONS**  
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)  
ADDRESS **3625 S. HIGHLAND**  
Signed **Debra Bodie** DEL REY CITY **CA 93616**  
WELL DRILLER/AUTHORIZED REPRESENTATIVE 07/20/12 DATE SIGNED **414178**  
C-57 LICENSE NUMBER

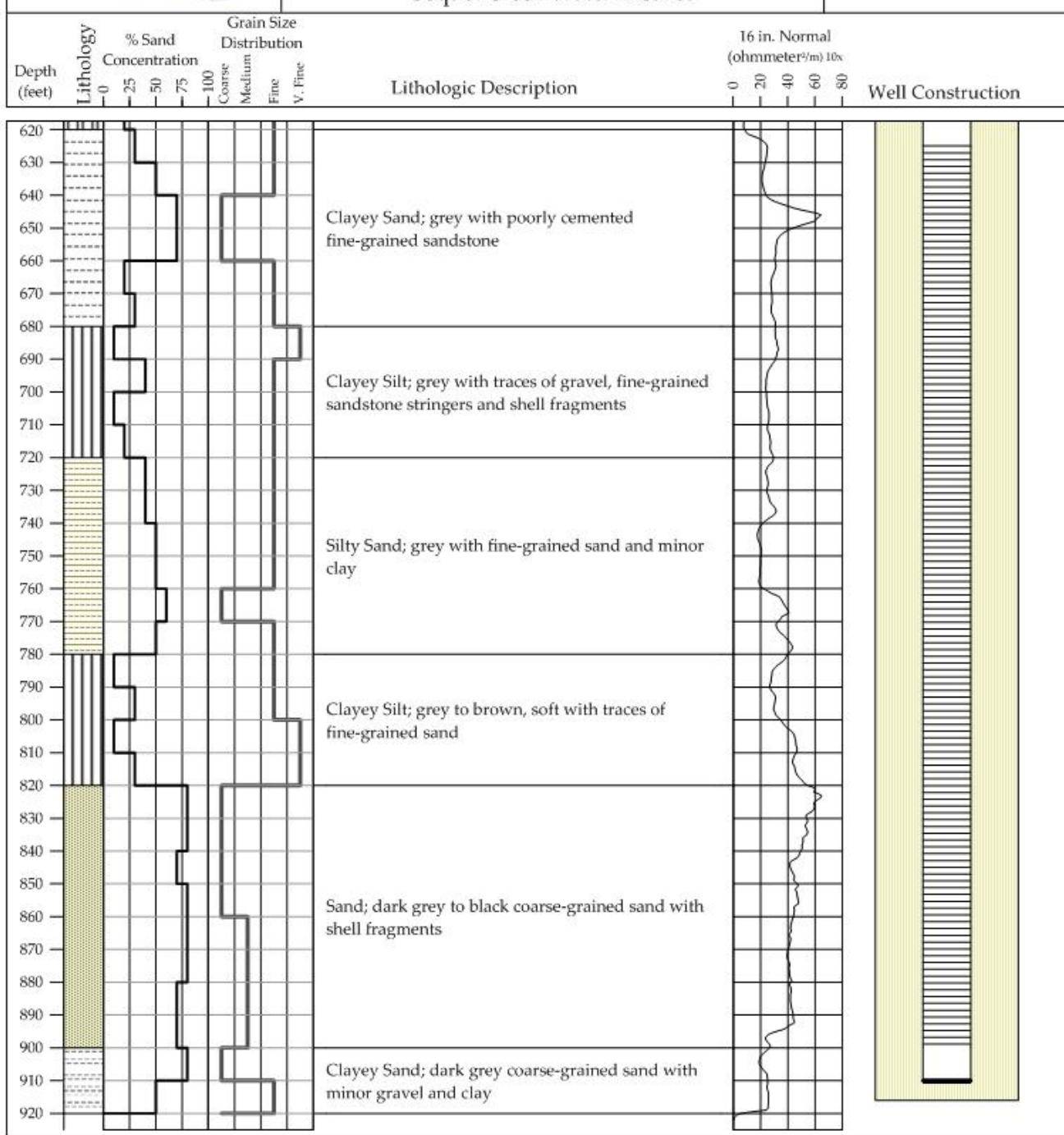


Logged By: Nick Byler Northing (Y): 1816133.2 Easting (X): 6147490.2 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 14.33 NAVD29, feet Location: Seacliff State Beach Drilling Dates: 3/12/12 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 916	Fill Materials 0 - 603 Neat Cement 603 - 609 Bentonite 609 - 916 Cemex 8 x 16	Borehole Depth, ft 0 - 1 1 - 625 625 - 900 900 - 910	Casing Diam., in. 4 2 2 2	Casing Material Sch. 80 PVC Blank Sch. 80 PVC Blank Sch. 80 PVC 0.040" Screen Sch. 80 PVC Blank
Static Water Level				



Logged By: Nick Byler Northing (Y): 1816133.2 Easting (X): 6147490.2 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 14.33 NAVD29, feet Location: Seacliff State Beach Drilling Dates: 3/12/12 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 916	<b>Fill Materials</b> 0 - 603 Neat Cement 603 - 609 Bentonite 609 - 916 Cemex 8 x 16	<b>Borehole</b> Depth, ft 0 - 1 1 - 625 625 - 900 900 - 910	<b>Casing</b> Diam., in. 8.75 8.75 8.75 8.75	<b>Casing Material</b> 4 Sch. 80 PVC Blank 2 Sch. 80 PVC Blank 2 Sch. 80 PVC 0.040" Screen 2 Sch. 80 PVC Blank
				Static Water Level

SC-9R A (Deep)

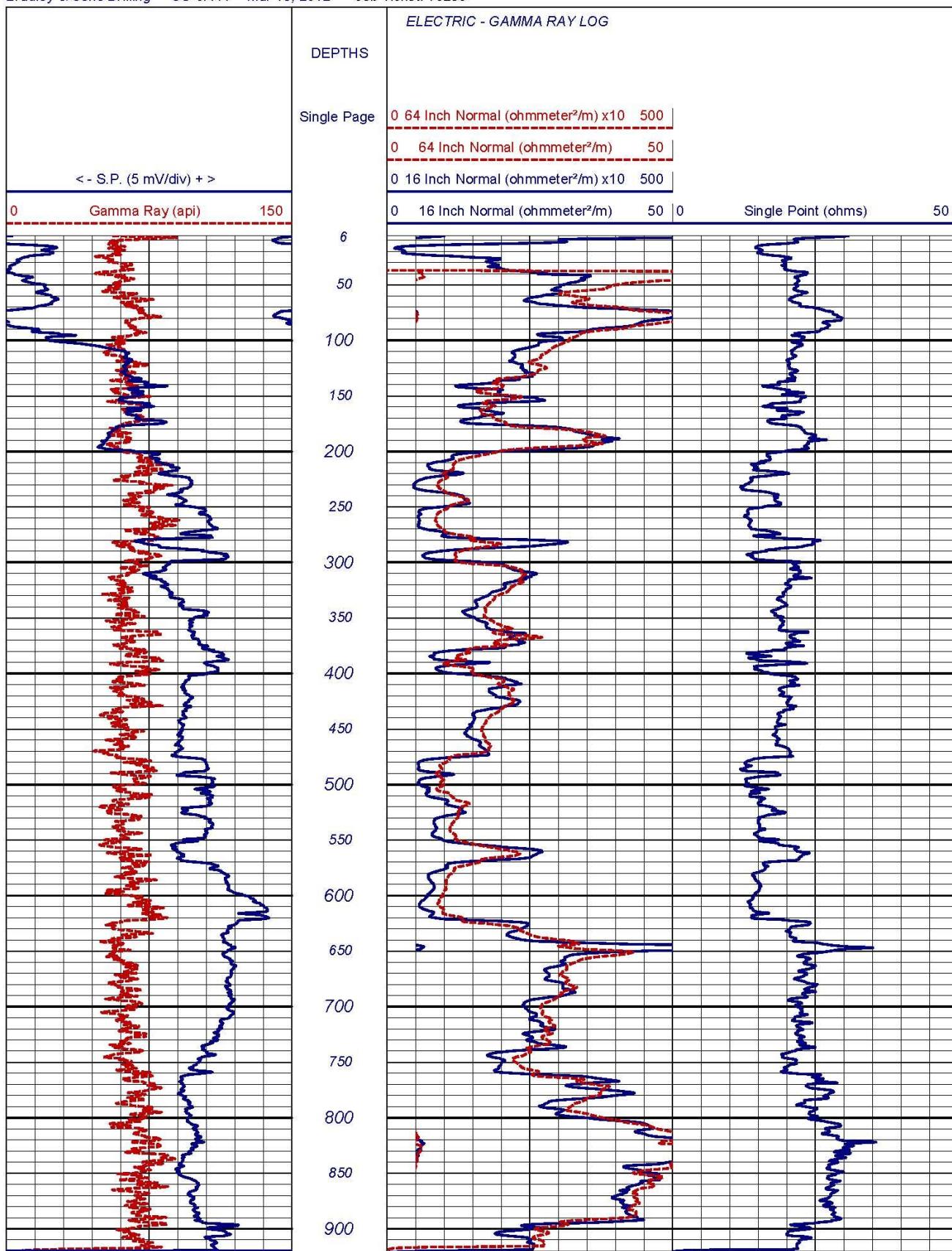


Logged By: Nick Byler Northing (Y): 1816133.2 Easting (X): 6147490.2 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 14.33 NAVD29, feet Location: Sealcliff State Beach Drilling Dates: 3/12/12 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 916	<b>Fill Materials</b>  0 - 603 Neat Cement 603 - 609 Bentonite 609 - 916 Cemex 8 x 16	<b>Borehole Casing</b>  Depth, ft      Diam., in.      Diam., in.      Casing Material 0 - 1      8.75      4      Sch. 80 PVC Blank 1 - 625      8.75      2      Sch. 80 PVC Blank 625 - 900      8.75      2      Sch. 80 PVC 0.040" Screen 900 - 910      8.75      2      Sch. 80 PVC Blank
		▼ Static Water Level

*Monitoring Well Destruction, Replacement, and New Installations*  
October 2, 2012 A-70

A-70





**welenco**  
CA. Contractor's License: 722373

Phone: (800) 445-9914 Fax: (661) 834-2550 Email: [welenco@welenco.com](mailto:welenco@welenco.com) Web: [www.welenco.com](http://www.welenco.com)  
(Prepared with Log Print, a professional software application developed by welenco, inc.)

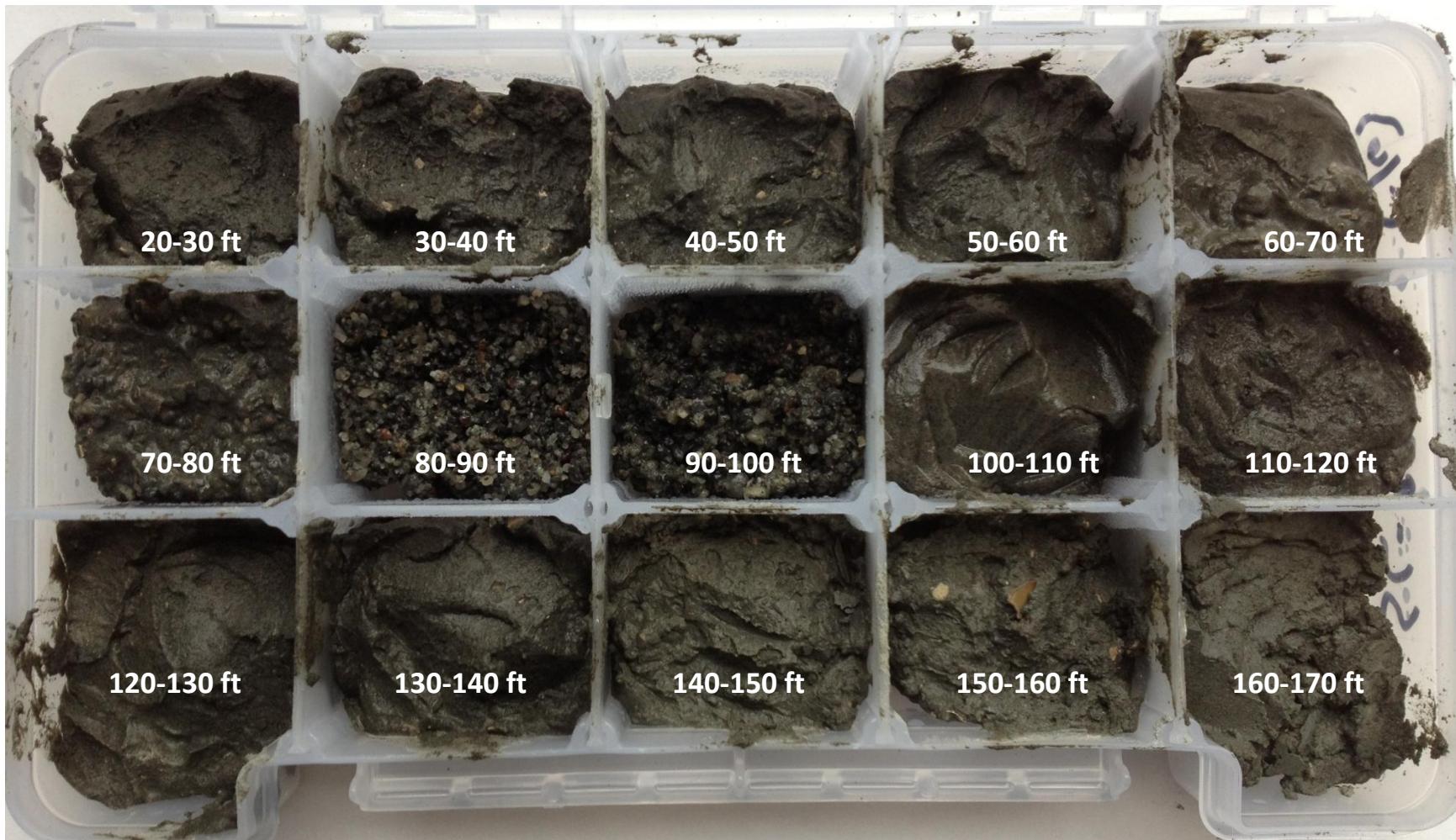
## SC-9RA

### Detailed Lithologic Description

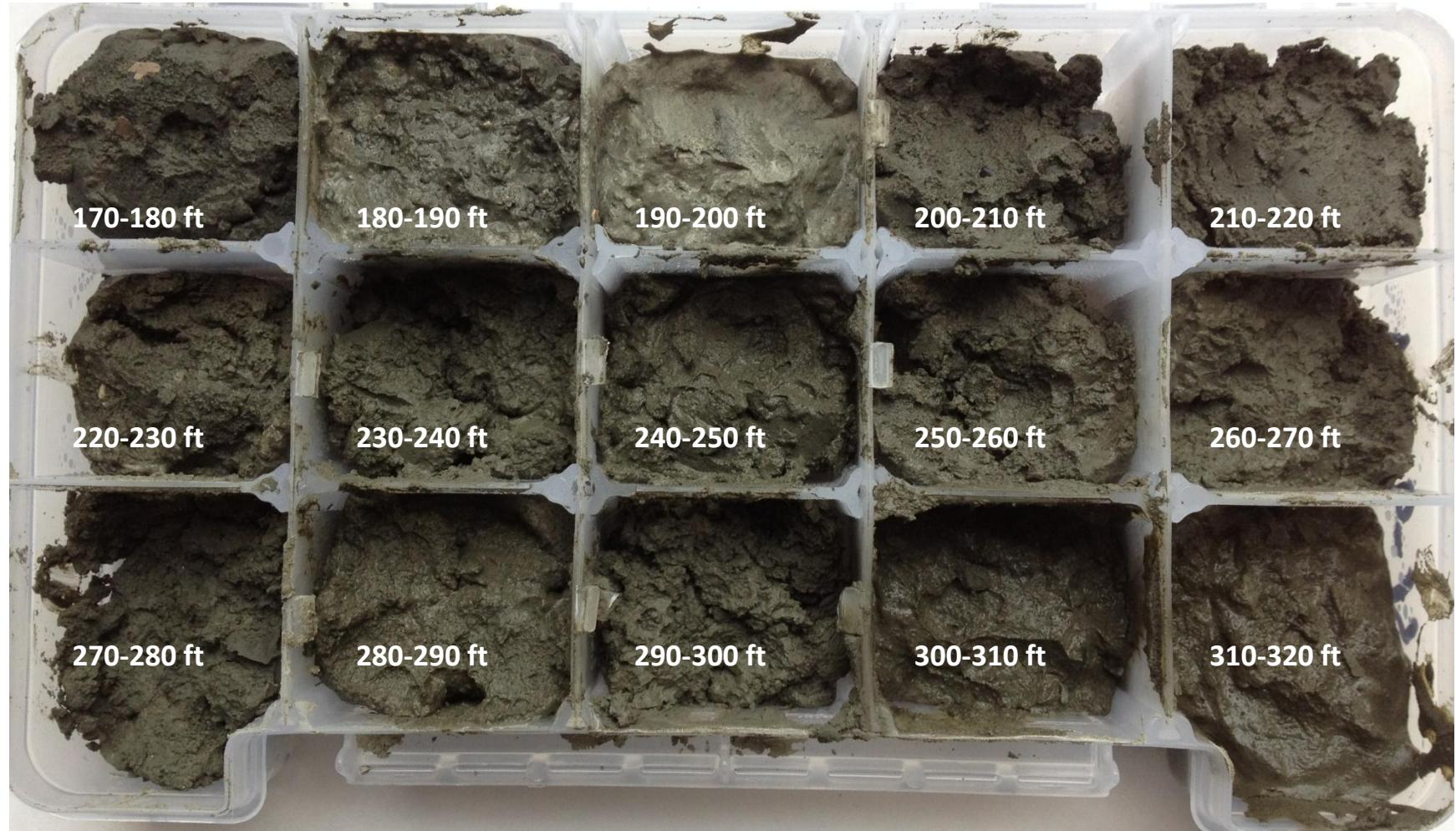
<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
0	10	Fill; tan brown to grey, poorly indurated, contains shell fragments and angular gravel
10	20	Fill; grey to brown with rounded gravel
20	30	Silty Clay; grey, firm with traces of chert and shell fragments
30	40	Silty Clay; grey with minor sand and gravel
40	50	Sandy Clay; dark grey, firm
50	60	Sandy Clay; dark grey with minor gravel
60	70	Sandy Clay; grey with coarse-grained sand
70	80	Sand; dark grey, coarse-grained to gravel sized
80	90	Sand; dark grey, coarse-grained and angular that consists of quartz and chert
90	100	Sand; grey, coarse-grained sand consisting of quartz and chert
100	110	Silty Clay; grey, firm, with traces of coarse-grained sand
110	120	Silty Clay; blue-grey with minor coarse-grained sand
120	130	Clay; dark grey with minor silts and shell fragments
130	140	Clay; grey, firm with traces of shell fragments
140	150	Clay; grey, firm with minor shell fragments
150	160	Clay; dark grey, firm with shell fragments
160	170	Silty Clay; grey, with traces of sand and shell fragments
170	180	Clay; dark grey, firm with minor shell fragments
180	190	Sandy Clay; grey with coarse-grained sand
190	200	Sandy Clay; light grey with coarse-grained sand and shell fragments
200	210	Clay; grey, firm with traces of sand and shell fragments
210	220	Clay; grey, firm
220	230	Clay; dark grey, firm
230	240	Clay; grey, very firm
240	250	Clay; grey, firm
250	260	Clay; grey, very firm
260	270	Clay; grey, firm
270	280	Clay; grey very firm
280	290	Silty Clay; grey with traces of sand and shell fragments
290	300	Clay; grey, very firm with traces of sandstone
300	310	Clay; grey, firm with traces of sand and shell fragments
310	320	Clay; grey with stringers of medium-grained sandstone
320	330	Sandy Clay; grey, firm with traces of shell fragments
330	340	Sandy Clay; grey, firm
340	350	Clay; grey, soft with traces of very-fine grained sand
350	360	Sandy Clay; grey, firm with traces of shell fragments

<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
360	370	Clay; grey, firm with traces of fine-grained sandstone
370	380	Clay; grey with well indurated medium grained sandstone stringers.
380	390	Clay; grey with traces of shell fragments
390	400	Clay; grey, firm with minor sand and shell fragments
400	410	Clay; grey, firm with traces of shell fragments
410	420	Clay; dark grey, firm with shell fragments
420	430	Clayey Sand; dark grey coarse-grained sand with minor clay
430	440	Clayey Sand; dark grey coarse-grained sand mixed with clay
440	450	Sandy Clay; dark grey, firm with minor very fine-grained sand
450	460	Clay; dark grey with traces of very fine-grained sand
460	470	Clay; dark grey to black, soft with traces of very fine-grained sand
470	480	Clay; dark grey to brown, soft with minor shell fragments
480	490	Clay; dark grey-brown, firm with shell fragments
490	500	Sandy Clay; dark grey with well indurated medium-grained sandstone and shell fragments
500	510	Clay; grey, firm with minor shell fragments
510	520	Clay; grey, soft with sandstone stringers and traces of shell fragments
520	530	Clay; grey, soft with traces of shell fragments
530	540	Clay; grey, soft with abundant shell fragments
540	550	Clay; grey, firm with shell fragments
550	560	Clay; grey, soft with shell fragments
560	570	Sandy Clay; grey with coarse-grained sands and shell fragments
570	580	Sandy Clay; grey coarse-grained sands and abundant shell fragments
580	590	Sandy Clay; grey, firm with sandstone stringers
590	600	Silty Clay; grey, firm with minor shell fragments
600	610	Clay; grey, firm with fine-grained sandstone stringers
610	620	Clay; grey with poorly indurated sandstone stringers
620	630	Sandy Clay; grey with poorly cemented fine-grained sandstone
630	640	Clayey Sand; poorly indurated fine-grained sandstone with minor clay
640	650	Clayey Sand; coarse-grained sand with well cemented sandstone stringers
650	660	Clayey Sand; coarse-grained sand with well indurated sandstone stringers
660	670	Sandy Clay; soft with traces of fine-grained sand
670	680	Sandy Clay; grey, soft with minor fine-grained sand
680	690	Silty Clay; grey with traces of gravel and shell fragments
690	700	Silty Sand; fine-grained sand with minor clay
700	710	Silty Clay; grey with minor fine-grained sand
710	720	Silty Clay; grey, soft with fine-grained sandstone stringers
720	730	Silty Sand; grey fine-grained sand with minor clay
730	740	Silty Sand; grey fine-grained sand with traces of clay
740	750	Silty Sand; grey with fine-grained sand and minor clay
750	760	Silty Sand; grey fine-grained sand

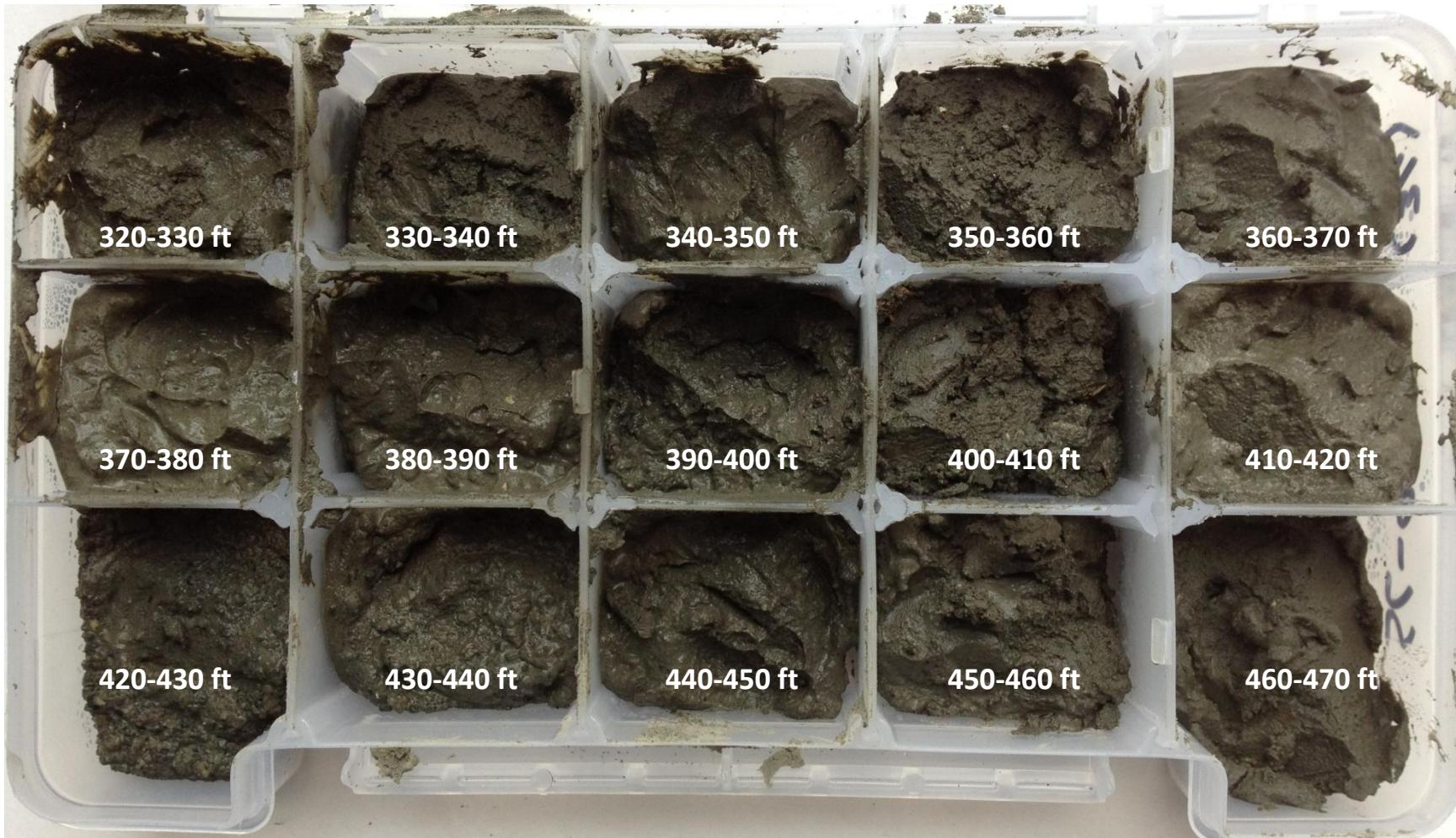
<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
760	770	Silty Sand; grey to black coarse-grained sand
770	780	Silty Sand; grey, soft, with fine-grained sand
780	790	Silty Clay; grey, soft with traces of fine-grained sand
790	800	Sandy Clay; grey, soft with minor fine-grained sand
800	810	Silty Clay; grey to brown, soft
810	820	Silty Sand; grey very fine-grained sand with minor clay
820	830	Sand; dark grey coarse-grained sands with shell fragments
830	840	Sand; grey coarse-grained sand with shell fragments
840	850	Sand; grey coarse-grained with minor clay
850	860	Sand; grey coarse-grained with shell fragments
860	870	Sand; dark grey to black medium-grained sand
870	880	Sand; dark grey medium-grained sand
880	890	Sand; dark grey to brown medium-grained sand with traces of clay
890	900	Sand; dark grey to brown medium-grained sand with minor clay
900	910	Clayey Sand; dark grey coarse-grained sand with minor gravel and clay
910	920	Sandy Clay; grey, soft with fine-grained sand and traces of gravel



**Cuttings from 20 – 170 feet  
SC-9RA (Deep) at Seacliff State Beach**



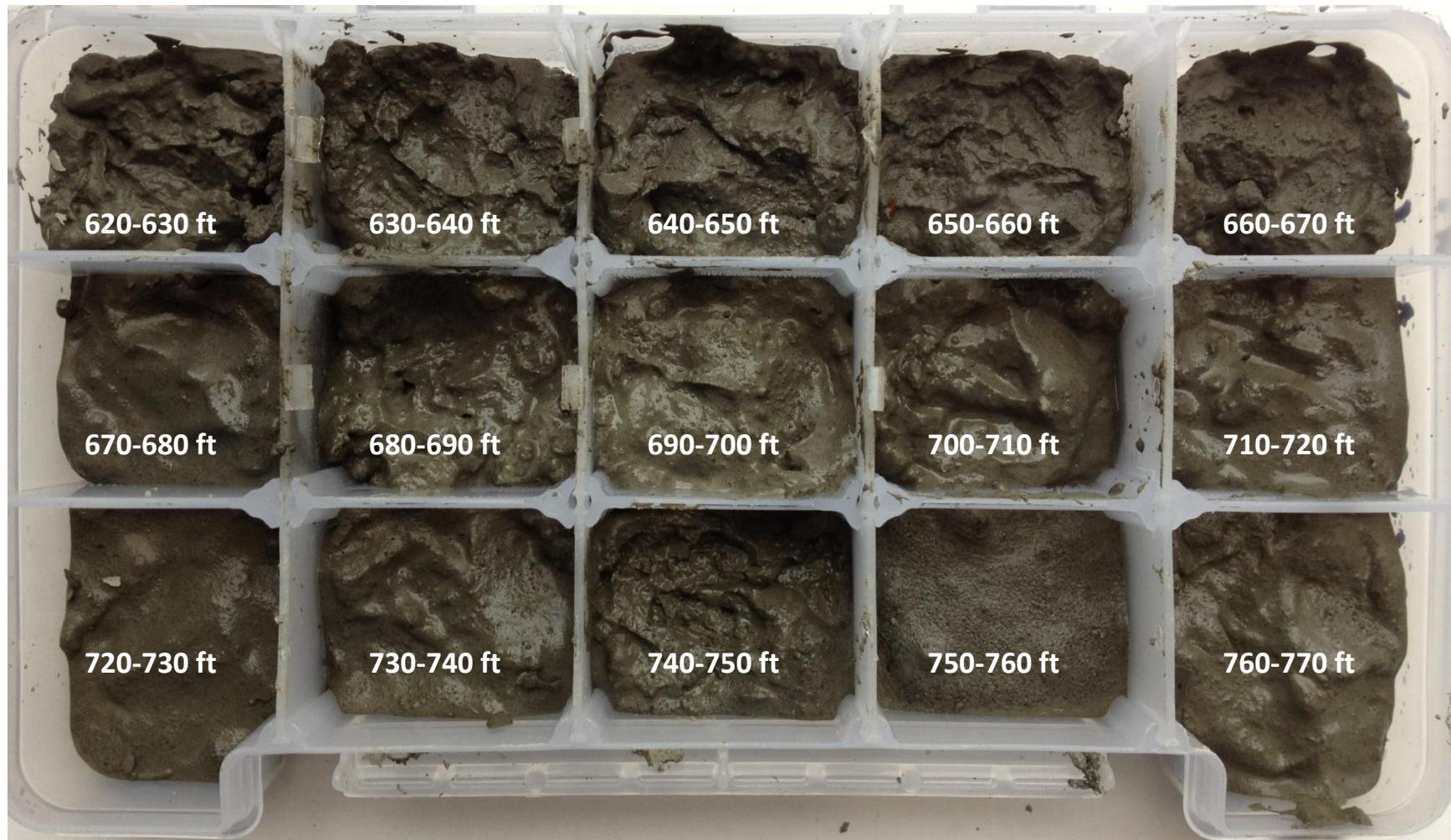
Cuttings from 170 – 320 feet  
SC-9RA (Deep) at Seacliff State Beach



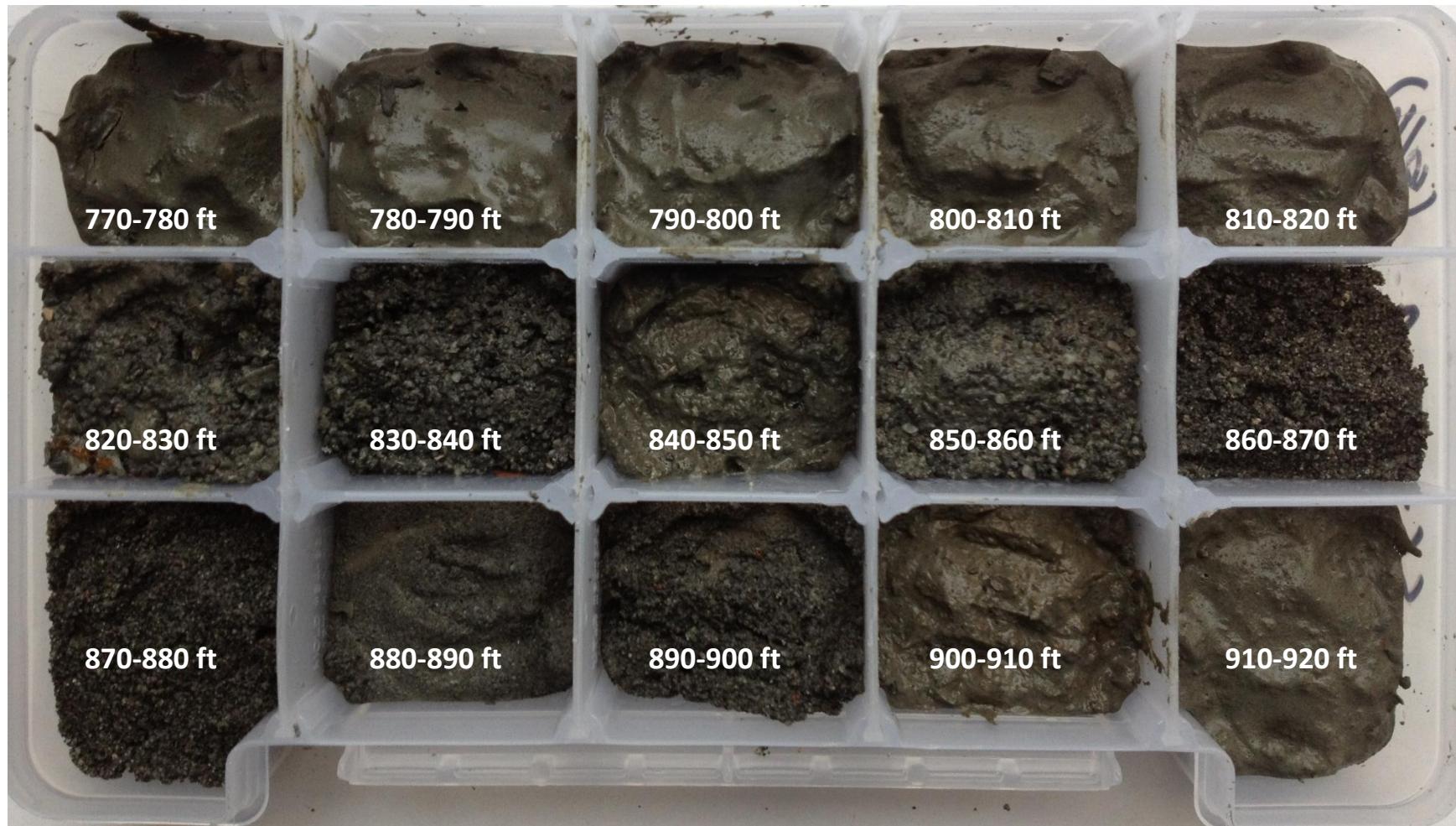
Cuttings from 320 – 470 feet  
SC-9RA (Deep) at Seacliff State Beach



Cuttings from 470 – 620 feet  
SC-9RA (Deep) at Seacliff State Beach



**Cuttings from 620 – 770 feet  
SC-9RA (Deep) at Seacliff State Beach**



Cuttings from 770 – 920 feet  
SC-9RA (Deep) at Seacliff State Beach

## **SC-9RC (Intermediate)**

Well Permit  
Well Drillers Log  
Lithologic Log

**APPLICATION FOR WELL PERMIT**

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

138201-01

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

12-052

B654

4680

PROGRAM ELEMENT

SITE ADDRESS Las Olas dr Camp site B21

OWNER Cal State Parks ADDRESS 144 School St Santa Cruz Ca. 95060

DRILLING CONTRACTOR Bradley &amp; Sons LICENSE # 414178 PHONE 559 441-1401

DIRECTIONS TO SITE State Park Dr west To Las Olas dr

**DESIGN SPECIFICATIONS:****INTENDED USE**

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System \_\_\_\_\_

IRRIGATION \_\_\_\_\_

COMMERCIAL/INDUSTRIAL \_\_\_\_\_

MONITORING: GROWTR  VADOSE \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY) \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA  NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)**CONSTRUCTION** DEPTH (FT.) 380 DIAMETER (IN.) 2" DEPTH OF SEAL (FT.) 300' WIDTH OF SEAL (IN.) 3"**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: 5 TYPES: DOMESTIC IRRIGATION COMMERCIAL USE OTHER Sample

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE TO BE DESTROYED 

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_**V DESTRUCTION:** DEPTH OF WELL \_\_\_\_\_ DEPTH OF SEAL: \_\_\_\_\_ NUMBER OF WATER FORMATIONS PENETRATED \_\_\_\_\_  
CLEANING OF WELL REQUIRED YES:  NO:  SEALING MATERIAL \_\_\_\_\_**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

**WORKER'S COMPENSATION CERTIFICATE**

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER \_\_\_\_\_

DRILLING CONTRACTOR *Bradley* \_\_\_\_\_**FOR OFFICE USE ONLY:**ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO METER REQUIRED YES  NO  METER INSTALLED \_\_\_\_\_ DATE \_\_\_\_\_ READING \_\_\_\_\_SITE INSPECTION DATE *2/14/12* EHS SPECIALIST *(HR)* ANNULAR WELL SEAL WITNESSED: \_\_\_\_\_APPLICATION APPROVAL DATE *2/16/12* *(HR)* YES DATE \_\_\_\_\_

PAD INSPECTION \_\_\_\_\_

RECEIPT OF WELL LOG \_\_\_\_\_ NO DEPTH \_\_\_\_\_

FINAL \_\_\_\_\_ SEAL MATERIAL \_\_\_\_\_

# SACKS CEMENT/YARD \_\_\_\_\_

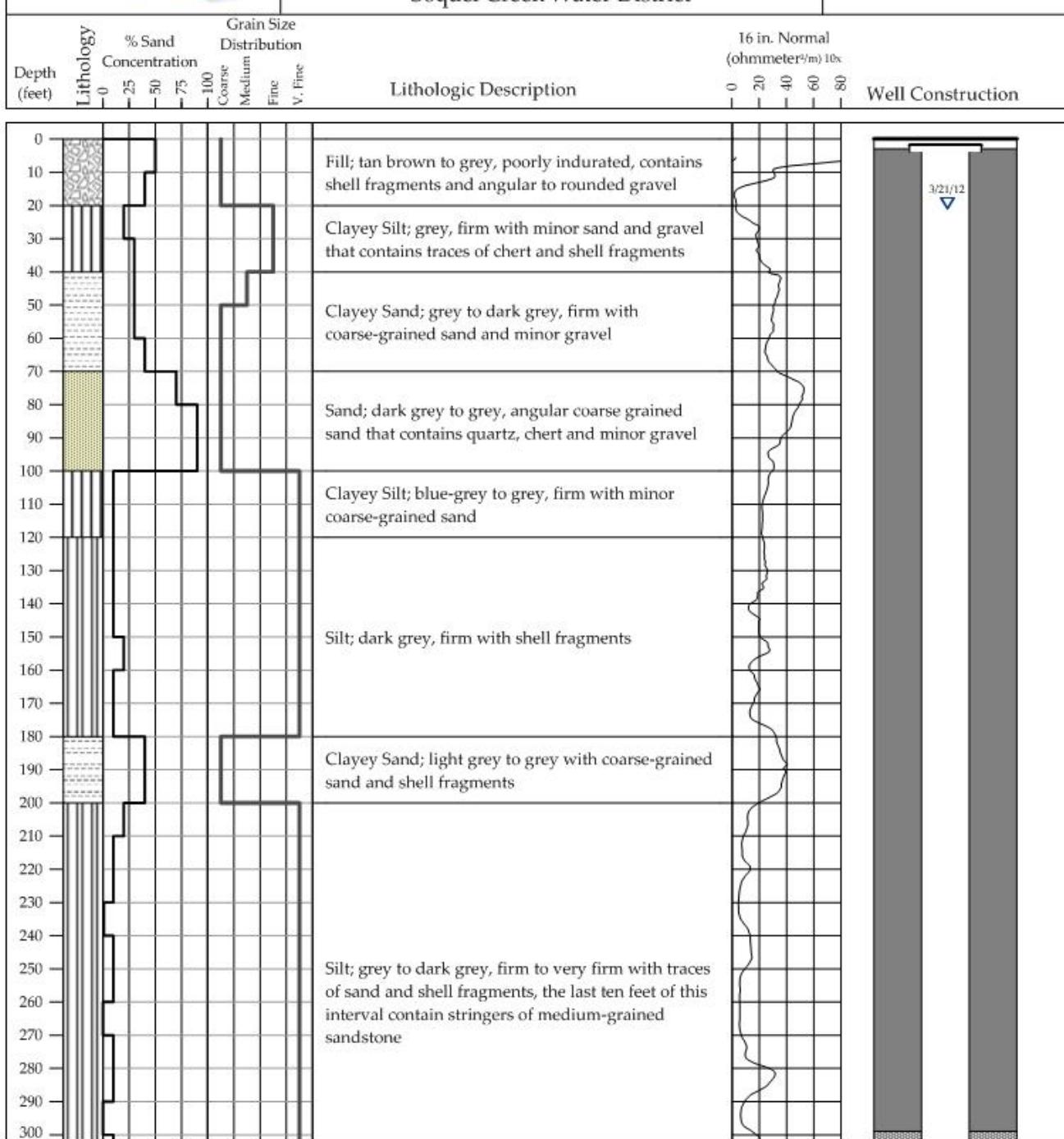
COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

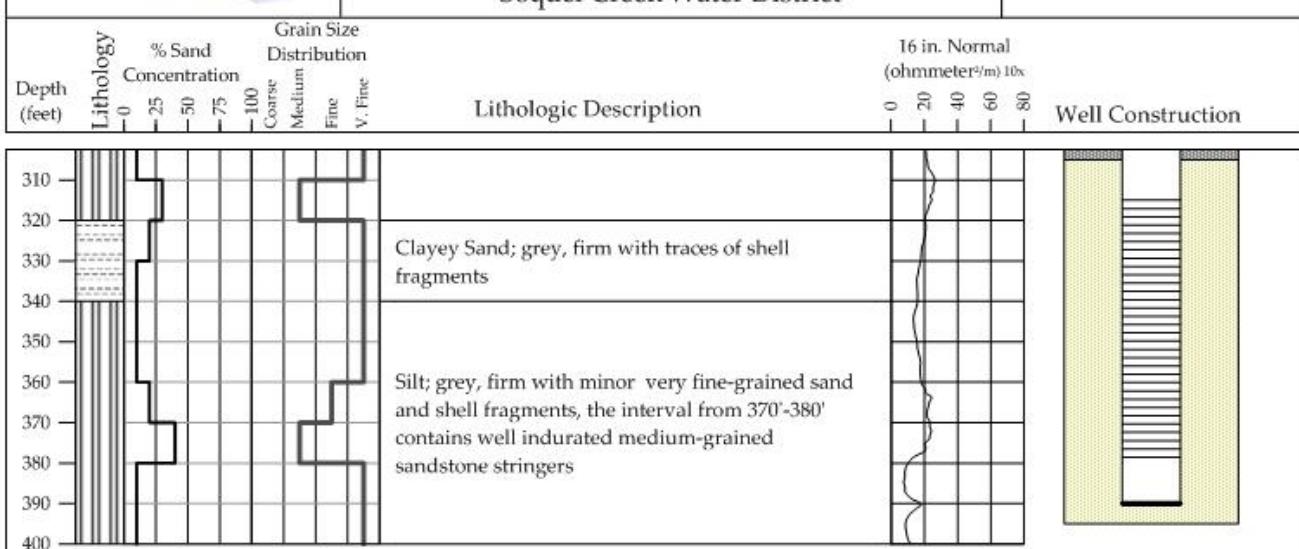
*ODW 2/24/12*





Logged By: Nick Byler Northing (Y): 1816119.8 Easting (X): 6147503.1 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 14.4 NAVD29, feet Location: Seacliff State Beach Drilling Dates: 3/6/12 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 395	<b>Fill Materials</b> 0 - 299 Neat Cement 299 - 305 Bentonite 305 - 395 Cemex 8 x 16	<b>Borehole</b> Depth, ft 0 - 1 1 - 315 315 - 380 380 - 390	<b>Casing</b> Diam., in. 4 2 2 2	<b>Casing Material</b> Sch. 80 PVC Blank Sch. 80 PVC Blank Sch. 80 PVC 0.040" Screen Sch. 80 PVC Blank
--	---	--	---	--

Static Water Level



Note: Lithology, % Sand Concentration, Grain Size Distribution, Lithologic Description, and Geophysical Log are from SC-9R A (Deep)

Logged By: Nick Byler Northing (Y): 1816119.8 Easting (X): 6147503.1 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 14.4 NAVD29, feet Location: Seacliff State Beach Drilling Dates: 3/6/12 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 395	<b>Fill Materials</b> 0 - 299 Neat Cement 299 - 305 Bentonite 305 - 395 Cemex 8 x 16	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Borehole Depth, ft</th><th>Casing Diam., in.</th><th>Casing Diam., in.</th><th>Casing Material</th></tr> </thead> <tbody> <tr> <td>0 - 1</td><td>8.75</td><td>4</td><td>Sch. 80 PVC Blank</td></tr> <tr> <td>1 - 315</td><td>8.75</td><td>2</td><td>Sch. 80 PVC Blank</td></tr> <tr> <td>315 - 380</td><td>8.75</td><td>2</td><td>Sch. 80 PVC 0.040" Screen</td></tr> <tr> <td>380 - 390</td><td>8.75</td><td>2</td><td>Sch. 80 PVC Blank</td></tr> </tbody> </table> <p style="text-align: center;">▼ Static Water Level</p>	Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material	0 - 1	8.75	4	Sch. 80 PVC Blank	1 - 315	8.75	2	Sch. 80 PVC Blank	315 - 380	8.75	2	Sch. 80 PVC 0.040" Screen	380 - 390	8.75	2	Sch. 80 PVC Blank
Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material																			
0 - 1	8.75	4	Sch. 80 PVC Blank																			
1 - 315	8.75	2	Sch. 80 PVC Blank																			
315 - 380	8.75	2	Sch. 80 PVC 0.040" Screen																			
380 - 390	8.75	2	Sch. 80 PVC Blank																			

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## **SC-9RE (Shallow)**

Well Permit  
Well Drillers Log  
Lithologic Log

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_

MONITORING WELL

03820-01

12-053 BL053

4680

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

(PERMIT #)

(ENVISION #)

PROGRAM ELEMENT

SITE ADDRESS Las Olas dr Camp site B21

OWNER Cal State Parks ADDRESS 144 School St Santa Cruz Ca. 95060

DRILLING CONTRACTOR Bradley B. Sons LICENSE # 414178 PHONE 559-441-1401

DIRECTIONS TO SITE STATE PARK dr west of Las Olas dr

DESIGN SPECIFICATIONS:

CASH REGISTER VALIDATION

INTENDED USE

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System \_\_\_\_\_

IRRIGATION \_\_\_\_\_

COMMERCIAL/INDUSTRIAL \_\_\_\_\_

MONITORING: GRDWTR  VADOSE \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY) \_\_\_\_\_

DISTANCE FROM WELL SITE TO:

SEPTIC SYSTEMS \_\_\_\_\_

SEWER \_\_\_\_\_

NEAREST PROPERTY LINE \_\_\_\_\_

CASING \_\_\_\_\_

SINGLE  DOUBLE 

MATERIAL PVC \_\_\_\_\_

TYPE OF JOINT Thread \_\_\_\_\_

GRAVEL PACK TYPE OF WELL CONSTRUCTION:ROTARY 

CABLE \_\_\_\_\_

DUG \_\_\_\_\_

OTHER \_\_\_\_\_

02/09/2012

000000

19125 4:16PM

E-Beth 0008

PE # 4680

\$323.00

CIR01

\$323.00

ESTIMATED WORK DATES; START \_\_\_\_\_ COMPLETION \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA  NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) 150 DIAMETER (IN.) 3" DEPTH OF SEAL (FT.) 10" WIDTH OF SEAL (IN.) 3"

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: 5 TYPES: DOMESTIC \_\_\_\_ IRRIGATION \_\_\_\_ COMMERCIAL USE \_\_\_\_ OTHER Sample

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_ TO BE DESTROYED 

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL \_\_\_\_ TO BE DESTROYED  OTHER \_\_\_\_\_

DESTRUCTION: DEPTH OF WELL \_\_\_\_\_ DEPTH OF SEAL: \_\_\_\_\_ NUMBER OF WATER FORMATIONS PENETRATED \_\_\_\_\_  
 CLEANING OF WELL REQUIRED YES:  NO:  SEALING MATERIAL \_\_\_\_\_

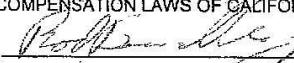
PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
 INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED, I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER DRILLING CONTRACTOR FOR OFFICE USE ONLY:ENVIRONMENTAL ASSESSMENT REQUIRED YES  NO METER REQUIRED YES  NO 

METER INSTALLED \_\_\_\_\_

DATE \_\_\_\_\_

READING \_\_\_\_\_

SITE INSPECTION

DATE 2/14/12

EHS SPECIALIST (TBD)

ANNULAR WELL SEAL WITNESSED:

APPLICATION APPROVAL

DATE 2/16/12

(TBD)

YES DATE \_\_\_\_\_

PAD INSPECTION

\_\_\_\_\_

\_\_\_\_\_

NO DEPTH \_\_\_\_\_

RECEIPT OF WELL LOG

\_\_\_\_\_

\_\_\_\_\_

SEAL MATERIAL \_\_\_\_\_

FINAL

\_\_\_\_\_

\_\_\_\_\_

# SACKS CEMENT/YARD \_\_\_\_\_

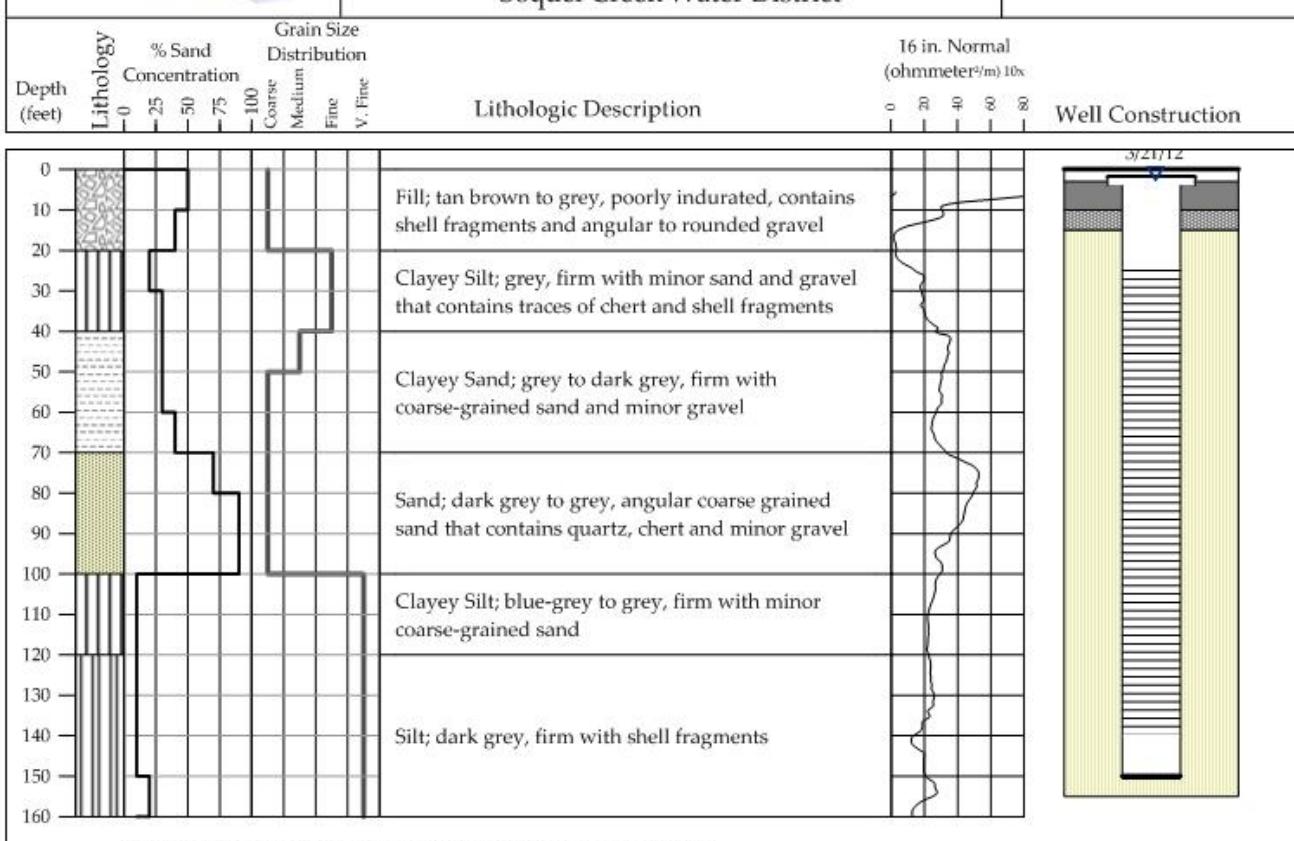
COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

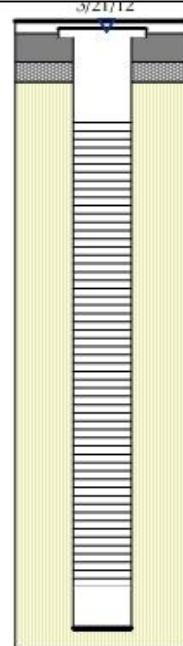
Well Permit Application - PHD-133.WPD (REV. 9/03)

CW 2/20/12





Note: Lithology, % Sand Concentration, Grain Size Distribution, Lithologic Description, and Geophysical Log are from SC-9R A (Deep)



Logged By: Nick Byler Northing (Y): 1816126.2 Easting (X): 6147477.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 13.34 NAVD29, feet Location: Seacliff State Beach Drilling Dates: 3/6/12 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 155	<b>Fill Materials</b> 0 - 10 Neat Cement 10 - 15 Bentonite 15 - 155 Cemex 8 x 16	<b>Borehole Depth, ft</b> <b>Casing Diam., in.</b> <b>Casing Diam., in.</b> <b>Casing Material</b> 0 - 1 8.75 4 Sch. 80 PVC Blank 1 - 25 8.75 2 Sch. 80 PVC Blank 25 - 140 8.75 2 Sch. 80 PVC 0.040" Screen 140 - 150 8.75 2 Sch. 80 PVC Blank
		Static Water Level

## **SC-8 Destruction**

Well Destruction Permits

**APPLICATION FOR WELL PERMIT**

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

042-102-01

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

12-093-815452

(PERMIT #)

4081

(ENVISION #)

PROGRAM ELEMENT

SITE ADDRESS Seal Cliff State Beach @ Creek dr, Aptos

OWNER State of California ADDRESS 303 Big Tree Park rd, Felton, Ca 95018

DRILLING CONTRACTOR Bradley &amp; Sons LICENSE # 444178 PHONE 559-441-1401

DIRECTIONS TO SITE State Park Exit West To Park Then Follow To south, next To creek

**DESIGN SPECIFICATIONS:****INTENDED USE**

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System \_\_\_\_\_

IRRIGATION \_\_\_\_\_

COMMERCIAL/INDUSTRIAL \_\_\_\_\_

MONITORING: \_\_\_\_\_

GRDWTR VADOSE \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY)

**DISTANCE FROM WELL SITE TO:**

SEPTIC SYSTEMS \_\_\_\_\_

SEWER \_\_\_\_\_

NEAREST PROPERTY LINE \_\_\_\_\_

CASING \_\_\_\_\_

SINGLE \_\_\_\_\_ DOUBLE \_\_\_\_\_

MATERIAL \_\_\_\_\_

TYPE OF JOINT \_\_\_\_\_

GRAVEL PACK \_\_\_\_\_

**TYPE OF WELL CONSTRUCTION:**

ROTARY \_\_\_\_\_

CABLE \_\_\_\_\_

DUG \_\_\_\_\_

OTHER \_\_\_\_\_

**CASH REGISTER VALIDATION**

04/02/2012 000000

10:09AM

E-Beth

0008

PE # 4601

\$115.00

CHECK1

\$115.00

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: (FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) \_\_\_\_\_ DIAMETER (IN.) \_\_\_\_\_ DEPTH OF SEAL (FT.) \_\_\_\_\_ WIDTH OF SEAL (IN.) \_\_\_\_\_

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: TYPES: DOMESTIC IRRIGATION COMMERCIAL USE OTHER

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE TO BE DESTROYED

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL TO BE DESTROYED OTHER

**WELL DESTRUCTION:** DEPTH OF WELL 100' DEPTH OF SEAL: NUMBER OF WATER FORMATIONS PENETRATED 1

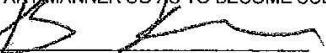
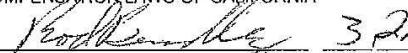
CLEANING OF WELL REQUIRED YES: NO: SEALING MATERIAL 1251 Cement

**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
INSURANCE CARRIER: POLICY #

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER  DRILLING CONTRACTOR  3/29/12

**FOR OFFICE USE ONLY:**ENVIRONMENTAL ASSESSMENT REQUIRED YES NO 

METER REQUIRED YES	NO	METER INSTALLED	DATE	READING	ANNULAR WELL SEAL WITNESSED:
SITE INSPECTION		4-4-12	A0204		
APPLICATION APPROVAL		4-5-12	A0204		YES DATE
PAD INSPECTION					
RECEIPT OF WELL LOG					NO DEPTH
FIN**					SEAL MATERIAL
					# SACKS CEMENT/YARD

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

X G

APPLICATION FOR WELL PERMIT

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

042-102-01

12-094 SR# 8152

4681

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

(PERMIT #)

(ENVISION #)

PROGRAM ELEMENT

SITE ADDRESS Seacliff State beach @ Creek dr. Aptos

OWNER State of California ADDRESS 303 Big Tree Park Rd. Felton Ca. 95018

DRILLING CONTRACTOR Bradley &amp; Sons LICENSE # 4144178 PHONE 559-441-1401

DIRECTIONS TO SITE STATE PARK EXIT WEST TO PARK then follow to south next to creek

04/02/2012 00000  
#0192 CASH REGISTER VALIDATION 0001PE # 4681 \$115.00  
\$115.00DESIGN SPECIFICATIONS:

INTENDED USE	DISTANCE FROM WELL SITE TO:	TYPE OF WELL CONSTRUCTION
DOMESTIC: _____	SEPTIC SYSTEMS _____	ROTARY _____
#Homes Served _____	SEWER _____	CABLE _____
WATER SYSTEM WELL: _____	NEAREST PROPERTY LINE _____	DUG _____
Name of Water System	CASING _____	OTHER _____
IRRIGATION _____	SINGLE _____ DOUBLE _____	
COMMERCIAL/INDUSTRIAL _____	MATERIAL _____	
MONITORING: _____	TYPE OF JOINT _____	
GROWTH VADOSE _____	GRAVEL PACK _____	
OTHER: _____ (SPECIFY)		

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: / / (FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) DIAMETER (IN.) DEPTH OF SEAL (FT.) WIDTH OF SEAL (IN.)

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
\_\_\_\_ TO SUPPLEMENT NEW WELL \_\_\_\_ TO BE DESTROYED \_\_\_\_ OTHER \_\_\_\_\_

WELL DESTRUCTION: DEPTH OF WELL 338 DEPTH OF SEAL: NUMBER OF WATER FORMATIONS PENETRATED \_\_\_\_\_  
CLEANING OF WELL REQUIRED YES: NO: SEALING MATERIAL Neat Cement

PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

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INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_  
I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER B. Bradley DRILLING CONTRACTOR Bradley 3/29/12FOR OFFICE USE ONLY:

ENVIRONMENTAL ASSESSMENT REQUIRED YES NO \_\_\_\_\_

METER REQUIRED YES NO _____	METER INSTALLED _____	DATE _____	READING _____
	DATE	EHS SPECIALIST	ANNULAR WELL SEAL WITNESSED:
SITE INSPECTION	4-4-12	A Gray	_____
APPLICATION APPROVAL	4-5-12	A Gray	YES DATE _____
PAD INSPECTION	_____	_____	NO DEPTH _____
RECEIPT OF WELL LOG	_____	_____	SEAL MATERIAL _____
FINAL	_____	_____	# SACKS CEMENT/YARD _____

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

**APPLICATION FOR WELL PERMIT**

NEW  REPLACEMENT  SUPPLEMENTAL  DESTRUCTION  OTHER \_\_\_\_\_  MONITORING WELL

042-102-01

(ASSESSOR'S PARCEL NUMBER)

(PARCEL SIZE)

12-092

(PERMIT #)

87603

(ENVISION #)

4681

PROGRAM ELEMENT

SITE ADDRESS Seacliff State Beach &amp; Creek Dr. Aptos

OWNER California, state of ADDRESS 303 Big Trees Park Rd. Felton, Ca 95018

DRILLING CONTRACTOR Bradley &amp; Sons LICENSE # 444178 PHONE 559-441-1401

DIRECTIONS TO SITE State Park exit west to Park Then follow to south, next to creek

**DESIGN SPECIFICATIONS:****INTENDED USE**

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System \_\_\_\_\_

IRRIGATION \_\_\_\_\_

COMMERCIAL/INDUSTRIAL \_\_\_\_\_

MONITORING: \_\_\_\_\_

GRDWTR VADOSE \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY) \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)

**CONSTRUCTION** DEPTH (FT.) \_\_\_\_\_ DIAMETER (IN.) \_\_\_\_\_ DEPTH OF SEAL (FT.) \_\_\_\_\_ WIDTH OF SEAL (IN.) \_\_\_\_\_**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_ OTHER \_\_\_\_\_

**WELL DESTRUCTION:** DEPTH OF WELL 200 DEPTH OF SEAL: 807 NUMBER OF WATER FORMATIONS PENETRATED 1

CLEANING OF WELL REQUIRED YES: NO: SEALING MATERIAL Neat Cement

**PLOT PLAN: ATTACH 2 COPIES OF PLOT PLAN (SEE REVERSE FOR REQUIREMENTS)**

I HEREBY AGREE TO COMPLY WITH ALL LAWS AND REGULATIONS OF THE COUNTY OF SANTA CRUZ AND STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION, AND DECLARE UNDER PENALTY OF PERJURY THE INFORMATION SUBMITTED ON THIS APPLICATION IS TRUE AND CORRECT. I WILL CONTACT THE ENVIRONMENTAL HEALTH SERVICE WHEN I COMMENCE THE WORK. WITHIN 15 DAYS AFTER COMPLETION OF WORK I WILL FURNISH THE ENVIRONMENTAL HEALTH SERVICE A REPORT OF THE WORK PERFORMED AND NOTIFY THEM BEFORE PUTTING THE WELL INTO USE. I UNDERSTAND THAT THIS PERMIT EXPIRES ONE YEAR FROM DATE OF ISSUANCE. I UNDERSTAND APPROVAL OF THE WELL PERMIT DOES NOT INDICATE WHETHER THIS PROPERTY IS SUITABLE FOR AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR THAT A PERMIT TO INSTALL SUCH SYSTEM WILL BE GRANTED.

**WORKER'S COMPENSATION CERTIFICATE**

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.

INSURANCE CARRIER: \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKER'S COMPENSATION LAWS OF CALIFORNIA

PROPERTY OWNER: \_\_\_\_\_

DRILLING CONTRACTOR: \_\_\_\_\_

3 28/10

**FOR OFFICE USE ONLY:**

ENVIRONMENTAL ASSESSMENT REQUIRED YES: NO: ✓

METER REQUIRED YES	NO	METER INSTALLED	DATE	READING	ANNULAR WELL SEAL WITNESSED:
SITE INSPECTION		4-4-12	A Gaylor		
APPLICATION APPROVAL		4-5-12	A Anna		YES DATE _____
PAD INSPECTION					NO DEPTH _____
RECEIPT OF WELL LOG					SEAL MATERIAL _____
FINAL					# SACKS CEMENT/YARD _____

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

Well Permit Application - PHD-133.WPD (REV. 9/03)

## **SC-8RF**

Well Permit  
Well Drillers Log  
Lithologic Log  
Welenco Geophysical Log  
Detailed Lithologic Description  
Photographs of Borehole Cuttings

APPLICATION FOR WELL PERMIT

New  Replacement  Supplemental  Destruction  Other \_\_\_\_\_  Geothermal  Monitoring Well

742-102-01

12-079 8707 4680

S. Parcel Number Other Parcels Served (Permit #) (Envision #) Program Element

Site Address 201 STATE Park dr Apt#3, 95003

Owner California, State of Address 303 135 Trees Park rd. Felton, CA 95018

Drilling Contractor Bradley B Son License # 4141178 Phone 559-441-1401

Directions To Site Highway 1 To state park dr. ESTIMATED WORK DATES: START 3/19 COMPLETION 3/21

Mail Correspondence To: 3625 S. Highland Ave Del-Rey Cr., 93616

**DESIGN SPECIFICATIONS:****INTENDED USE**

DOMESTIC: \_\_\_\_\_

#Homes Served \_\_\_\_\_

WATER SYSTEM WELL: \_\_\_\_\_

Name of Water System \_\_\_\_\_

IRRIGATION Acres: \_\_\_\_\_

Crop: \_\_\_\_\_

Water Use: \_\_\_\_\_ ac/yr

COMMERCIAL/INDUSTRIAL Type: \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA: NO  YES NAME: Sequoia Creek Water

CONSTRUCTION DEPTH (FT.) 210 DIAMETER (IN.) 2"

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: 4 TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED 

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_**WELL DESTRUCTION:**

Depth Of Well \_\_\_\_\_ Depth Of Seal: \_\_\_\_\_

Number Of Water Formations Penetrated \_\_\_\_\_ Perforation?: \_\_\_\_\_

Cleaning Of Well Required Yes:  No:  Sealing Material: \_\_\_\_\_ Other measures: \_\_\_\_\_**DISTANCE FROM WELL SITE TO:**

SEPTIC SYSTEMS \_\_\_\_\_

SEWER \_\_\_\_\_

NEAREST PROPERTY LINE \_\_\_\_\_

MONITORING WELL: GRDWTR  VADOSE \_\_\_\_\_

OTHER: \_\_\_\_\_ (SPECIFY)

**TYPE OF WELL CONSTRUCTION**ROTARY 

CABLE \_\_\_\_\_

DUG \_\_\_\_\_

OTHER \_\_\_\_\_

CASING SINGLE  DOUBLE \_\_\_\_\_

MATERIAL SCH 80 PVC

TYPE OF JOINT Thread \_\_\_\_\_

GRAVEL PACK 

03/08/2012 SC-8

#788 4:39PM

PE # 4600

CHECK 1

E-Bath 0008

\$323.00

\$323.00

WATER EFFICIENCY EVALUATION REQUIRED YES  NO  COMPLETE: \_\_\_\_\_GEOPHYSICAL LOG REQUIRED YES  NO  RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

INSTALLATION VERIFIED: \_\_\_\_\_

OK? \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

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WORKER'S COMPENSATION CERTIFICATE

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INSURANCE CARRIER: \_\_\_\_\_ POLICY #: \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED, I SHALL NOT EMPLOY ANY

PROPERTY OWNER: DD DRILLING CONTRACTOR: Bob 3/8/12\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_SITE INSPECTION: 3/14/12SUPPLEMENTAL WATER USE SHEET: 3/15/12APPLICATION APPROVAL: 3/15/12PAD INSPECTION: 3/15/12RECEIPT OF WELL LOG: 3/15/12FINAL: 3/15/12WATER EFFICIENCY EVALUATION REQUIRED YES  NO  COMPLETE: \_\_\_\_\_GEOPHYSICAL LOG REQUIRED YES  NO  RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

WATER QUALITY DATA RECEIVED: \_\_\_\_\_ OK? \_\_\_\_\_

# SACKS CEMENT/YARD: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

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QUADRUPPLICATE  
For Local Requirements

Page 1 of 1

Owner's Well No. SC 8 RF

Date Work Began 3/26/2012, Ended 3/27/2012

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ

Permit No. 12-079

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet

No. **EO148825**

DWR USE ONLY	DO NOT FILL IN
STATE WELL NO./STATION NO.	
LATITUDE	LONGITUDE
APN/TRS/OTHER	

Permit Date 3/8/2012

**GEOLOGIC LOG**

ORIENTATION (✓)		✓ VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)
DEPTH FROM SURFACE		DEPTH	DRILLING METHOD	FLUID	WATER
ft.	to ft.				
0	20	TOPSOIL, GRAVEL			
20	40	FINE/MEDIUM/COARSE SILT			
40	60	FINE SILT, MEDIUM/FINE/COARSE SANDS			
60	80	MEDIUM/FINE/COARSE SANDS			
80	100	MEDIUM/FINE/COARSE SANDS, FINE SILT			
100	160	FINE SILT			
160	180	FINE SILT, CLAY			
180	217	CLAY			
WEST					
EAST					

**WELL OWNER**

Name **SOQUEL CREEK WATER DIV**

Mailing Address **5180 SOQUEL DRIVE**

**SOQUEL** CA 95073

CITY

STATE ZIP

Address **201 STATE PARK DRIVE**

City **APTOS CA 95003**

County **SANTA CRUZ**

APN Book **042** Page **102** Parcel **01**

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Latitude \_\_\_\_\_

DEG. MIN. SEC.

DEG. MIN. SEC.

**LOCATION SKETCH**

ACTIVITY (✓)

✓ NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify) \_\_\_\_\_

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

**PLANNED USES (✓)**

WATER SUPPLY

— Domestic — Public

— Irrigation — Industrial

MONITORING ✓

TEST WELL \_\_\_\_\_

CATHODIC PROTECTION

HEAT EXCHANGE \_\_\_\_\_

DIRECT PUSH \_\_\_\_\_

INJECTION \_\_\_\_\_

VAPOR EXTRACTION \_\_\_\_\_

SPARGING \_\_\_\_\_

REMEDIATION \_\_\_\_\_

OTHER (SPECIFY) \_\_\_\_\_

**SOUTH**

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE,

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER \_\_\_\_\_ (FT.) BELOW SURFACE

DEPTH OF STATIC

WATER LEVEL \_\_\_\_\_ (FT.) & DATE MEASURED

ESTIMATED YIELD \* \_\_\_\_\_ (GPM) & TEST TYPE **AIR LIFT**

TEST LENGTH **4** (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (FT.)

*May not be representative of a well's long-term yield.*

TOTAL DEPTH OF BORING **217** (Feet)  
TOTAL DEPTH OF COMPLETED WELL **210** (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)				
		BLANK	SCREEN	CONDUIT	PIPE	FILL
0	20	✓		PVC	2"	SCH 80
20	200	✓		PVC	2"	SCH 80 .030
200	210	✓		PVC	2"	SCH 80

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
2	5	✓		
5	10			
10	210		✓	SRI 8

**ATTACHMENTS (✓)**

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other \_\_\_\_\_

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

**CERTIFICATION STATEMENT**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME **BRADLEY & SONS**

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS **3625 S. HIGHLAND**

Signed *[Signature]* WELL DRILLER/AUTHORIZED REPRESENTATIVE

**DEL REY**

CA **93616**

CITY

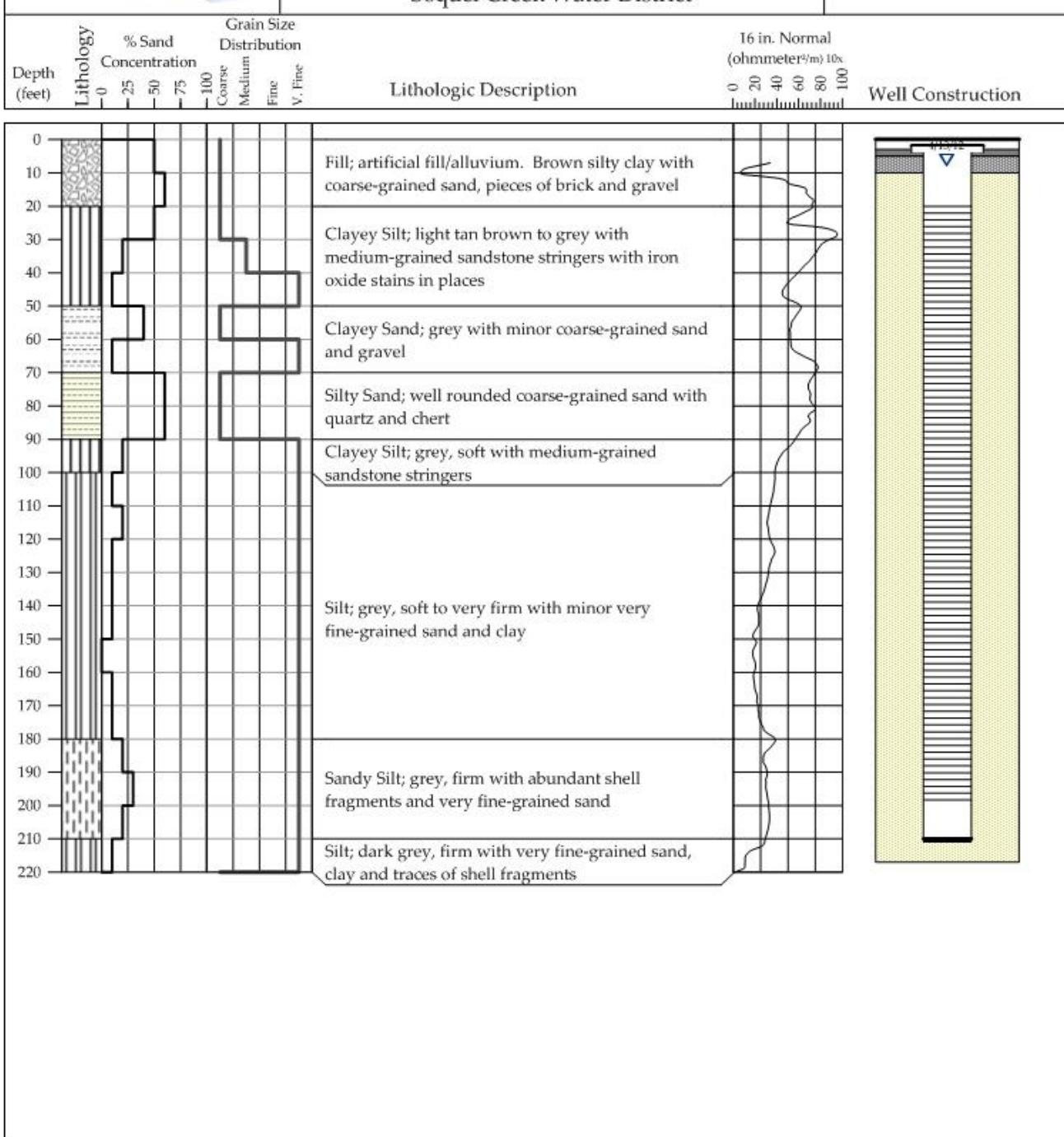
STATE **ZIP**

04/17/12

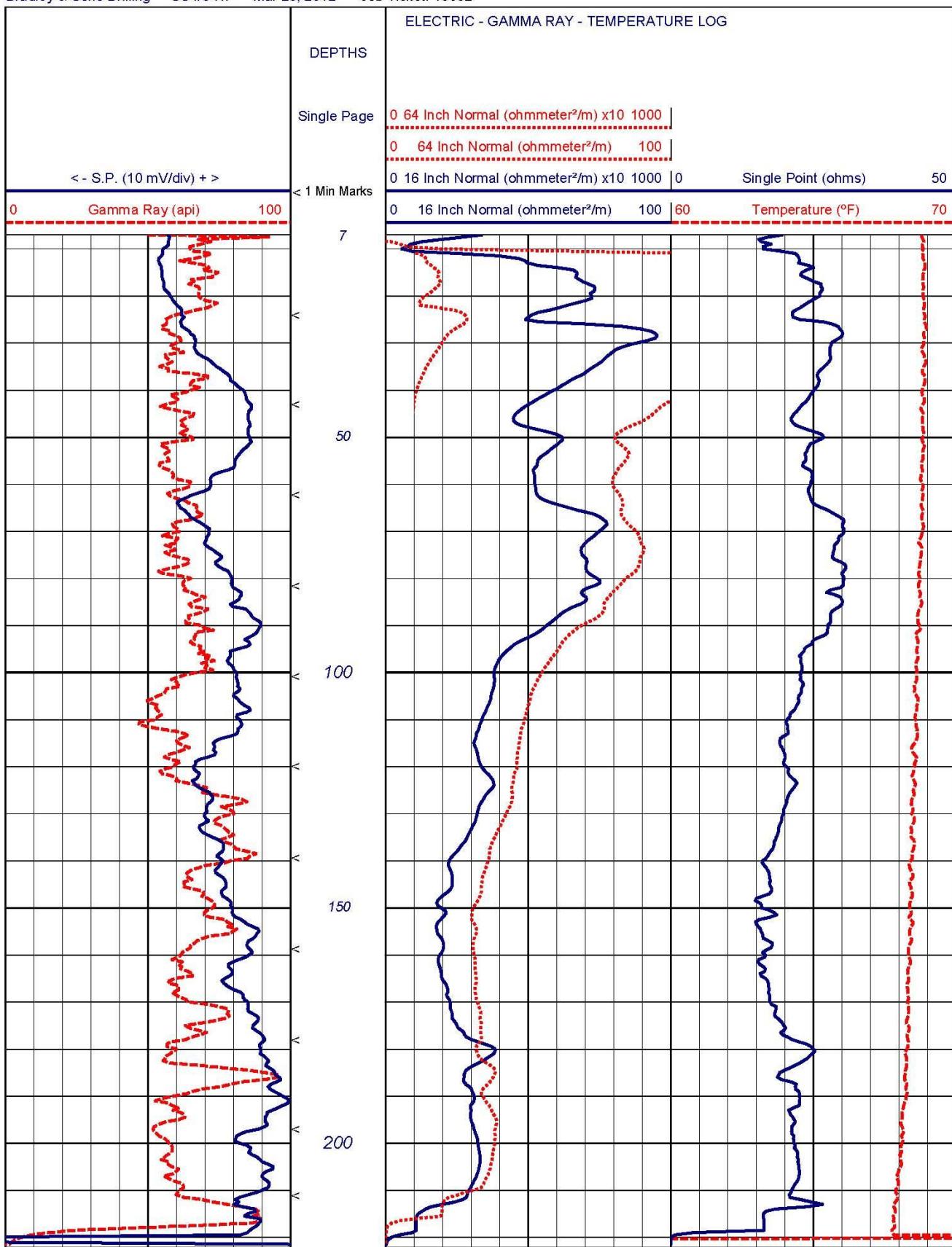
**414178**

DATE SIGNED

C-57 LICENSE NUMBER



Logged By: Nick Byler/Martin Feeney Northing (Y): Easting (X): Coordinate System: Ref. Point Elevation, ft amsl: Location: Aptos Creek Drilling Dates: 3/26/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 217	<b>Fill Materials</b> 0 - 5 Neat Cement 5 - 10 Bentonite 10 - 217 Cemex 8 x 16	<b>Borehole Diam., in.</b> <b>Casing Diam., in.</b> <b>Casing Material</b> 0 - 1 8.75 4 Sch. 80 PVC Blank 1 - 20 8.75 2 Sch. 80 PVC Blank 20 - 200 8.75 2 Sch. 80 PVC 0.040" Screen 200 - 210 8.75 2 Sch. 80 PVC Blank
Static Water Level		



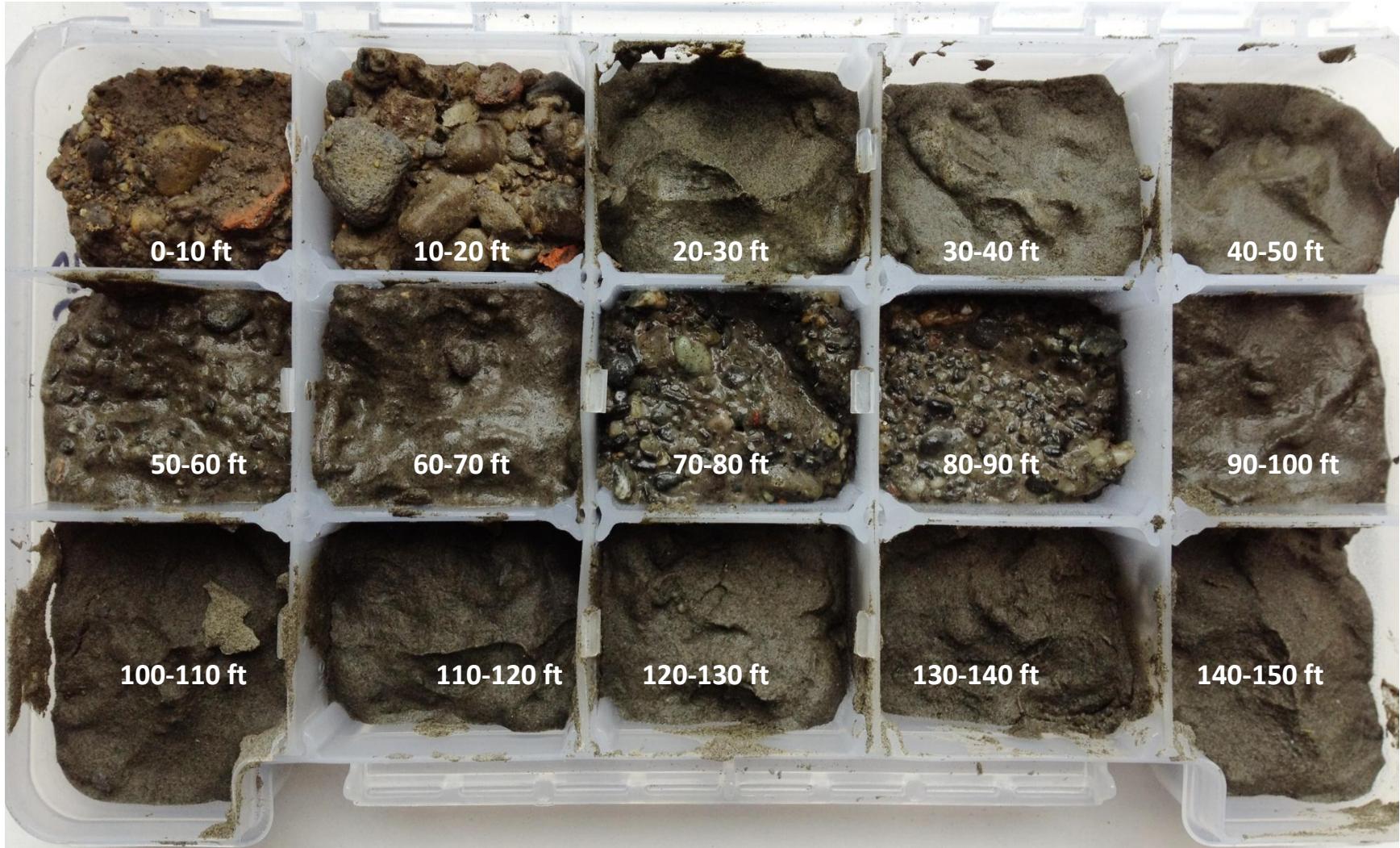
welenco  
CA. Contractor's License: 722373

Phone: (800) 445-9914 Fax: (661) 834-2550 Email: [welenco@welenco.com](mailto:welenco@welenco.com) Web: [www.welenco.com](http://www.welenco.com)  
(Prepared with Log Print, a professional software application developed by welenco, inc.)

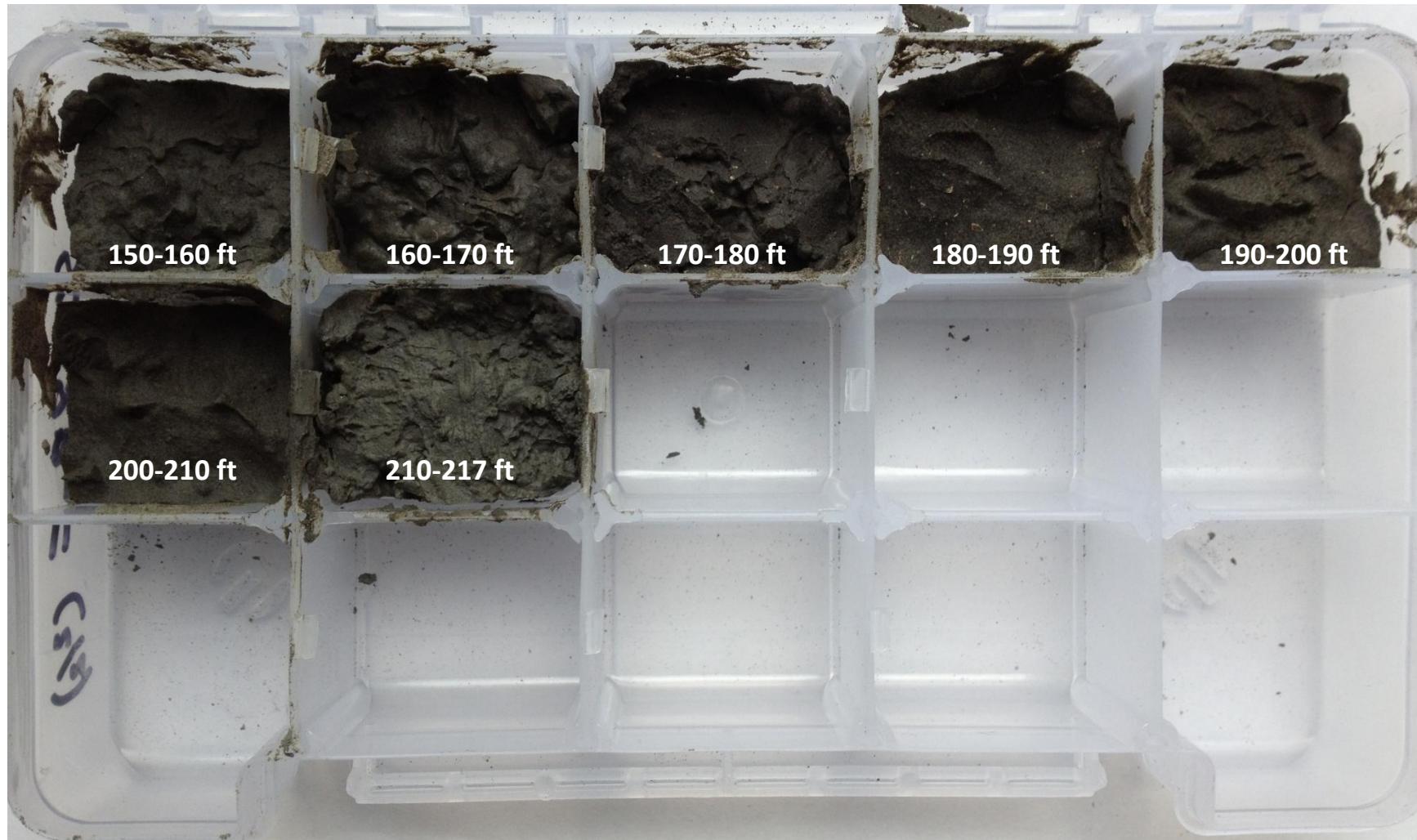
## SC-8RF

### Detailed Lithologic Description

<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
0	10	Fill; brown silty clay with minor coarse-grained sand, pieces of brick and gravel
10	20	Fill; artificial fill/alluvium with coarse-grained sand, bricks and gravel
20	30	Clayey Sand; light tan brown to grey with medium-grained sandstone stringers
30	40	Sandy Clay; light grey to grey with medium-grained sandstone stringers
40	50	Silty Clay; grey with traces of iron oxide stained sandstone stringers
50	60	Sandy Clay; grey with coarse-grained sand and minor silt
60	70	Silty Clay; grey with minor coarse-grained sand and gravel
70	80	Silty Sand; coarse-grained sand that contains well rounded quartz and chert
80	90	Silty Sand; well rounded coarse-grained sand with quartz and chert
90	100	Silty Clay; grey, soft with medium-grained sandstone stringers
100	110	Clay; grey, soft with minor coarse-grained sand and silt
110	120	Clay; grey, firm with very fine-grained sand and silt
120	130	Clay; grey, firm with very fine-grained sand and silt
130	140	Clay; grey, firm with minor very fine-grained sand and silt
140	150	Clay; grey, very firm with minor very fine-grained sand and silt
150	160	Clay; light grey, very firm with minor silt
160	170	Clay; grey, firm with minor very fine grained-sand and silt
170	180	Clay; dark grey, firm with shell fragments, minor very fine-grained sand and silt
180	190	Clayey Silt; grey, firm with abundant shell fragments
190	200	Sandy Silt; grey, firm with shell fragments and very fine-grained sand.
200	210	Clayey Silt; grey, soft with traces of very fine-grained sand and shell fragments
210	220	Clay; dark grey, firm with very fine-grained sand, silt and traces of shell fragments



**Cuttings from 0 – 150 feet  
SC-8RF at Aptos Creek**



**Cuttings from 150 – 217 feet**  
**SC-8RF at Aptos Creek**

## **SC-22AAA (Deep)**

Well Permits  
Well Drillers Log  
Lithologic Logs  
Welenco Geophysical Log  
Detailed Lithologic Description  
Photographs of Borehole Cuttings

APPLICATION FOR WELL PERMIT

New  Replacement  Supplemental  Destruction  Other \_\_\_\_\_  Geothermal  Monitoring Well

12079 4680  
 Parcel Number Other Parcels Served (Permit #) (Envision #) Program Element  
 Site Address 201 State Ranch Rd., Apt. 3 15018  
 Owner California, Inc. Address 15018 Park Rd, Santa Cruz, CA 95018  
 Drilling Contractor Drillers, Inc. License # 444178 Phone (831) 454-1931  
 Directions To Site From Hwy 1, take Park Rd. to 201 State Ranch Rd. Right on 201 State Ranch Rd. to Apt. 3 ESTIMATED WORK DATES: START 7/1 COMPLETION 7/1  
 Mail Correspondence To: 201 State Ranch Rd., Apt. 3, Santa Cruz, CA 95018

**DESIGN SPECIFICATIONS:****INTENDED USE**

DOMESTIC: \_\_\_\_\_  
 #Homes Served \_\_\_\_\_  
 WATER SYSTEM WELL: \_\_\_\_\_  
 Name of Water System \_\_\_\_\_

**DISTANCE FROM WELL SITE TO:**

SEPTIC SYSTEMS \_\_\_\_\_  
 SEWER \_\_\_\_\_  
 NEAREST PROPERTY LINE \_\_\_\_\_

**TYPE OF WELL CONSTRUCTION**

ROTARY   
 CABLE \_\_\_\_\_  
 DUG \_\_\_\_\_  
 OTHER \_\_\_\_\_

IRRIGATION \_\_\_\_\_ Acres: \_\_\_\_\_  
 Crop: \_\_\_\_\_

**MONITORING WELL:**

GRDWTR  VADOSE \_\_\_\_\_  
 OTHER: \_\_\_\_\_ (SPECIFY)

**CASING**

SINGLE  DOUBLE \_\_\_\_\_  
 MATERIAL Steel Pipe \_\_\_\_\_  
 TYPE OF JOINT Screw \_\_\_\_\_  
 GRAVEL PACK

COMMERCIAL/INDUSTRIAL \_\_\_\_\_ Type: \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA  NO  YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)

CONSTRUCTION DEPTH (FT.) \_\_\_\_\_ DIAMETER (IN.) \_\_\_\_\_ DEPTH OF SEAL (FT.) \_\_\_\_\_ WIDTH OF SEAL (IN.) \_\_\_\_\_

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: 1 TYPES: DOMESTIC  IRRIGATION  COMMERCIAL USE  OTHER
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE  TO BE DESTROYED
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
 TO SUPPLEMENT NEW WELL  TO BE DESTROYED  OTHER \_\_\_\_\_

**WELL DESTRUCTION:** Depth Of Well \_\_\_\_\_ Depth Of Seal: \_\_\_\_\_ Number Of Water Formations Penetrated \_\_\_\_\_ Perforation?: \_\_\_\_\_  
 Cleaning Of Well Required Yes:  No:  Sealing Material \_\_\_\_\_ Other measures: \_\_\_\_\_

**Plot Plan: Attach 2 copies of plot plan (see reverse for requirements)**

I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance. I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a permit to install such system will be granted.

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
 INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY

PROPERTY OWNER 31818 DRILLING CONTRACTOR 31818

**FOR OFFICE USE ONLY:**

	DATE	EHS SPECIALIST	MGR	ANNULAR WELL SEAL WITNESSED:
SITE INSPECTION	_____	_____	_____	YES DATE _____
SUPPLEMENTAL WATER USE SHEET	_____	_____	_____	NO DEPTH _____
APPLICATION APPROVAL	_____	_____	_____	SEAL MATERIAL _____
PAD INSPECTION	_____	_____	_____	# SACKS CEMENT/YARD _____
RECEIPT OF WELL LOG	_____	_____	_____	WATER QUALITY DATA RECEIVED _____ OK? _____
FINAL	_____	_____	_____	_____

WATER EFFICIENCY EVALUATION REQUIRED YES  NO  COMPLETE: \_\_\_\_\_ INSTALLATION VERIFIED: \_\_\_\_\_

GEOPHYSICAL LOG REQUIRED YES  NO  RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT

QUADRUPPLICATE  
For Local Requirements

STATE OF CALIFORNIA  
WELL COMPLETION REPORT  
Refer to Instruction Pamphlet  
No. EO114823

Page 1 of 1

Owner's Well No. 41 ST. AVE.

Date Work Began 4/2/2012, Ended 4/13/2012

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ

Permit No. 12-078 Permit Date 3/8/2012

DWR USE ONLY -- DO NOT FILL IN			
STATE WELL NO./STATION NO.			
LATITUDE		LONGITUDE	
APN/TRS/OTHER			

GEOLOGIC LOG

ORIENTATION (✓)		VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)
DEPTH FROM SURFACE		DRILLING METHOD		FLUID	
Ft. to Ft.		ROTARY		WATER	
Describe material, grain, size, color, etc.					
0	20	TOPSOIL, GRAVEL, MEDIUM/FINE/COARSE SAND			
20	40	MEDIUM/FINE/COARSE SANDS, D G, CLAY			
40	60	MEDIUM/FINE/COARSE SANDS, CLAY, MEDIUM/FINE/COARSE SAND, SMALL GRAVEL			
60	80	MEDIUM/FINE SANDS, BLACK SAND			
80	100	MEDIUM/FINE/COARSE BLACK SAND, WITH SOME GRANITE			
100	140	SMALL GRANITE WITH SOME CLAY			
140	180	SILTY CLAY, WITH SOME SHALE & SANDSTONE			
180	220	SILTY CLAY			
220	240	FINE SAND			
240	250	FINE SAND/ SANDSTONE			
250	260	SANDSTONE WITH SOME CLAY			
260	320	SILTY CLAY			
320	360	SILTY CLAY, SANDSTONE streaks			
360	420	FINE SAND, CLAY			
420	440	FINE SAND, CLAY, HARD streaks			
440	520	FINE SAND, CLAY, HARD streaks			
520	600	SANDY CLAY, SANDSTONE streaks			
600	620	CLAY WITH SAND STONE			
620	640	CLAY WITH MEDIUM/FINE/COARSE SANDS			
640	660	MEDIUM/FINE SANDS, SILTY CLAY			
660	680	SANDY CLAY WITH WET CLAY			
680	700	CEMENTED SAND			
700	710	GRANITE			

WELL OWNER

Name SOQUEL CREEK WATER DIVISION

Mailing Address 5180 SOQUEL DRIVE

CITY SOQUEL STATE CA ZIP 95073

Address 1840 41ST AVE WELL LOCATION

City SOQUEL CA 95073

County SANTA CRUZ

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Latitude \_\_\_\_\_ DEG. MIN. SEC. \_\_\_\_\_

DEG. MIN. SEC. \_\_\_\_\_ ACTIVITY (✓) \_\_\_\_\_

NORTH ✓ NEW WELL

MODIFICATION/REPAIR  
— Deepen  
— Other (Specify)

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY  
— Domestic — Public

— Irrigation — Industrial

MONITORING ✓ TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDIATION

OTHER (SPECIFY)

SOUTH Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER \_\_\_\_\_ FT. BELOW SURFACE

DEPTH OF STATIC WATER LEVEL \_\_\_\_\_ FT. & DATE MEASURED \_\_\_\_\_

ESTIMATED YIELD \* \_\_\_\_\_ (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ FT.

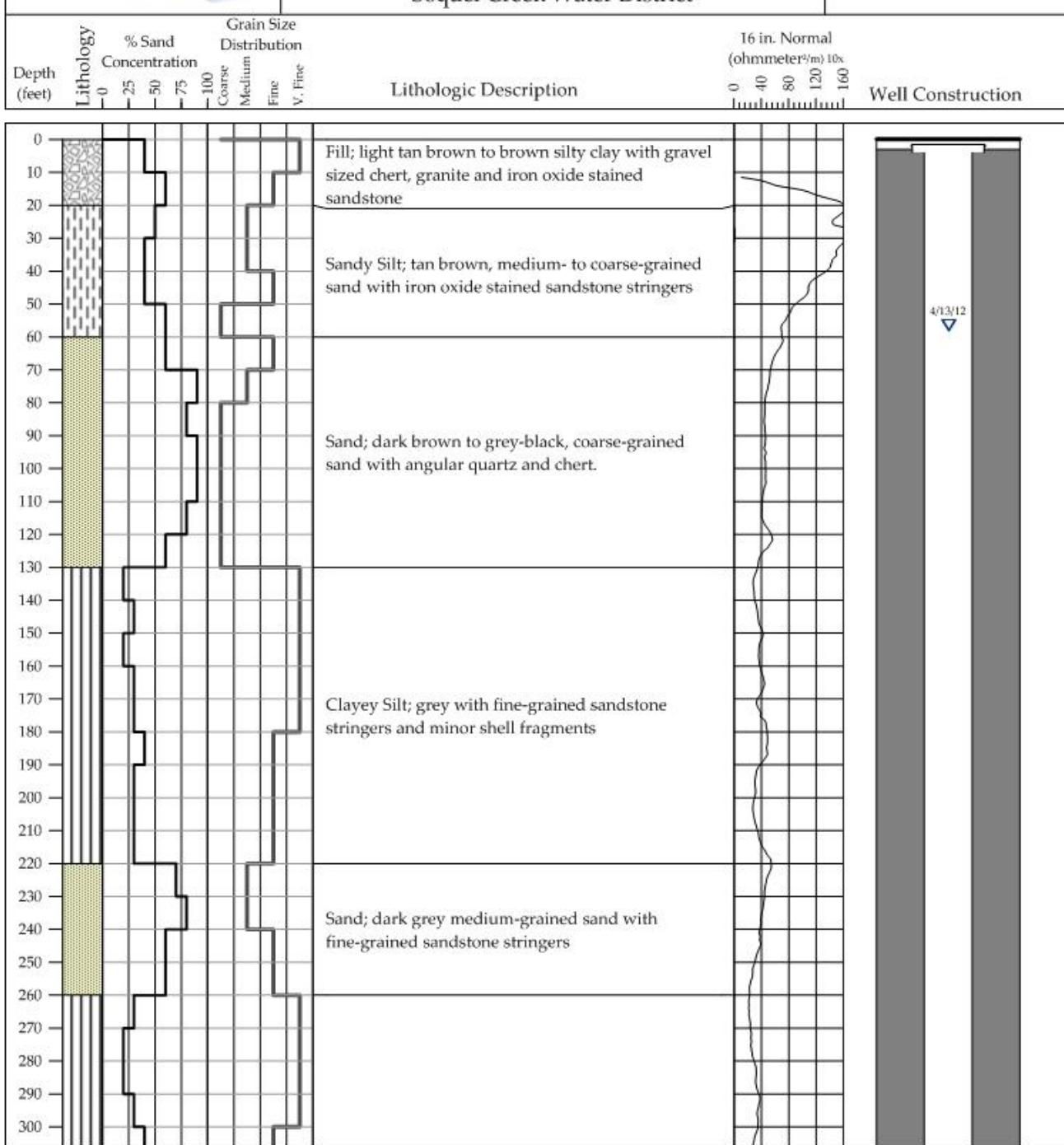
May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 710 (Feet)

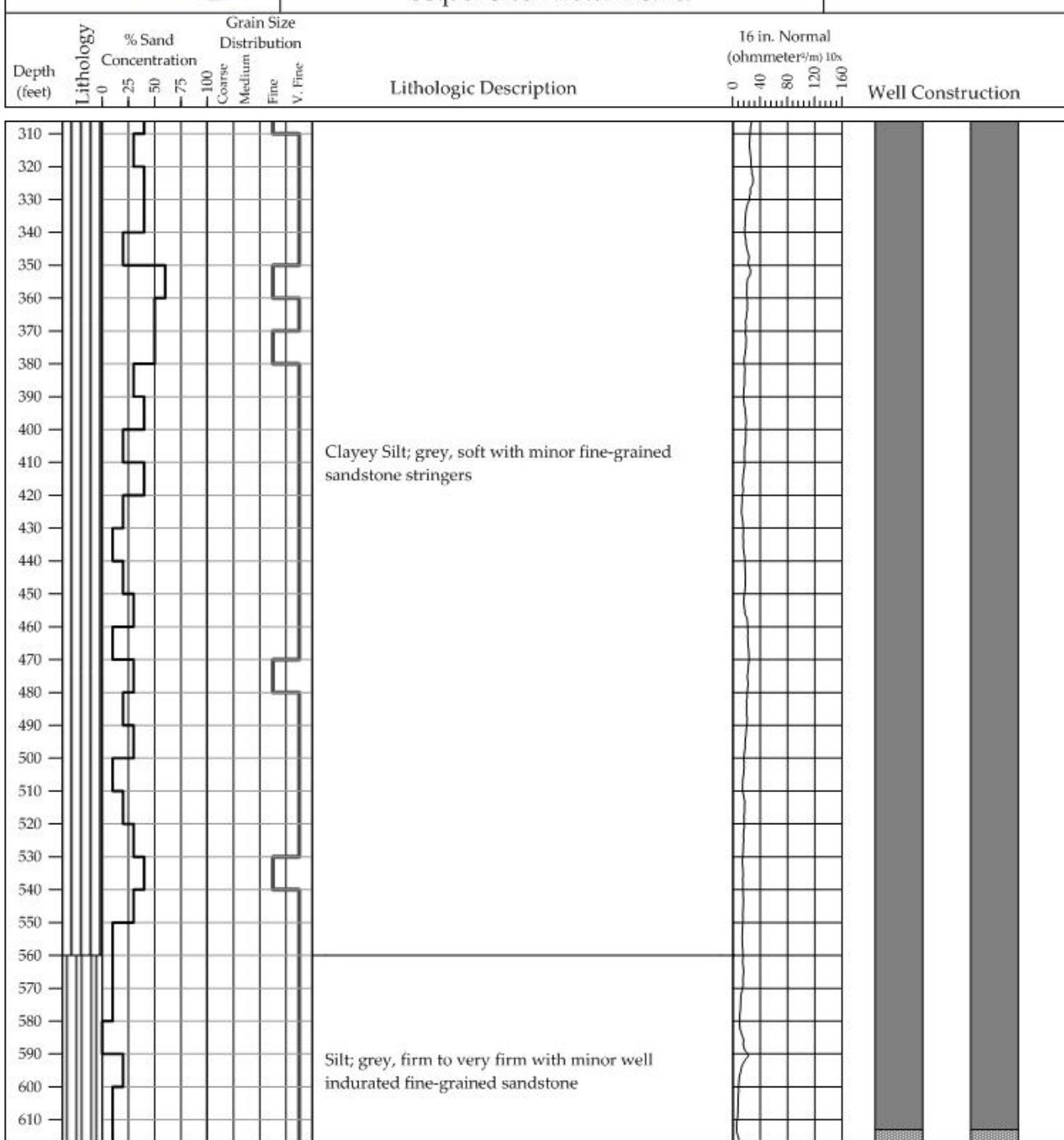
TOTAL DEPTH OF COMPLETED WELL 705 (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)					DEPTH FROM SURFACE	ANNULLAR MATERIAL				TYPE		
		TYPE (✓)	BLANK	SCREEN	COLLAR	FILL PIPE		MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CEMENT (✓)	BENTONITE (✓)	FILL (✓)
0	640	8 3/4"	✓				PVC		2"	SCH 80				
640	700	8 3/4"	✓				PVC		2"	SCH 80	.030			
700	705	8 3/4"	✓				PVC		2"	SCH 80				

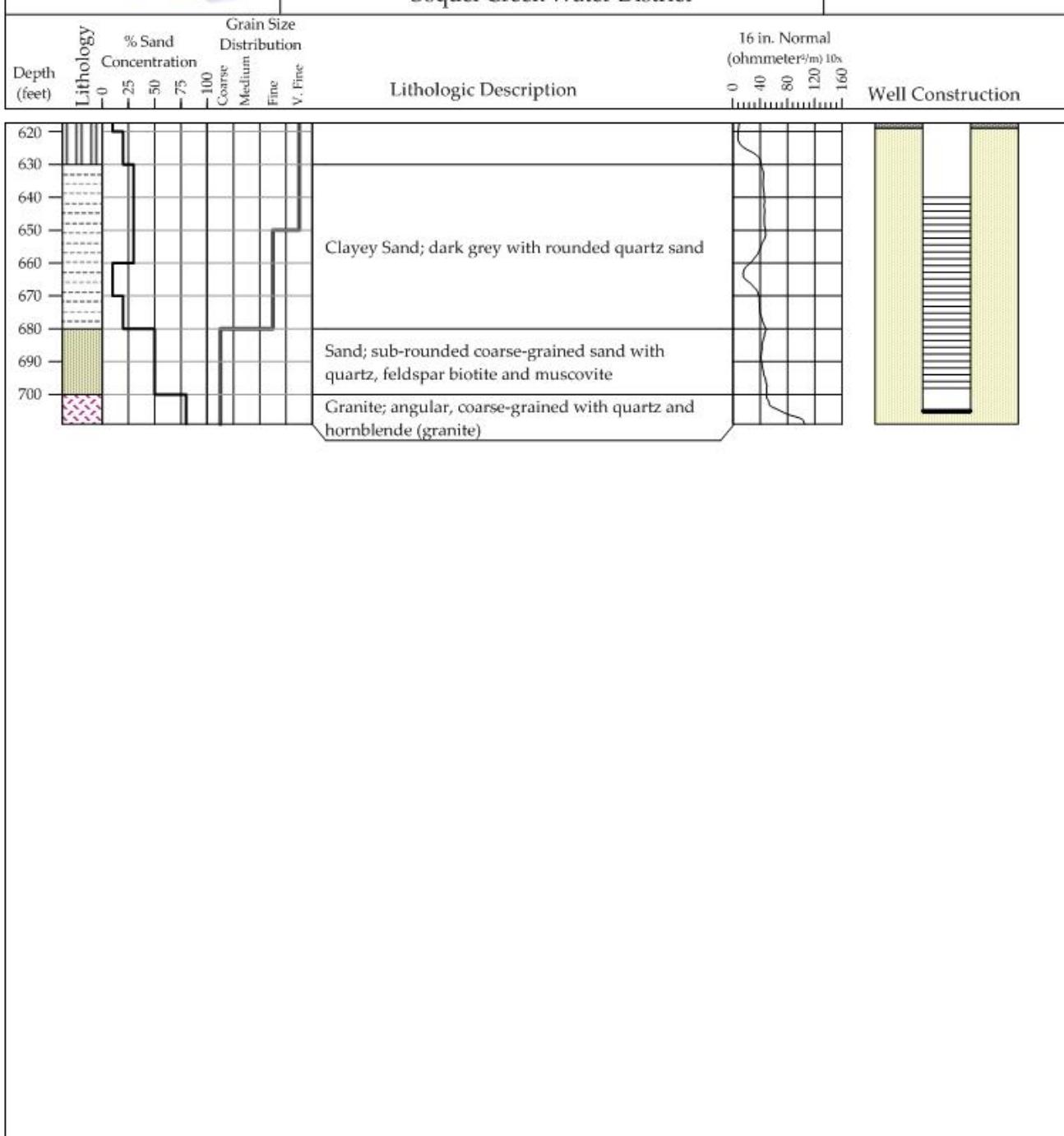
ATTACHMENTS (✓)		CERTIFICATION STATEMENT											
Geologic Log		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.											
Well Construction Diagram		NAME BRADLEY & SONS											
Geophysical Log(s)		(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)											
Soil/Water Chemical Analysis		3626 S. HIGHLAND											
Other		ADDRESS											
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.		Signed <i>R. Bradley</i> WELL DRILLER/AUTHORIZED REPRESENTATIVE											
		DATE SIGNED 04/16/12											
		C-57 LICENSE NUMBER 414178											



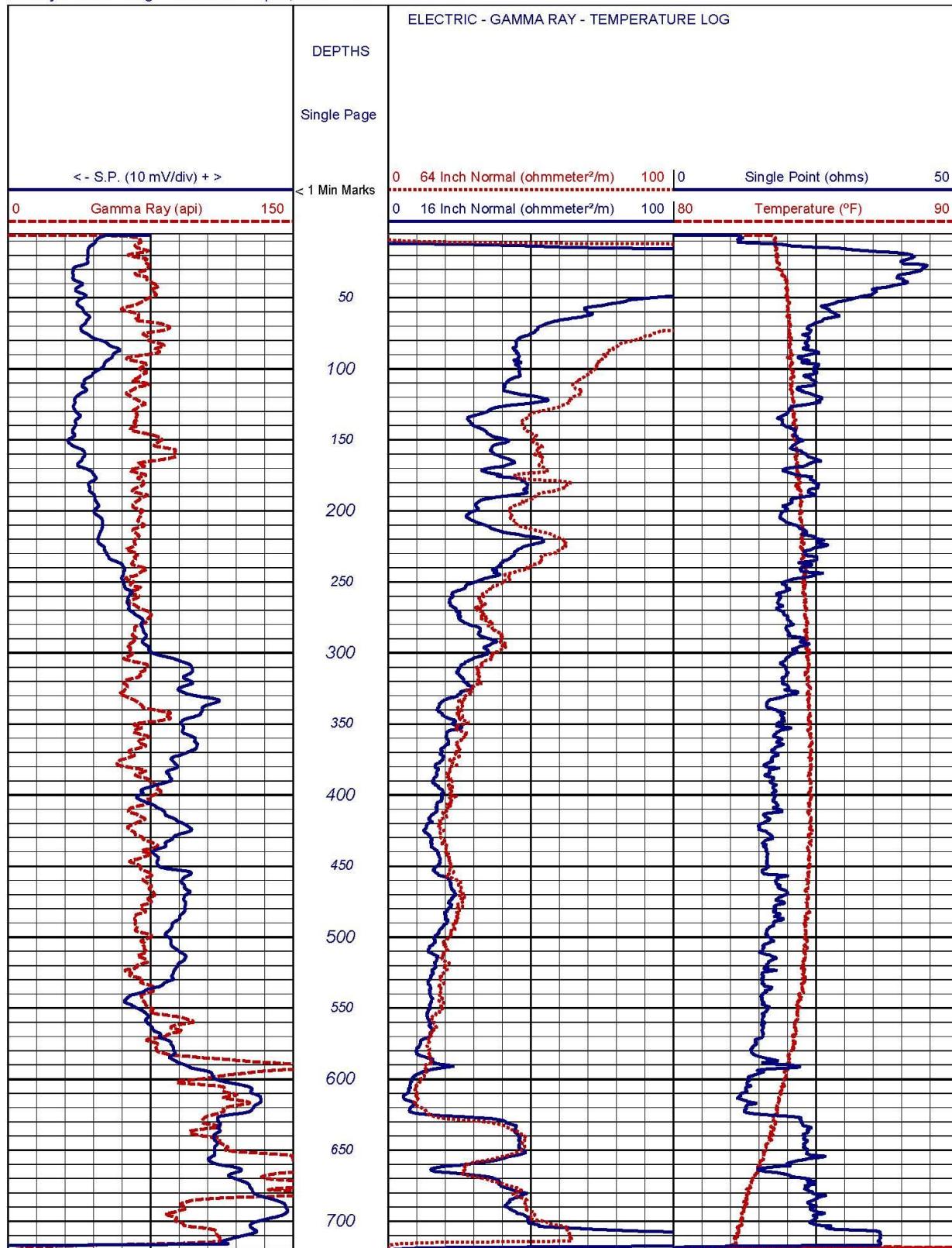
Logged By: Nick Byler/Martin Feeney Easting (X): 6134180.9 Northing (Y): 1817148.6 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 72.31 NAVD29, feet Location: 1840 41st Ave. Drilling Dates: 4/2/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 709	<b>Fill Materials</b> 0 - 613 Neat Cement 613 - 619 Bentonite 619 - 709 Cemex 8 x 16	Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material
		0 - 1	8.75	4	Sch. 80 PVC Blank
		1 - 640	8.75	2	Sch. 80 PVC Blank
		640 - 700	8.75	2	Sch. 80 PVC 0.040" Screen
		700 - 705	8.75	2	Sch. 80 PVC Blank



Logged By: Nick Byler/Martin Feeney Easting (X): 6134180.9 Northing (Y): 1817148.6 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 72.31 NAVD29, feet Location: 1840 41st Ave. Drilling Dates: 4/2/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 709	<b>Fill Materials</b> 0 - 613 Neat Cement 613 - 619 Bentonite 619 - 709 Cemex 8 x 16	Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material
		0 - 1	8.75	4	Sch. 80 PVC Blank
		1 - 640	8.75	2	Sch. 80 PVC Blank
		640 - 700	8.75	2	Sch. 80 PVC 0.040" Screen
		700 - 709	8.75	2	Sch. 80 PVC Blank



Logged By: Nick Byler/Martin Feeney Easting (X): 6134180.9 Northing (Y): 1817148.6 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 72.31 NAVD29, feet Location: 1840 41st Ave. Drilling Dates: 4/2/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 709	<b>Fill Materials</b> 0 - 613 Neat Cement 613 - 619 Bentonite 619 - 709 Cemex 8 x 16	Borehole Depth, ft 0 - 1 1 - 640 640 - 700 700 - 705	Casing Diam., in. 8.75 8.75 8.75 8.75	Casing Diam., in. 4 2 2 2	Casing Material Sch. 80 PVC Blank Sch. 80 PVC Blank Sch. 80 PVC 0.040" Screen Sch. 80 PVC Blank
					Static Water Level



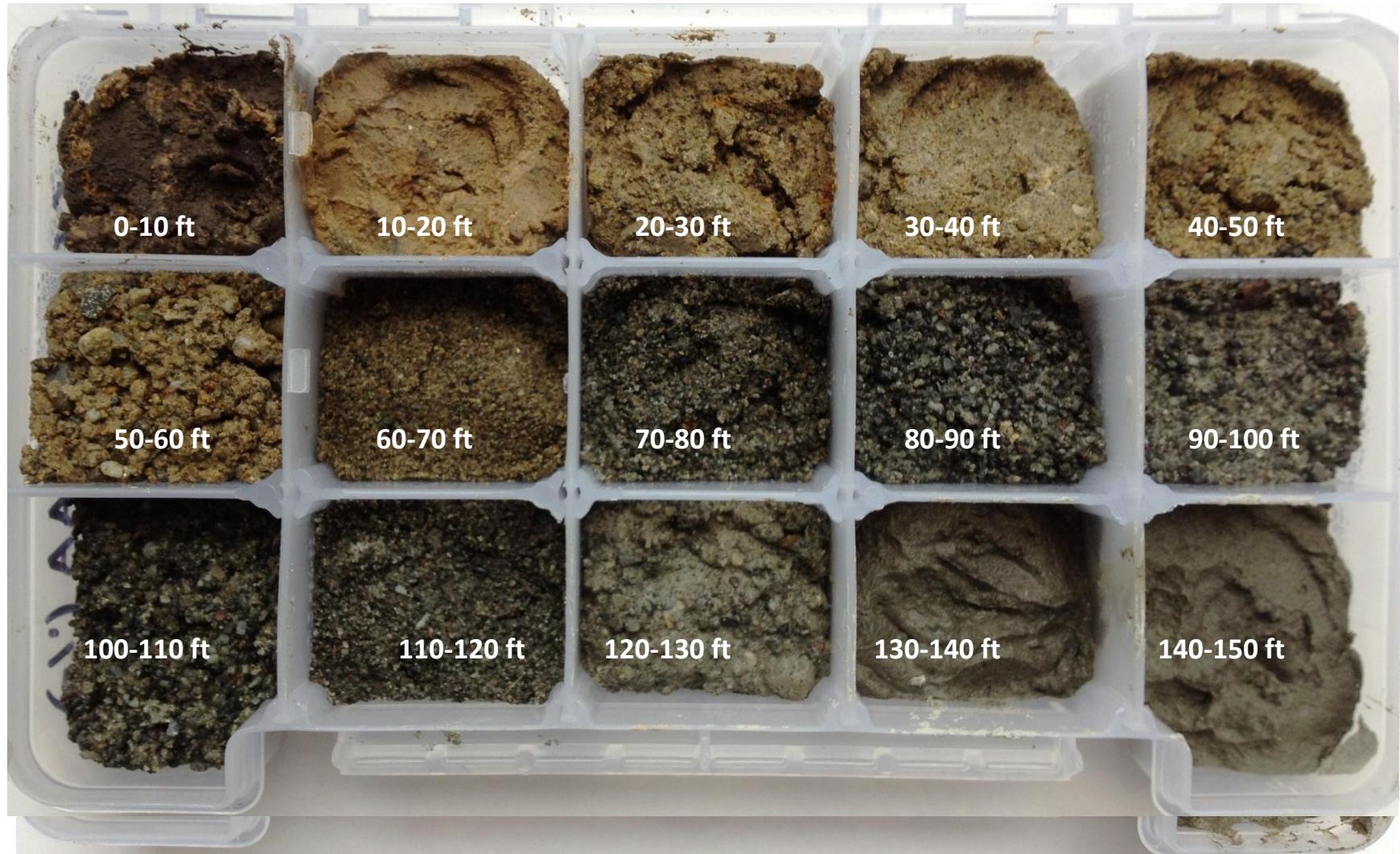
welenco  
CA. Contractor's License: 722373

Phone: (800) 445-9914 Fax: (661) 834-2550 Email: [welenco@welenco.com](mailto:welenco@welenco.com) Web: [www.welenco.com](http://www.welenco.com)  
(Prepared with Log Print, a professional software application developed by welenco, inc.)

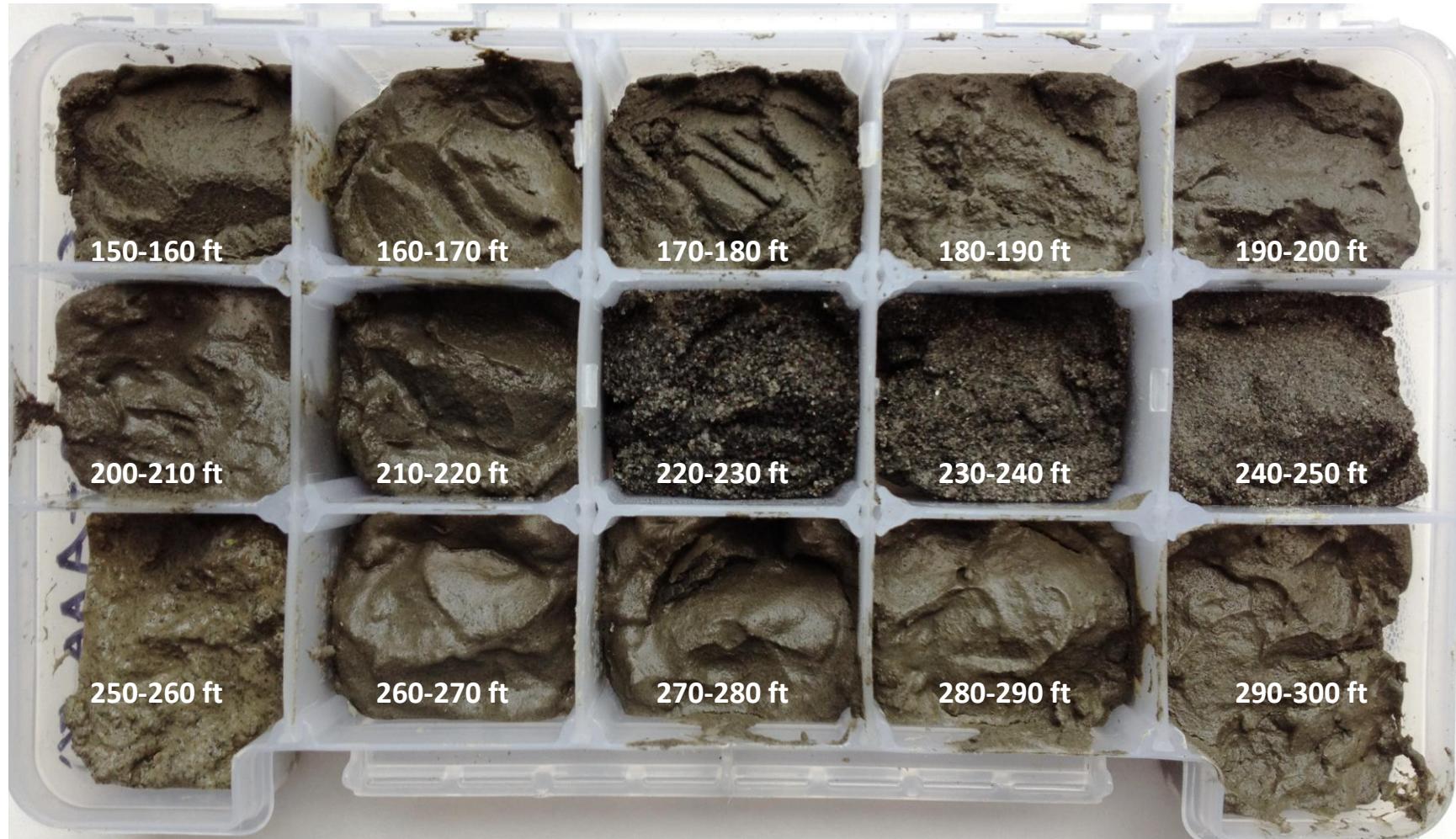
**SC-22AAA**  
**Detailed Lithologic Description**

<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
0	10	Fill; light tan brown to brown silty clay with gravel sized chert and granite
10	20	Fill; tan brown sandy silt with gravel sized granite and iron oxide stained sandstone
20	30	Sandy silt; light tan brown, medium-grained sand with well rounded gravel and pebbles
30	40	Sandy silt; tan brown, medium- to coarse-grained sand with iron oxide stained sandstone stringers
40	50	Sandy silt; light tan brown, fine-grained sand with iron oxide stained sandstone stringers
50	60	Silty sand; tan brown, coarse-grained sand to gravel with angular quartz and chert
60	70	Sand; brown fine- to medium-grained sand with minor silt
70	80	Sand; dark brown to black medium-grained sand with traces of silt
80	90	Sand; dark brown to grey-black, coarse-grained sand with angular quartz and chert.
90	100	Sand; grey to black, coarse-grained sand, angular with traces of silt
100	110	Sand; dark grey-brown, coarse-grained sand, angular with traces of silt
110	120	Sand; dark grey, coarse-grained with minor fine-grained sand and silt
120	130	Silty sand; light grey coarse-grained sand with poorly indurated sandstone stringers
130	140	Silty clay; grey, soft with sandstone stringers and shell fragments
140	150	Clayey silt; grey, soft with fine-grained sandstone stringers
150	160	Clayey silt; grey, soft with poorly indurated fine-grained sandstone stringers
160	170	Clayey silt; grey to brown, soft with fine-grained sandstone stringers
170	180	Clayey silt; grey with fine-grained sandstone stringers and minor shell fragments
180	190	Sandy silt; grey-brown with fine-grained sandstone stringers and traces of shell fragments
190	200	Sandy Silt; grey with fine-grained sandstone stringers and minor clay
200	210	Silty clay; dark grey, soft with fine-grained sandstone stringers
210	220	Silty clay; grey, soft with poorly indurated fine-grained sandstone stringers
220	230	Sand; dark grey to black, medium-grained sand with traces of silt
230	240	Sand; dark grey medium-grained sand with fine-grained sandstone stringers
240	250	Silty sand; grey, fine-grained sand with minor amounts of silt and traces of sandstone
250	260	Sand; grey, fine-grained sandstone with traces of silt. Well sorted
260	270	Silty clay; grey, soft with minor sandstone stringers
270	280	Silty clay; grey, soft with traces of fine-grained sandstone stringers
280	290	Silty clay; grey, soft with traces of fine-grained sandstone stringers
290	300	Silty clay; grey, soft with minor fine-grained sandstone stringers
300	310	Sandy clay; grey, soft with gravel sized fine-grained sandstone
310	320	Sandy silt; grey, soft with traces of fine-grained sandstone
320	330	Sandy silt; grey with minor stringers of fine-grained sandstone
330	340	Sandy clay; grey, soft with minor silt and fine-grained sandstone stringers

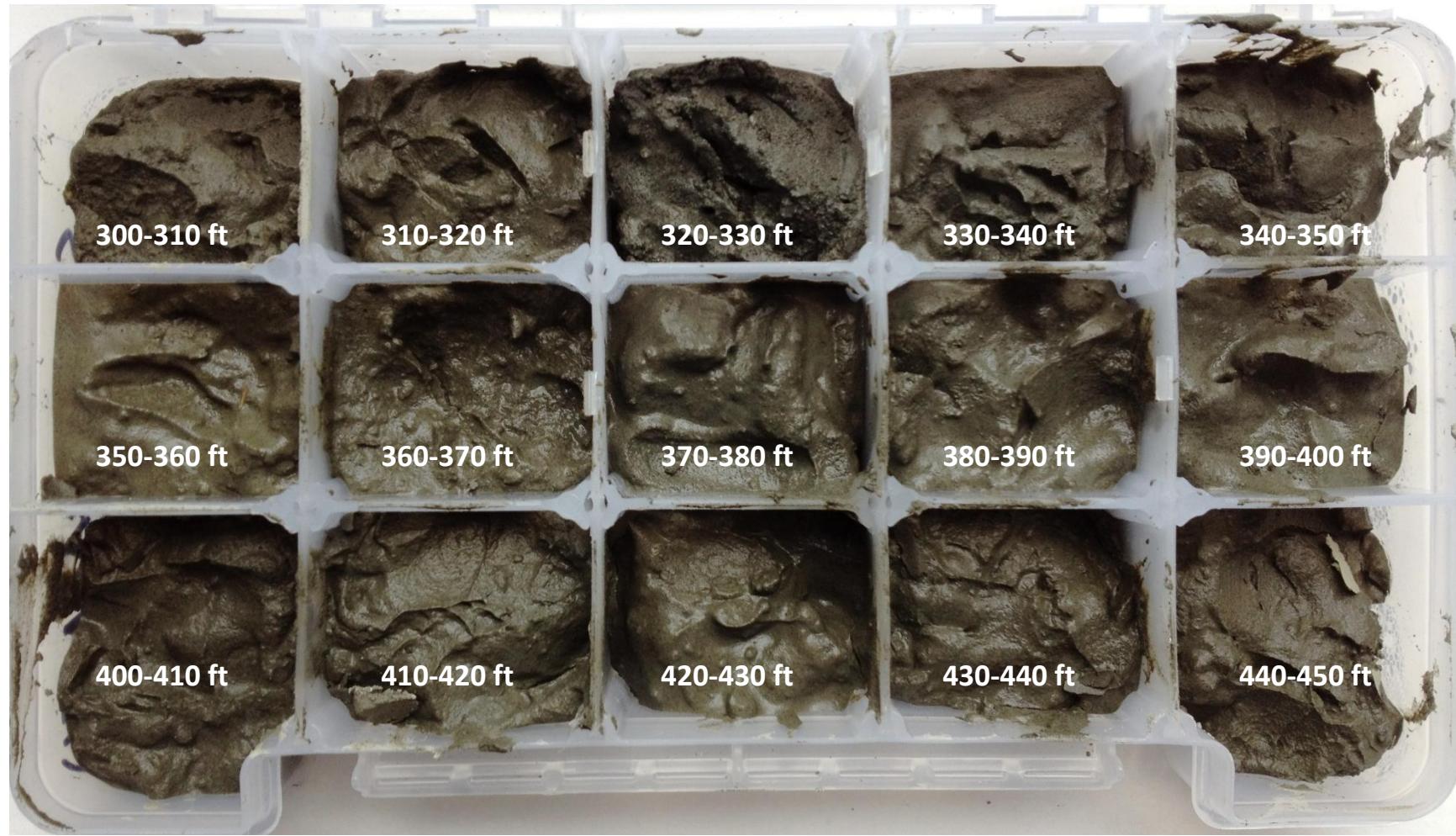
<b>From</b>	<b>To</b>	<b>Lithologic Description</b>
340	350	Silty clay; grey, firm with minor very fine-grained sand
350	360	Sandy silt; grey with gravel sized fine-grained sandstone stringers
360	370	Sandy silt; grey with minor very fine-grained sand and fine-grained sandstone stringers
370	380	Sandy silt; grey, soft with traces of very fine-grained sand and fine-grained sandstone
380	390	Clayey silt; grey, soft with traces of very fine-grained sand
390	400	Sandy silt; grey with minor very fine-grained sand and fine-grained sandstone
400	410	Silty clay; grey, soft with traces of fine-grained sandstone
410	420	Sandy silt; grey with traces of very fine-grained sand and fine-grained sandstone
420	430	Silty clay; grey, soft with traces of very fine-grained sand
430	440	Silty clay; grey, soft with traces of very fine-grained sand
440	450	Silty clay; grey, soft with traces of very fine-grained sand
450	460	Silty clay; grey, soft with minor very fine-grained sand
460	470	Silty clay; grey, firm with traces of very fine-grained sand
470	480	Sandy clay; grey, soft with minor fine-grained sandstone
480	490	Silty clay; grey with traces of fine-grained sandstone stringers
490	500	Sandy silt; grey with minor well indurated very fine-grained sandstone
500	510	Silty clay; grey with traces of very fine-grained sand
510	520	Silty clay; grey, soft with minor very fine-grained sand
520	530	Silty clay; grey, firm with well indurated sandstone stringers
530	540	Sandy silt; grey with well indurated sandstone stringers
540	550	Sandy silt; grey, soft with poorly cemented sandstone
550	560	Clayey silt, grey, soft with traces of very fine-grained sand
560	570	Silty clay; grey, soft with traces of very fine-grained sand
570	580	Clay; dark grey with minor silt and traces of very fine-grained sand
580	590	Clay; grey, firm with traces of silt
590	600	Clay; grey, firm with minor well indurated fine-grained sandstone
600	610	Clay; grey, very firm with minor fine-grained sandstone stringers
610	620	Clay; grey, very firm with traces of fine-grained sandstone
620	630	Clay; dark grey to brown, firm with well indurated sandstone stringers
630	640	Sandy clay; dark grey with rounded quartz sand
640	650	Sandy clay; dark grey with rounded quartz sand
650	660	Sandy clay; grey with rounded quartz sand
660	670	Silty clay; grey with traces of fine-grained sandstone stringers
670	680	Sandy clay, grey with fine-grained sand
680	690	Silty sand; coarse-grained sand with quartz, feldspar, biotite and muscovite
690	700	Sand; sub-rounded coarse-grained sand with quartz, feldspar biotite and muscovite
700	710	Sand; Angular, coarse-grained with quartz and hornblende (granite)



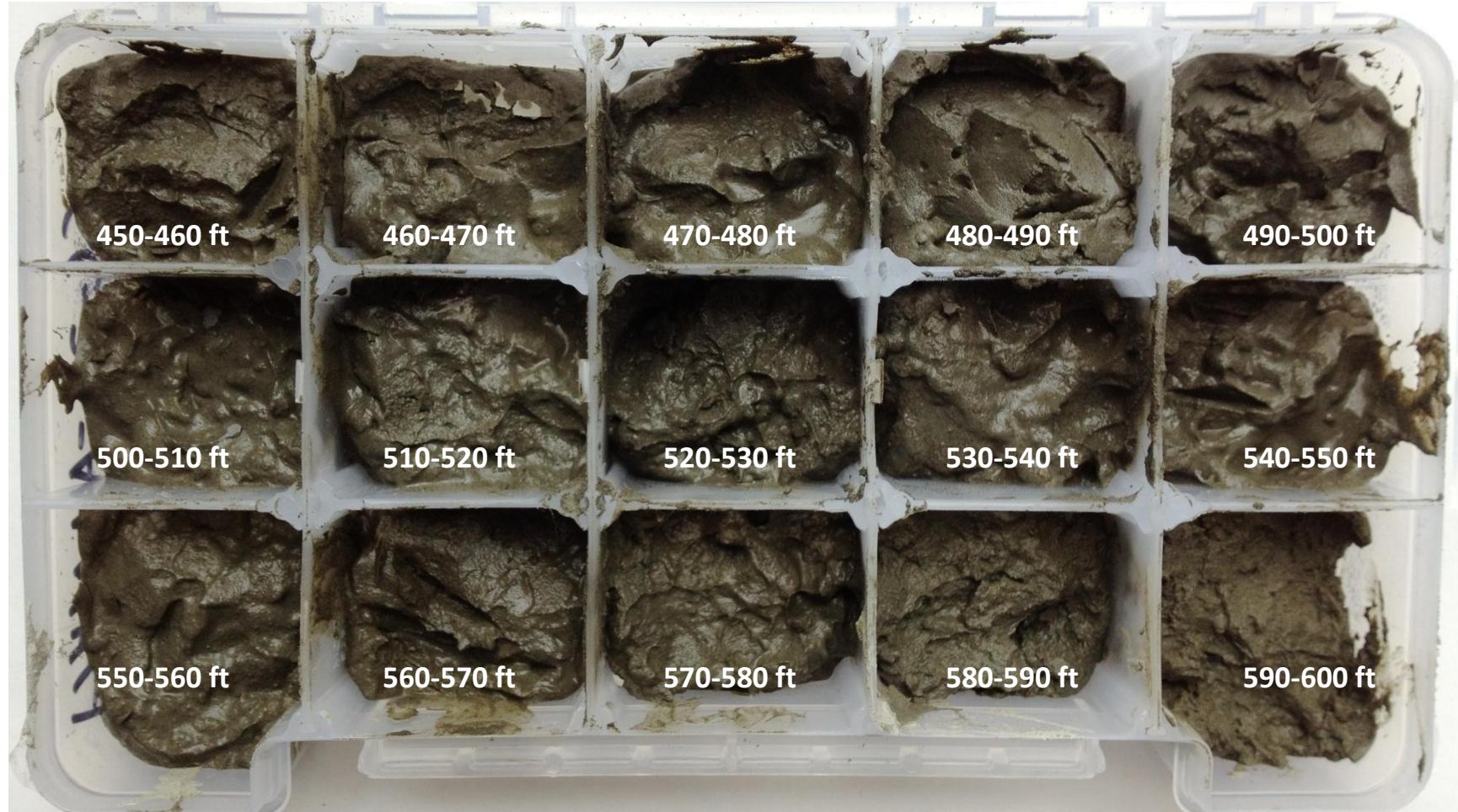
**Cuttings from 0 – 150 feet  
SC-22AAA (Deep) at 41st Ave**



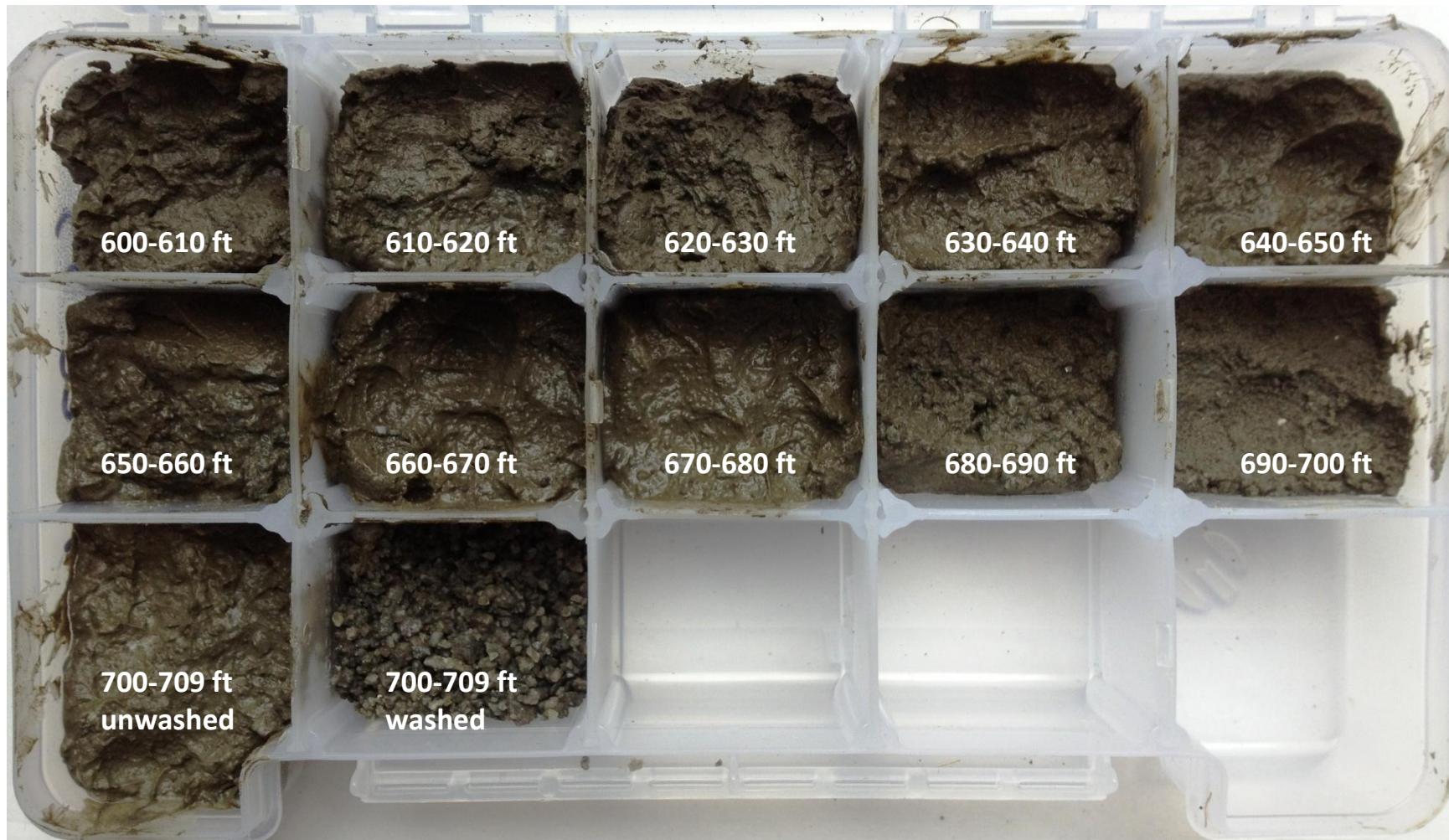
**Cuttings from 150 – 300 feet  
SC-22AAA (Deep) at 41st Ave**



Cuttings from 300 – 450 feet  
SC-22AAA (Deep) at 41st Ave



**Cuttings from 600 – 750 feet  
SC-22AAA (Deep) at 41st Ave**



Cuttings from 600 – 709 feet  
SC-22AAA (Deep) at 41st Ave

## **SC-22AA (Intermediate)**

Well Permit  
Well Drillers Log  
Lithologic Log

**APPLICATION FOR WELL PERMIT**

New  Replacement  Supplemental  Destruction  Other \_\_\_\_\_  Geothermal  Monitoring Well

Parcel Number \_\_\_\_\_ Other Parcels Served \_\_\_\_\_ (Permit #) 12-078 (Envision #) 4680 Program Element \_\_\_\_\_

Site Address \_\_\_\_\_ Owner \_\_\_\_\_ Address \_\_\_\_\_

Drilling Contractor \_\_\_\_\_ License # \_\_\_\_\_ Phone \_\_\_\_\_

Directions To Site \_\_\_\_\_ ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

Mail Correspondence To: \_\_\_\_\_

**DESIGN SPECIFICATIONS:**

INTENDED USE	DISTANCE FROM WELL SITE TO:	TYPE OF WELL CONSTRUCTION
DOMESTIC: _____	SEPTIC SYSTEMS _____	ROTARY <input checked="" type="checkbox"/>
#Homes Served _____	SEWER _____	CABLE _____
WATER SYSTEM WELL: _____	NEAREST PROPERTY LINE _____	DUG _____
Name of Water System _____		OTHER _____
IRRIGATION _____ Acres: _____	MONITORING WELL: _____	CASING
Crop: _____	GRDWTR <input checked="" type="checkbox"/> VADOSE _____	SINGLE <input checked="" type="checkbox"/> DOUBLE <input type="checkbox"/>
Water Use: _____ ac/yr	OTHER: _____ (SPECIFY) _____	MATERIAL <input checked="" type="checkbox"/> PVC <input type="checkbox"/> HDPE <input type="checkbox"/> OTHER _____
COMMERCIAL/INDUSTRIAL _____ Type: _____		TYPE OF JOINT <input checked="" type="checkbox"/> FLEX <input type="checkbox"/> RIGID <input type="checkbox"/> OTHER _____
WITHIN WATER DISTRICT SERVICE AREA NO <input type="checkbox"/> YES NAME: _____		GRAVEL PACK <input checked="" type="checkbox"/>

**CONSTRUCTION** DEPTH (FT.) 120 DIAMETER (IN.) 24 DEPTH OF SEAL (FT.) 215 WIDTH OF SEAL (IN.) 4 (FORM HSA-579-REQUIRED)

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
\_\_\_\_\_ TO SUPPLEMENT NEW WELL \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_ OTHER \_\_\_\_\_

**WELL DESTRUCTION:** Depth Of Well \_\_\_\_\_ Depth Of Seal: \_\_\_\_\_ Number Of Water Formations Penetrated \_\_\_\_\_ Perforation?: \_\_\_\_\_  
Cleaning Of Well Required Yes:  No:  Sealing Material \_\_\_\_\_ Other measures: \_\_\_\_\_

**Plot Plan: Attach 2 copies of plot plan (see reverse for requirements)**

I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance. I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a permit to install such system will be granted.

**WORKER'S COMPENSATION CERTIFICATE**

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE,

INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR \_\_\_\_\_

	DATE	EHS SPECIALIST	MGR	ANNUAL WELL SEAL WITNESSED:
SITE INSPECTION	_____	_____	_____	YES DATE _____
SUPPLEMENTAL WATER USE SHEET	_____	_____	_____	NO DEPTH _____
APPLICATION APPROVAL	_____	_____	_____	SEAL MATERIAL _____
PAD INSPECTION	_____	_____	_____	# SACKS CEMENT/YARD _____
RECEIPT OF WELL LOG	_____	_____	_____	WATER QUALITY DATA RECEIVED _____ OK? _____
FINAL	_____	_____	_____	

WATER EFFICIENCY EVALUATION REQUIRED YES  NO  COMPLETE: \_\_\_\_\_ INSTALLATION VERIFIED: \_\_\_\_\_

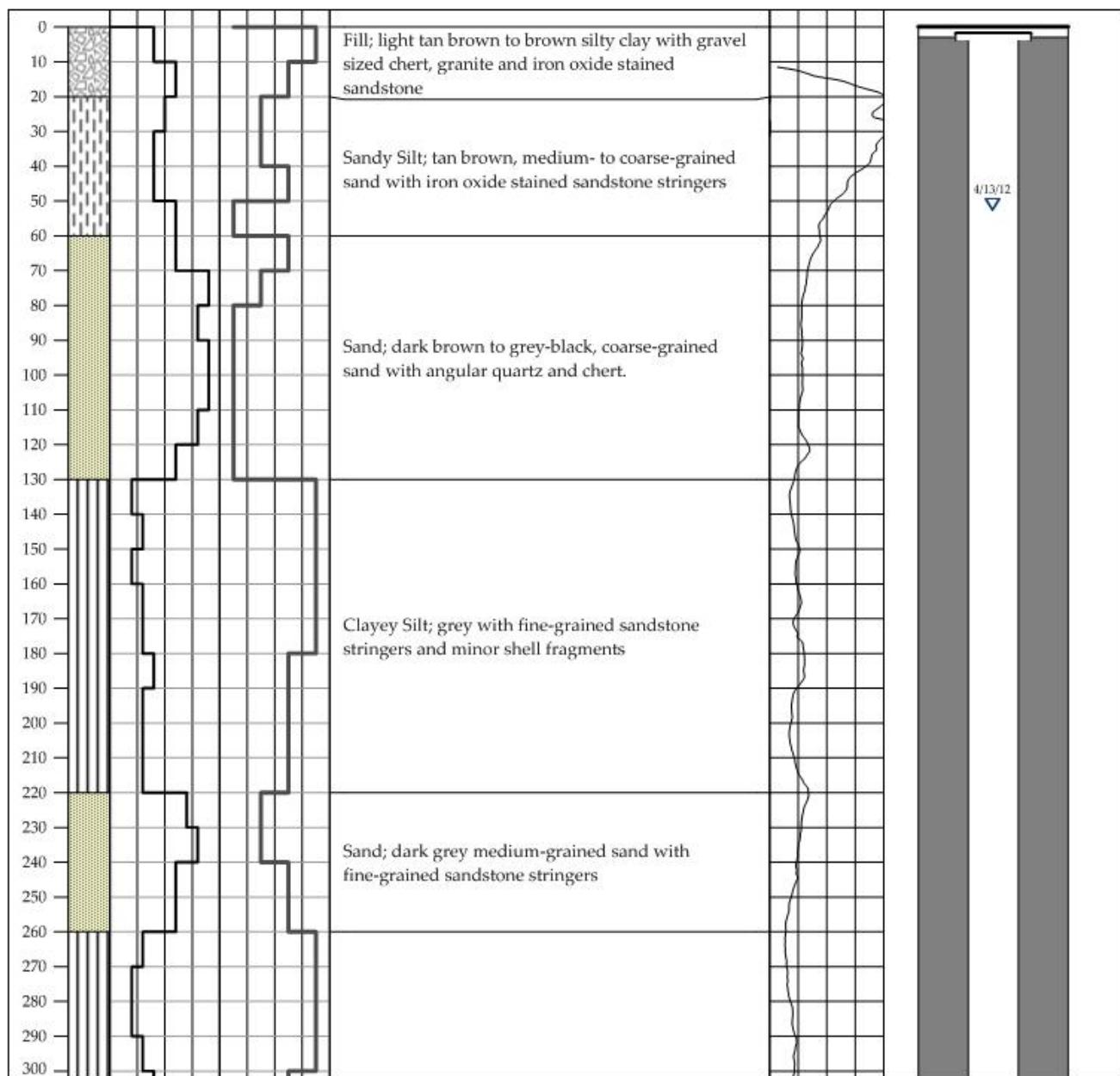
GEOPHYSICAL LOG REQUIRED YES  NO  RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT



Depth (feet)	Lithology	% Sand Concentration	Grain Size Distribution	Lithologic Description	Well Construction	
					16 in. Normal (ohmmeter <sup>2/m</sup> ) 10x	0 40 80 120 160



Logged By: Nick Byler/Martin Feeney  
Easting (X): 6134195.3  
Northing (Y): 1817148.5  
Coordinate System: State Plane, NAD 83, CA Zone 3, feet  
Ref. Point Elevation, ft amsl: 72.67 NAVD29, feet  
Location: 1840 41st Ave.  
Drilling Dates: 4/10/2012  
Drilling Contractor: Bradley & Sons, Inc.  
Drilling Method: Direct Rotary  
Total Drilled Depth, ft: 510

**Fill Materials**  
0 - 448 Neat Cement  
448 - 454 Bentonite  
454 - 510 Cemex 8 x 16

Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material
0 - 1	8.75	4	Sch. 80 PVC Blank
1 - 460	8.75	2	Sch. 80 PVC Blank
460 - 490	8.75	2	Sch. 80 PVC 0.040" Screen
490 - 500	8.75	2	Sch. 80 PVC Blank

Static Water Level

Depth (feet)	Lithology	% Sand Concentration	Grain Size Distribution	Lithologic Description								Well Construction
				0	25	50	75	100	Coarse	Medium	Fine	



Note: Lithology, % Sand Concentration, Grain Size Distribution, Lithologic Description, and Geophysical Log are from SC-21 AAA (Deep)

Logged By: Nick Byler/Martin Feeney Easting (X): 6134849.2 Northing (Y): 1827101.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 218.63 NAVD29, feet Location: Cornwell Tank Site Drilling Dates: 2/13/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 330	<b>Fill Materials</b> 0 - 232 Neat Cement 232 - 238 Bentonite 238 - 330 Cemex 8 x 16	Borehole Depth, ft	Casing Diam., in.	Casing Diam., in.	Casing Material
		0 - 1	8.75	4	Sch. 80 PVC Blank
		1 - 255	8.75	2	Sch. 80 PVC Blank
		255 - 315	8.75	2	Sch. 80 PVC 0.040" Screen
		315 - 325	8.75	2	Sch. 80 PVC Blank

Static Water Level

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## **SC-22AA (Intermediate)**

Well Permit  
Well Drillers Log  
Lithologic Log

APPLICATION FOR WELL PERMIT

New     Replacement     Supplemental     Destruction     Other \_\_\_\_\_     Geothermal     Monitoring Well

City of Capitola Village    12-077    4080  
 Parcel Number    Other Parcels Served    (Permit #)    (Envision #)    Program Element  
 Site Address    1700 1st St. Capitola, CA 95010  
 Owner    City of Capitola    Address    1700 1st St. Capitola, CA 95010  
 Drilling Contractor    City of Capitola    License # 123456789    Phone (831) 454-2022  
 Directions To Site From I-710 take 41st Ave to Capitola St    ESTIMATED WORK DATES: START 10/15/2012 COMPLETION 12/31/2012  
 Mail Correspondence To: \_\_\_\_\_

DESIGN SPECIFICATIONS:

INTENDED USE	DISTANCE FROM WELL SITE TO:	TYPE OF WELL CONSTRUCTION
DOMESTIC: _____	SEPTIC SYSTEMS _____	ROTARY _____
#Homes Served: _____	SEWER _____	CABLE _____
WATER SYSTEM WELL: _____	NEAREST PROPERTY LINE _____	DUG _____
Name of Water System		OTHER _____
IRRIGATION _____ Acres: _____	MONITORING WELL: _____	CASING
Crop: _____	GRDWTR <input checked="" type="checkbox"/> VADOSE _____	SINGLE <input checked="" type="checkbox"/> DOUBLE _____
Water Use: _____ ac/yr	OTHER: _____ (SPECIFY)	MATERIAL <u>ASBESTOS</u>
COMMERCIAL/INDUSTRIAL _____ Type: _____		TYPE OF JOINT <u>Threaded</u>
WITHIN WATER DISTRICT SERVICE AREA	NO <input type="checkbox"/> YES <input checked="" type="checkbox"/> NAME: _____	GRAVEL PACK <input checked="" type="checkbox"/>

**CONSTRUCTION** DEPTH (FT.) 100 DIAMETER (IN.) 6" DEPTH OF SEAL (FT.) 100 WIDTH OF SEAL (IN.) 6" (FORM HSA-579-REQUIRED)

EXISTING WELLS ON PROPERTY:

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
 TO SUPPLEMENT NEW WELL     TO BE DESTROYED     OTHER \_\_\_\_\_

**WELL DESTRUCTION:** Depth Of Well \_\_\_\_\_ Depth Of Seal: \_\_\_\_\_ Number Of Water Formations Penetrated \_\_\_\_\_ Perforation?: \_\_\_\_\_  
 Cleaning Of Well Required Yes:  No:  Sealing Material \_\_\_\_\_ Other measures: \_\_\_\_\_

**Plot Plan:** Attach 2 copies of plot plan (see reverse for requirements)

I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance. I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a permit to install such system will be granted.

WORKER'S COMPENSATION CERTIFICATE

A CURRENTLY EFFECTIVE CERTIFICATION OF WORKERS COMPENSATION INSURANCE IS ON FILE WITH THIS OFFICE.  
 INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR \_\_\_\_\_

<u>FOR OFFICE USE ONLY:</u>			
	DATE	EHS SPECIALIST	MGR
SITE INSPECTION	_____	_____	_____
SUPPLEMENTAL WATER USE SHEET	_____	_____	_____
APPLICATION APPROVAL	_____	_____	_____
PAD INSPECTION	_____	_____	_____
RECEIPT OF WELL LOG	_____	_____	_____
FINAL	_____	_____	_____
WATER QUALITY DATA RECEIVED _____ OK? _____			

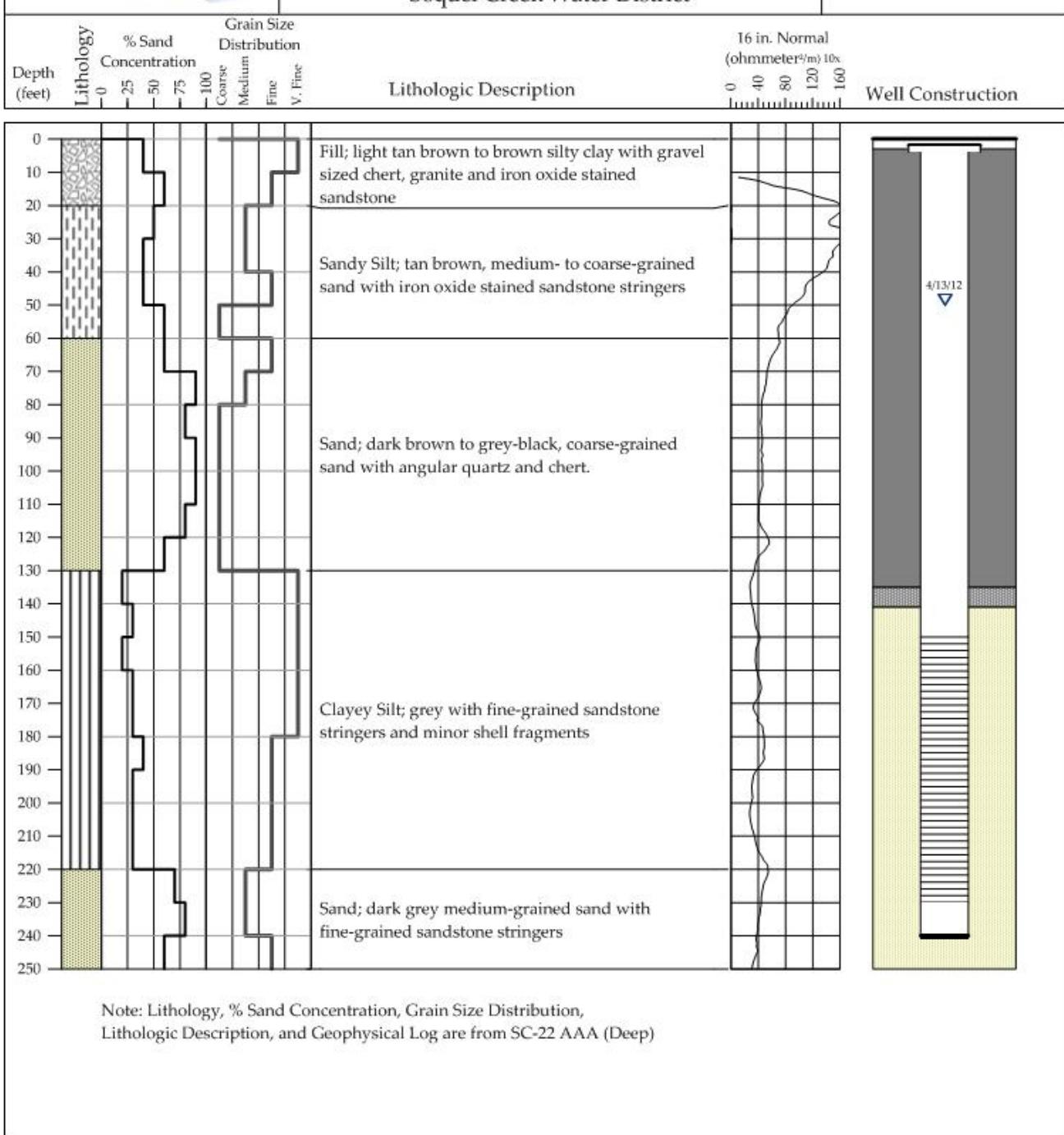
WATER EFFICIENCY EVALUATION REQUIRED YES  NO  COMPLETE: \_\_\_\_\_ INSTALLATION VERIFIED \_\_\_\_\_

GEOPHYSICAL LOG REQUIRED YES  NO  RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT





Logged By: Nick Byler/Martin Feeney Easting (X): 6134210.4 Northing (Y): 1817148.3 Coordinate System: State Plane, NAD 83, CA Zone 3, feet Ref. Point Elevation, ft amsl: 72.38 NAVD29, feet Location: 1840 41st Ave. Drilling Dates: 4/9/2012 Drilling Contractor: Bradley & Sons, Inc. Drilling Method: Direct Rotary Total Drilled Depth, ft: 250	<b>Fill Materials</b> 0 - 135 Neat Cement 135 - 141 Bentonite 141 - 250 Cemex 8 x 16	<table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Depth, ft</th> <th>Borehole Diam., in.</th> <th>Casing Diam., in.</th> <th>Casing Material</th> </tr> </thead> <tbody> <tr> <td>0 - 1</td> <td>8.75</td> <td>4</td> <td>Sch. 80 PVC Blank</td> </tr> <tr> <td>1 - 230</td> <td>8.75</td> <td>2</td> <td>Sch. 80 PVC Blank</td> </tr> <tr> <td>230 - 150</td> <td>8.75</td> <td>2</td> <td>Sch. 80 PVC 0.040" Screen</td> </tr> <tr> <td>150 - 240</td> <td>8.75</td> <td>2</td> <td>Sch. 80 PVC Blank</td> </tr> </tbody> </table> <p style="text-align: center;">▼ Static Water Level</p>	Depth, ft	Borehole Diam., in.	Casing Diam., in.	Casing Material	0 - 1	8.75	4	Sch. 80 PVC Blank	1 - 230	8.75	2	Sch. 80 PVC Blank	230 - 150	8.75	2	Sch. 80 PVC 0.040" Screen	150 - 240	8.75	2	Sch. 80 PVC Blank
Depth, ft	Borehole Diam., in.	Casing Diam., in.	Casing Material																			
0 - 1	8.75	4	Sch. 80 PVC Blank																			
1 - 230	8.75	2	Sch. 80 PVC Blank																			
230 - 150	8.75	2	Sch. 80 PVC 0.040" Screen																			
150 - 240	8.75	2	Sch. 80 PVC Blank																			

## **SC-5D and E**

Well Destruction Permits  
Well Drillers Logs

APPLICATION FOR WELL PERMIT

New     Replacement     Supplemental     Destruction     Other \_\_\_\_\_     Geothermal     Monitoring Well

026-201-05      12-074      4681  
 Si. Parcel Number    Other Parcels Served    (Permit #)    (Envision #)    Program Element

Site Address 1500 Park Ave (on Bluff between 1st & 2nd) Santa Cruz, CA 95060

Owner Calif. Assoc. Geotechnical Engineers Address 2073 El Paseo, Palo Alto, CA 95018

Drilling Contractor Geotech Services Inc. License # 6454783 Phone (831) 454-1441

Directions To Site \_\_\_\_\_ ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

Mail Correspondence To: 1500 Park Ave, Santa Cruz, CA 95060

**DESIGN SPECIFICATIONS:**

INTENDED USE	DISTANCE FROM WELL SITE TO:	TYPE OF WELL CONSTRUCTION
DOMESTIC: _____	SEPTIC SYSTEMS _____	ROTARY _____
# Homes Served _____	SEWER _____	CABLE _____
WATER SYSTEM WELL: _____	NEAREST PROPERTY LINE _____	DUG _____
Name of Water System _____	CASING	
IRRIGATION _____ Acres: _____	GRDWTR _____	SINGLE _____ DOUBLE _____
Crop: _____	VADOSE _____	MATERIAL _____
Water Use: _____ ac/yr	OTHER: _____ (SPECIFY)	TYPE OF JOINT _____
COMMERCIAL/INDUSTRIAL _____ Type: _____	GRAVEL PACK _____	

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)

**CONSTRUCTION** DEPTH (FT.) \_\_\_\_\_ DIAMETER (IN.) \_\_\_\_\_ DEPTH OF SEAL (FT.) \_\_\_\_\_ WIDTH OF SEAL (IN.) \_\_\_\_\_

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_
2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_
3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:  
 TO SUPPLEMENT NEW WELL     TO BE DESTROYED     OTHER \_\_\_\_\_

**WELL DESTRUCTION:** Depth Of Well \_\_\_\_\_ Depth Of Seal: 10' Number Of Water Formations Penetrated 1 Perforation? 10'  
 Cleaning Of Well Required Yes: No Sealing Material \_\_\_\_\_ Other measures: \_\_\_\_\_

**Plot Plan:** Attach 2 copies of plot plan (see reverse for requirements)

I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance. I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a permit to install such system will be granted.

**WORKER'S COMPENSATION CERTIFICATE**

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INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY

PROPERTY OWNER \_\_\_\_\_

DRILLING CONTRACTOR \_\_\_\_\_

**FOR OFFICE USE ONLY:**

	DATE	EHS SPECIALIST	MGR	ANNULAR WELL SEAL WITNESSED:
SITE INSPECTION	_____	_____	_____	YES DATE _____
SUPPLEMENTAL WATER USE SHEET	_____	_____	_____	NO DEPTH _____
APPLICATION APPROVAL	_____	_____	_____	SEAL MATERIAL _____
PAD INSPECTION	_____	_____	_____	# SACKS CEMENT/YARD _____
RECEIPT OF WELL LOG	_____	_____	_____	WATER QUALITY DATA RECEIVED _____ OK? _____
FINAL	_____	_____	_____	_____

WATER EFFICIENCY EVALUATION REQUIRED YES NO COMPLETE: \_\_\_\_\_ INSTALLATION VERIFIED: \_\_\_\_\_  
 GEOPHYSICAL LOG REQUIRED YES NO RECEIVED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

DISTRIBUTION: WHITE - EHS /YELLOW - WELL DRILLER /PINK - FISCAL CONTROL /GOLDENROD - RECEIPT



APPLICATION FOR WELL PERMIT

New  Replacement  Supplemental  Destruction  Other \_\_\_\_\_  Geothermal  Monitoring Well

*576-201-05* *12075* *4081*  
 Site Parcel Number Other Parcels Served (Permit #) (Envision #) Program Element

Site Address *1500 Park Ave (or New Stanton rd)* Laramie Co., Colorado  
 Owner *California, LLC* or Address *1503 Park Ave, Suite 400, San Jose, CA 95118*

Drilling Contractor *California, LLC* License # *4N44732* Phone *(831) 454-1501*

Directions To Site \_\_\_\_\_ ESTIMATED WORK DATES: START \_\_\_\_\_ COMPLETION \_\_\_\_\_

Mail Correspondence To: \_\_\_\_\_

**DESIGN SPECIFICATIONS:**

**INTENDED USE** **DISTANCE FROM WELL SITE TO:** **TYPE OF WELL CONSTRUCTION**

DOMESTIC: SEPTIC SYSTEMS \_\_\_\_\_ ROTARY \_\_\_\_\_

#Homes Served \_\_\_\_\_ CABLE \_\_\_\_\_

WATER SYSTEM WELL: NEAREST PROPERTY LINE \_\_\_\_\_ DUG \_\_\_\_\_

Name of Water System \_\_\_\_\_ OTHER \_\_\_\_\_

IRRIGATION \_\_\_\_\_ Acres: \_\_\_\_\_ Casing \_\_\_\_\_

Crop: \_\_\_\_\_ GRDWRTR VADOSE \_\_\_\_\_ SINGLE DOUBLE \_\_\_\_\_

Water Use: \_\_\_\_\_ ac/yr OTHER: \_\_\_\_\_ (SPECIFY) MATERIAL \_\_\_\_\_

COMMERCIAL/INDUSTRIAL \_\_\_\_\_ Type: \_\_\_\_\_ TYPE OF JOINT \_\_\_\_\_

WITHIN WATER DISTRICT SERVICE AREA NO YES NAME: \_\_\_\_\_ (FORM HSA-579-REQUIRED)

**CONSTRUCTION** DEPTH (FT.) DIAMETER (IN.) DEPTH OF SEAL (FT.) WIDTH OF SEAL (IN.)

**EXISTING WELLS ON PROPERTY:**

1. OTHER WELLS ON PROPERTY: NUMBER: \_\_\_\_\_ TYPES: DOMESTIC \_\_\_\_\_ IRRIGATION \_\_\_\_\_ COMMERCIAL USE \_\_\_\_\_ OTHER \_\_\_\_\_

2. CONDITION OF OTHER WELLS ON PROPERTY: IN USE \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_

3. IF NEW WELL REPLACES AN EXISTING WELL, INDICATE INTENTIONS FOR USE OF REPLACED WELL:

TO SUPPLEMENT NEW WELL \_\_\_\_\_ TO BE DESTROYED \_\_\_\_\_ OTHER \_\_\_\_\_

**WELL DESTRUCTION:** Depth Of Well \_\_\_\_\_ Depth Of Seal: \_\_\_\_\_ Number Of Water Formations Penetrated \_\_\_\_\_ Perforation?: \_\_\_\_\_  
 Cleaning Of Well Required Yes: \_\_\_\_\_ No: \_\_\_\_\_ Sealing Material \_\_\_\_\_ Other measures: \_\_\_\_\_

**Plot Plan: Attach 2 copies of plot plan (see reverse for requirements)**

I hereby agree to comply with all laws and regulations of the county of Santa Cruz and state of California pertaining to well construction, and declare under penalty of perjury the information submitted on this application is true and correct. I will contact the environmental health service when I commence the work. Within 15 days after completion of work I will furnish the environmental health service a report of the work performed and notify them before putting the well into use. I understand that this permit expires one year from date of issuance. I understand approval of the well permit does not indicate whether this property is suitable for an individual sewage disposal system or that a permit to install such system will be granted.

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INSURANCE CARRIER \_\_\_\_\_ POLICY # \_\_\_\_\_

I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY

PROPERTY OWNER \_\_\_\_\_ DRILLING CONTRACTOR \_\_\_\_\_

**FOR OFFICE USE ONLY:**

SITE INSPECTION	DATE	EHS SPECIALIST	MGR	ANNUAL WELL SEAL WITNESSED:
_____	_____	_____	_____	YES DATE _____
SUPPLEMENTAL WATER USE SHEET	_____	_____	_____	NO DEPTH _____
APPLICATION APPROVAL	_____	_____	_____	SEAL MATERIAL _____
PAD INSPECTION	_____	_____	_____	# SACKS CEMENT/YARD _____
RECEIPT OF WELL LOG	_____	_____	_____	WATER QUALITY DATA RECEIVED OK?
FINAL	_____	_____	_____	_____

TRIPPLICATE  
Owner's Copy

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**

Page 1 of 1

**Owner's Well No.** DESTROY SC-5E

Date Work Began 3/12/2012      Ended 3/4/2012

Local Permit Agency ENVIRO HEALTH SANTA C

Local Permit Agency ENVIRO HEALTH, SANTA CRUZ  
Permit No. 12-075 Permit Date 3/1/2012

Permit No. 12-073 Permit Date 3/11/2012

DWR USE ONLY -- DO NOT FILL IN									
STATE WELL NO./STATION NO.									
LATITUDE					LONGITUDE				
APN/TRS/OTHER									

## **GEOLOGIC LOG**

**ATTACHMENTS (✓)**

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other \_\_\_\_\_

<b>CERTIFICATION STATEMENT</b>					
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.					
<b>NAME</b> <u>BRADLEY &amp; SONS</u> (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)					
<b>ADDRESS</b> <u>3625 S. HIGHLAND</u>		<b>DEL REY</b>	<b>CA</b>	<b>93616</b>	
		<b>CITY</b>	<b>STATE</b>	<b>ZIP</b>	
<b>Signed</b>	<u>Donna Bostic</u>		<b>04/09/12</b>	<b>414178</b>	
<b>WELL DRILLER/AUTHORIZED REPRESENTATIVE</b>			<b>DATE SIGNED</b>	<b>C-57 LICENSE NUMBER</b>	

DWR 188 REV. 11-97

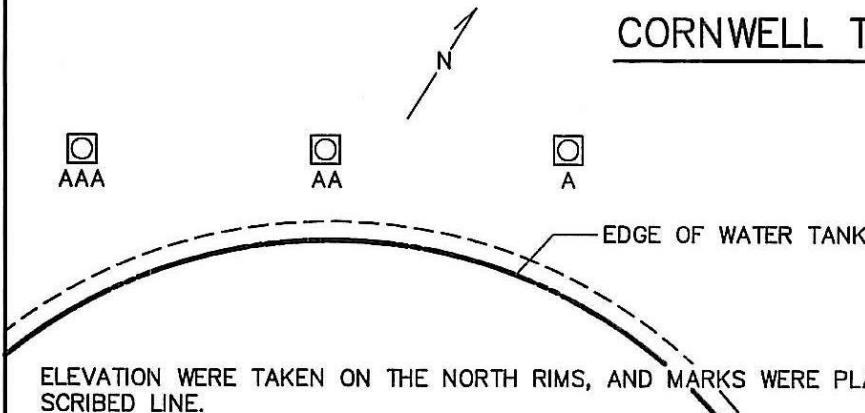
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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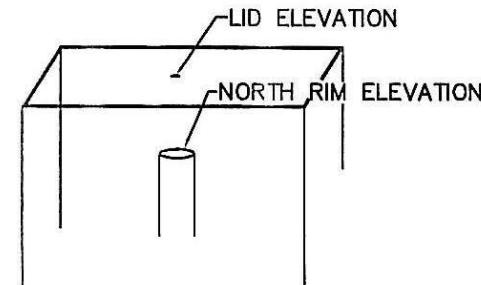
## APPENDIX B: SURVEY DATA



SC-21  
CORNWELL TANK MONITORING WELLS



ELEVATION WERE TAKEN ON THE NORTH RIMS, AND MARKS WERE PLACED AT THAT LOCATION IN BLACK MARKER AND A SCRIBED LINE.



**DETAIL FOR MONITORING WELL VAULT (NEW)**

ID	STATE PLANE COORDINATES, NAD 83 0403-CALIF. ZONE 3, U.S. FEET		WELL ELEVATION. 1929-FT    **NAVD88 FT.	LID ELEVATION. 1929-FT    **NAVD88 FT.	
	NORTHING	EASTING		AAA	AA
AAA	1827094.3	6134840.1	218.84	221.59'	219.23'
AA	1827101.3	6134849.2	218.63'	221.38'	219.09'
A	1827107.3	6134859.5	218.43'	221.18'	218.98'

**NOTES**

STATE PLANE COORDINATES WERE DERIVED FROM FAST STATIC OBSERVATIONS ON EACH OF THE MONITORING WELLS, AND THE COORDINATES WERE CALCULATED UTILIZING THE NGS-OPUS WEBSITE

\*\*NGVD29 ELEVATIONS WERE CALCULATED USING THE U.S. ARMY CORPS OF ENGINEERS CORPSCON 6.0.1 PROGRAM. THE CALCULATED ELEVATION DIFFERENCE FROM NAVD88 FT TO 1929-FT IS -2.75' FT

ELEVATION WERE TAKEN ON THE NORTH RIMS, AND MARKS WERE PLACED AT THAT LOCATION IN BLACK MARKER AND A SCRIBED LINE.

ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF.

**BASIS OF ELEVATIONS**

ELEVATIONS SHOWN ARE BASED ON NGS BENCHMARK:

DESIGNATION — R-125  
PID — GU4226  
STATE/COUNTY — CA/SANTA CRUZ  
USGS QUAD — WATSONVILLE WEST (1995)

ELEVATION — 182.61 FEET ADJUSTED NAVD88 DATUM  
\*\* ELEVATION — 179.86 FEET ADJUSTED NGVD29 DATUM

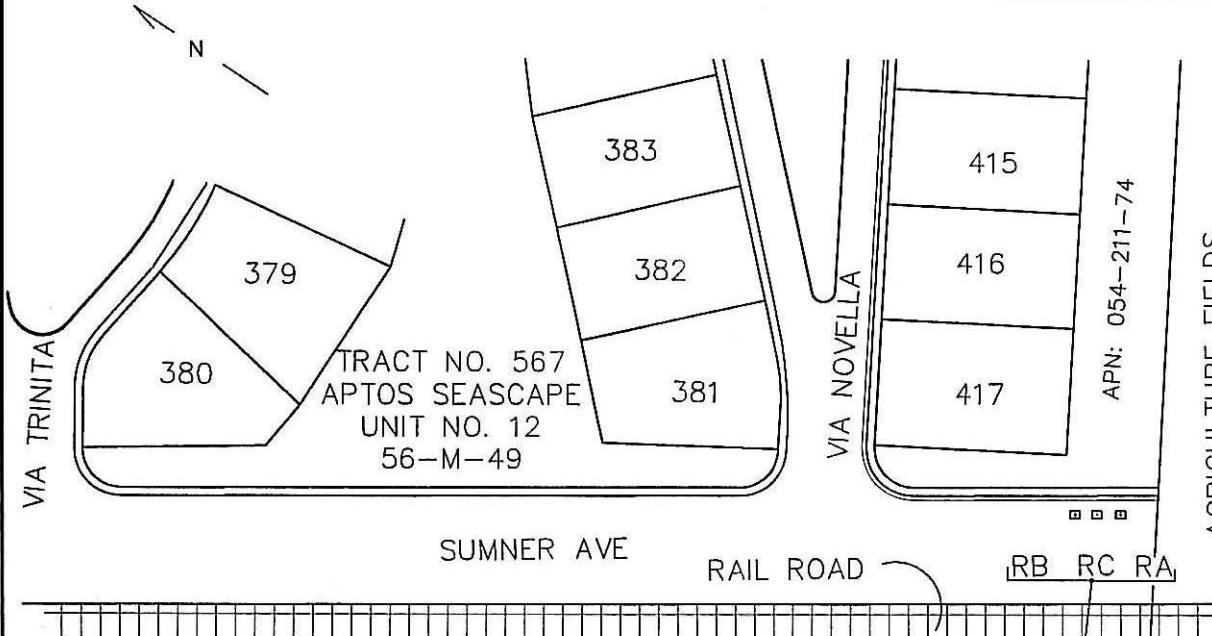
**STATION DESCRIPTION**

IN ROB ROY JUNCTION, AT THE INTERSECTION OF US HIGHWAY 1 AND FREEDOM BLVD., IN THE SOUTHEAST ABUTMENT WALKWAY OF THE NORTHEAST ABUTMENT, OF THE OVERPASS, 38.7 FT. SOUTHWEST OF THE NORTHEAST END OF THE BRIDGE, 34.8 FT. SOUTHEAST OF THE SOUTHWEST GUARDRAIL, AND 1.0 FT. ABOVE THE LEVEL OF THE ROAD.



<b>BOWMAN &amp; WILLIAMS</b> CONSULTING CIVIL ENGINEERS 1011 CEDAR STREET SANTA CRUZ CA 426-3560	SCALE    NONE	JOB NO.    24797
	DATE    MAY 31, 2012	DWG NAME    24797_Mon-Well_elev.DWG
	APN:    102-441-48	REF NO.    24694

SC-A2  
SUMNER DRIVE MONITORING WELLS



### BASIS OF ELEVATIONS

ELEVATIONS SHOWN ARE BASED ON THE COUNTY OF SANTA CRUZ DEPARTMENT OF PUBLIC WORKS BENCHMARK #41A

### STATION DESCRIPTION

MOVE BRASS CAP TO TOP OF CURB NW CORNER OF VIA LANTANA AND DOLPHIN DRIVE ACROSS FROM 2200 DOLPHIN DRIVE., 20' WEST OF THE CENTERLINE OF DOLPHIN DRIVE, AND 56' NORTH OF THE CENTERLINE OF VIA LANTANA, STAMPED W-41

ELEVATION - 147.86 1929-FT (UNADJUSTED)

\*\* BENCHMARK #41A CALCULATED ELEVATION IS 150.61' FT. NAVD88

### DETAIL FOR MONITORING WELL VAULT (NEW)

STATE PLANE COORDINATES, NAD 83(CORS 96) 0403-CALIF. ZONE 3, U.S. FEET			RB	RC	RA
			WELL ELEVATION.	LID ELEVATION.	
ID	NORTHING	EASTING	1929-FT	**NAVD88 FT.	
RB	1805542.6	6161061.4	128.20'	130.95'	128.76'
RC	1805530.2	6161069.4	128.22	130.97'	128.85'
RA	1805517.6	6161077.6	128.28	131.03'	128.96'
					131.51'
					131.60'
					131.71'

### NOTES

STATE PLANE COORDINATES WERE DERIVED FROM FAST STATIC OBSERVATIONS ON EACH OF THE MONITORING WELLS, AND THE COORDINATES WERE CALCULATED UTILIZING THE NGS-OPUS WEBSITE

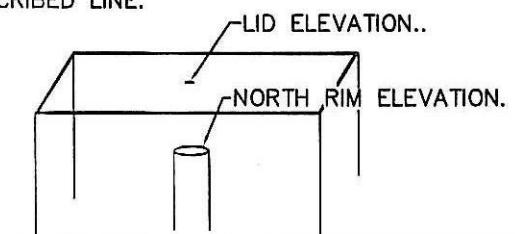
\*\*NAVD88 ELEVATIONS WERE CALCULATED USING THE U.S. ARMY CORPS OF ENGINEERS CORPSCON 6.0.1 PROGRAM. THE CALCULATED ELEVATION DIFFERENCE FROM 1929-FT TO NAVD88 FT IS +2.75' FT

ELEVATION WERE TAKEN ON THE NORTH RIMS, AND MARKS WERE PLACED AT THAT LOCATION IN BLACK MARKER AND A SCRIBED LINE.

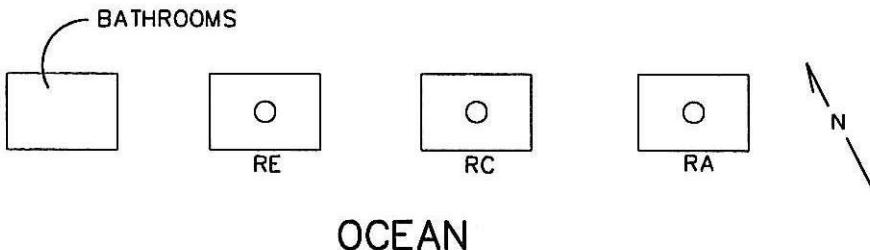
ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF.

**BOWMAN & WILLIAMS**  
CONSULTING CIVIL ENGINEERS  
1011 CEDAR STREET SANTA CRUZ CA 426-3560

SCALE	NONE	JOB NO.	24797
DATE	JULY 16, 2012	DWG NAME	24797_Mon-Well_elev.DWG
APN:	ADJACENT TO 054-211-74	REF NO.	24797



SC-9 SEACLIFF STATE BEACH  
LAS OLAS DRIVE MONITORING WELLS  
DETAIL FOR MONITORING WELL VAULT (NEW)



ID	WELL ELEVATION		LID ELEVATION	
	1929-FT	**NAVD88 FT.	1929-FT	**NAVD88 FT.
RE	13.34'	16.08'	13.91'	16.65'
RC	13.40'	16.14'	13.89'	16.63'
RA	13.33'	16.07'	13.91'	16.65'

STATE PLANE COORDINATES, NAD 83(CORS 96)  
0403-CALIF. ZONE 3, U.S. FEET

ID	NORTHING	EASTING
RE	1816133.2	6147477.3
RC	1816119.8	6147503.1
RA	1816126.2	6147490.2

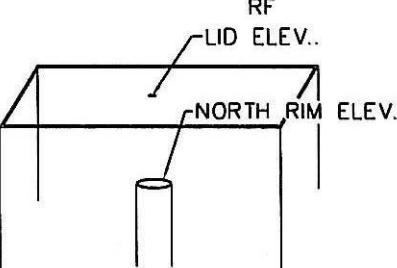
BASIS OF ELEVATIONS

ELEVATIONS SHOWN ARE BASED ON THE COUNTY OF SANTA CRUZ  
DEPARTMENT OF PUBLIC WORKS BENCHMARK #394

BRASS DISK STAMPED 10.57 LOCATED AT THE RIO DEL MAR  
ESPLANADE PUMP STATION ON MARINA AVE. 143' E OF MOOSEHEAD DR.  
AT THE E'LY COR. OF THE PUMP STATION IN THE BRICK WORK BEHIND  
THE SIDEWALK.

ELEVATION - 10.71 1929-FT (UNADJUSTED)

\*\* BENCHMARK #394 CALCULATED ELEVATION IS 13.46' FT, NAVD88



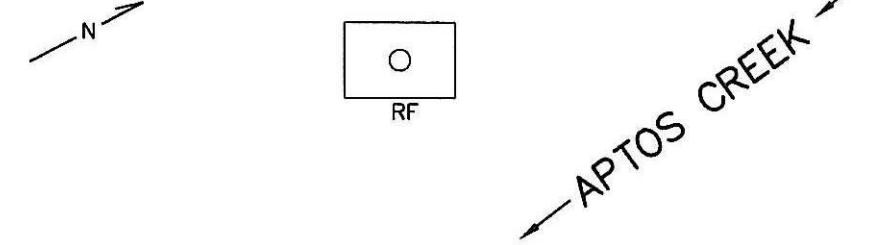
NOTES

STATE PLANE COORDINATES WERE DERIVED FROM FAST STATIC  
OBSERVATIONS ON EACH OF THE MONITORING WELLS, AND THE  
COORDINATES WERE CALCULATED UTILIZING THE NGS-OPUS WEBSITE

\*\*NAVD88 ELEVATIONS WERE CALCULATED USING THE U.S. ARMY CORPS  
OF ENGINEERS CORPSCON 6.0.1 PROGRAM. THE CALCULATED ELEVATION  
DIFFERENCE FROM 1929-FT TO NAVD88 FT IS +2.75' FT

ELEVATION WERE TAKEN ON THE NORTH RIMS, AND MARKS WERE  
PLACED AT THAT LOCATION IN BLACK MARKER AND A SCRIBED LINE.

ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF.



ID	WELL ELEVATION		LID ELEVATION	
	1929-FT	**NAVD88 FT.	1929-FT	**NAVD88 FT.
RF	11.35'	14.09'	11.79'	14.54'

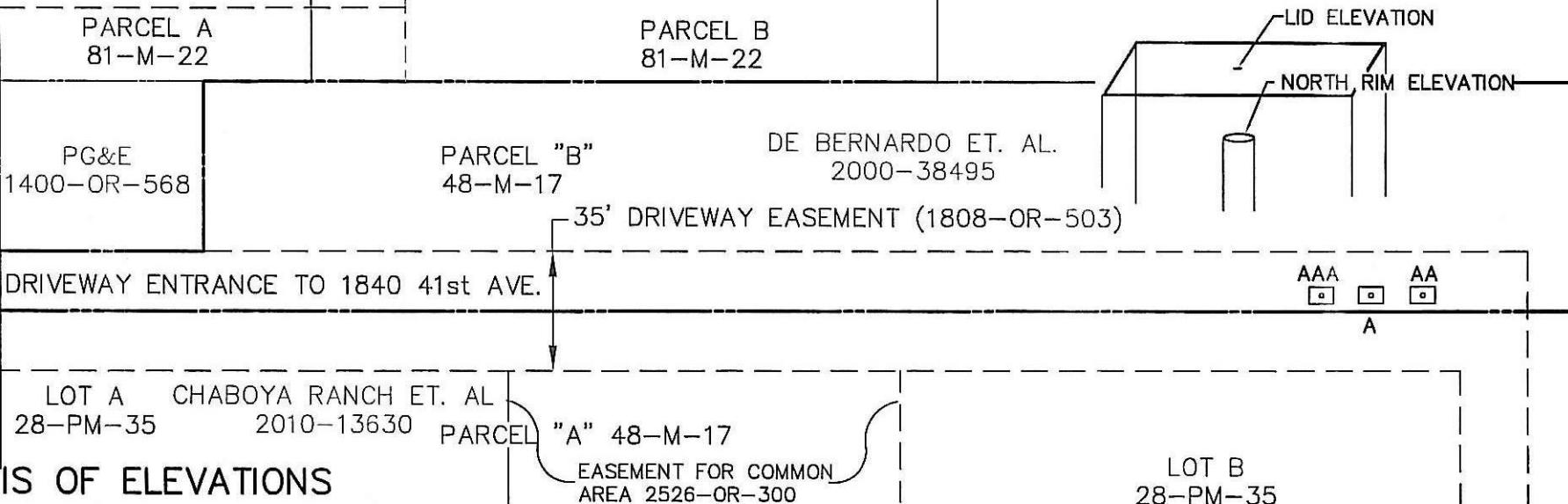
STATE PLANE COORDINATES, NAD 83(CORS 96)  
0403-CALIF. ZONE 3, U.S. FEET

ID	NORTHING	EASTING
RF	1814726.5	6150803.7



SC-22  
41ST AVENUE MONITORING WELLS

SN FILLMORE LLC  
2011-0009847



### BASIS OF ELEVATIONS

ELEVATIONS SHOWN HEREON ARE BASED ON THE COUNTY OF SANTA CRUZ BENCHMARK #13. A BRASS CAP IN A 12-INCH COUNTY MONUMENT BOX MARKED "CH1" LOCATED 45' WEST OF THE CENTERLINE OF 41ST AVENUE & 12 FEET SOUTH OF THE CENTERLINE OF THE RAILROAD TRACKS, ALSO 12.5 FEET EAST OF THE CENTERLINE OF THE SIGNAL CROSSING CONTROL BOX.

ELEVATION BM#13= 62.003 FEET NGVD29 (ADJUSTED)  
64.753 FEET (NAVD88)

### NOTES

\*\*THE CALCULATED DIFFERENCE FOR CONVERTING BETWEEN 1929-FT & NAVD88 ELEVATION, CALCULATED FROM THE ARMY CORPS OF ENGINEERS VERTCON PROGRAM IN THE AREA OF THIS MAP IS +2.75 FT.

STATE PLANE COORDINATES WERE DERIVED FROM FAST STATIC OBSERVATIONS ON EACH OF THE MONITORING WELLS, AND THE COORDINATES WERE CALCULATED UTILIZING THE NGS-OPUS WEBSITE

ELEVATIONS SHOWN ARE IN FEET AND DECIMALS THEREOF.

### DETAIL FOR MONITORING WELL VAULT (NEW)

STATE PLANE COORDINATES, NAD 83(CORS 96)  
0403-CALIF. ZONE 3, U.S. FEET

ID	NORTHING	EASTING
AAA	1817148.6	6134180.9
A	1817148.5	6134195.3
AA	1817148.3	6134210.4

WELL ELEVATION.	
1929-FT	**NAVD88 FT.
72.31'	75.06'
72.67'	75.42'
72.38'	75.13'

LID ELEVATION.	
1929-FT	**NAVD88 FT.
72.72'	75.47'
73.15'	75.90'
72.87'	75.62'

APN: 034-131-15

**BOWMAN & WILLIAMS**  
CONSULTING CIVIL ENGINEERS  
1011 CEDAR STREET SANTA CRUZ CA 426-3560

SCALE 1"=50'	JOB NO. 24797
DATE JULY 16, 2012	DWG NAME 24797_Mon-Well_elev.DWG
APN: 034-131-15	FILE NO. 24797



## **APPENDIX C: WATER QUALITY DATA**



ANALYTICAL CHEMISTS  
and  
BACTERIOLOGISTS  
Approved by State of California

TEL: 831-724-5422  
FAX: 831-724-3188

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Felipe Luevano

Work Order #: 2030169  
Reporting Date: March 18, 2012

Date Received: March 6, 2012  
Project # / Name: None / Hydrometrics- N. Byler  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: BC-21A (2774F), sampled 3/6/2012 4:00:00PM  
Sampler Name / Co.: N. Byler / Hydrometrics  
Matrix: Water  
Laboratory #: 2030169-01

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.3	pH Units	0.1	-	SM4500-H+ B	03/06/12	
Specific Conductance (EC)	750	µS/cm	1.0	1600	SM2510B	03/06/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/06/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	03/06/12	
Bicarbonate as HCO3	120	mg/L	2.0	-	SM 2320B	03/06/12	
Total Alkalinity as CaCO3	100	mg/L	2.0	-	SM 2320B	03/06/12	
Hardness	220	mg/L	5.0	-	SM 2340 B	03/07/12	
Total Dissolved Solids	540	mg/L	10	1000	SM2540C	03/12/12	
Nitrate as NO3	ND	mg/L	1.0	45	EPA 300.0	03/08/12	
Chloride	40	mg/L	1.0	500	EPA 300.0	03/08/12	
Sulfate as SO4	220	mg/L	1.0	500	EPA 300.0	03/08/12	
Fluoride	0.51	mg/L	0.10	2	EPA 300.0	03/08/12	
Calcium	63	mg/L	0.50	-	EPA 200.7	03/07/12	
Magnesium	16	mg/L	0.50	-	EPA 200.7	03/07/12	
Potassium	6.0	mg/L	0.50	-	EPA 200.7	03/07/12	
Sodium	60	mg/L	0.50	-	EPA 200.7	03/07/12	
* Iron	3100	ug/L	50	300	EPA 200.7	03/07/12	
Manganese	43	ug/L	20	50	EPA 200.7	03/07/12	
Copper	ND	ug/L	50	1000	EPA 200.7	03/07/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	03/07/12	

RL - are levels down to which we can quantify with reliability, a result below this level is reported as "ND" for Not Detected.

State Drinking Water Limits - as listed by California Administrative Code, Title 22.

\* - a \* in the left hand margin of the report means that particular constituent is above the California Drinking Water Limits.

Page 1 of 3

ANALYTICAL CHEMISTS  
and  
BACTERIOLOGISTS  
Approved by State of California

TEL: 831-724-5422  
FAX: 831-724-3188

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Felipe Luevano

Work Order #: 2030169  
Reporting Date: March 18, 2012

Date Received: March 6, 2012  
Project # / Name: None / Hydrometrics- N. Byler  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-21AAA (2774D), sampled 3/5/2012 4:00:00PM  
Sampler Name / Co.: N. Byler / Hydrometrics  
Matrix: Water  
Laboratory #: 2030169-02

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	7.7	pH Units	0.1	-	SM4500-H+ B	03/06/12	
Specific Conductance (EC)	460	µS/cm	1.0	1600	SM2510B	03/06/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/06/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	03/06/12	
Bicarbonate as HCO3	230	mg/L	2.0	-	SM 2320B	03/06/12	
Total Alkalinity as CaCO3	190	mg/L	2.0	-	SM 2320B	03/06/12	
Hardness	150	mg/L	5.0	-	SM 2340 B	03/07/12	
Total Dissolved Solids	320	mg/L	10	1000	SM2540C	03/12/12	
Nitrate as NO3	ND	mg/L	1.0	45	EPA 300.0	03/08/12	
Chloride	13	mg/L	1.0	500	EPA 300.0	03/08/12	
Sulfate as SO4	33	mg/L	1.0	500	EPA 300.0	03/08/12	
Fluoride	0.25	mg/L	0.10	2	EPA 300.0	03/08/12	
Calcium	34	mg/L	0.50	-	EPA 200.7	03/07/12	
Magnesium	16	mg/L	0.50	-	EPA 200.7	03/07/12	
Potassium	4.9	mg/L	0.50	-	EPA 200.7	03/07/12	
Sodium	30	mg/L	0.50	-	EPA 200.7	03/07/12	
Iron	180	ug/L	50	300	EPA 200.7	03/07/12	
Manganese	47	ug/L	20	50	EPA 200.7	03/07/12	
Copper	ND	ug/L	50	1000	EPA 200.7	03/07/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	03/07/12	

RL - are levels down to which we can quantify with reliability, a result below this level is reported as "ND" for Not Detected.  
State Drinking Water Limits - as listed by California Administrative Code, Title 22.

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Page 2 of 3

ANALYTICAL CHEMISTS  
and  
BACTERIOLOGISTS  
Approved by State of California

TEL: 831-724-5422  
FAX: 831-724-3188

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Felipe Luevano

Work Order #: 2030169  
Reporting Date: March 18, 2012

Date Received: March 6, 2012  
Project # / Name: None / Hydrometrics- N. Byler  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-21AA (2774E), sampled 3/5/2012 4:00:00PM  
Sampler Name / Co.: N. Byler / Hydrometrics  
Matrix: Water  
Laboratory #: 2030169-03

	Results	Units	RL	State Drinking Water Limits *	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.2	pH Units	0.1	-	SM4500-H+ B	03/06/12	
Specific Conductance (EC)	360	µS/cm	1.0	1600	SM2510B	03/06/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/06/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	03/06/12	
Bicarbonate as HCO3	180	mg/L	2.0	-	SM 2320B	03/06/12	
Total Alkalinity as CaCO3	150	mg/L	2.0	-	SM 2320B	03/06/12	
Hardness	120	mg/L	5.0	-	SM 2340 B	03/07/12	
Total Dissolved Solids	250	mg/L	10	1000	SM2540C	03/12/12	
Nitrate as NO3	ND	mg/L	1.0	45	EPA 300.0	03/08/12	
Chloride	16	mg/L	1.0	500	EPA 300.0	03/08/12	
Sulfate as SO4	14	mg/L	1.0	500	EPA 300.0	03/08/12	
Fluoride	0.22	mg/L	0.10	2	EPA 300.0	03/08/12	
Calcium	34	mg/L	0.50	-	EPA 200.7	03/07/12	
Magnesium	8.7	mg/L	0.50	-	EPA 200.7	03/07/12	
Potassium	4.6	mg/L	0.50	-	EPA 200.7	03/07/12	
Sodium	21	mg/L	0.50	-	EPA 200.7	03/07/12	
Iron	220	ug/L	50	300	EPA 200.7	03/07/12	
Manganese	ND	ug/L	20	50	EPA 200.7	03/07/12	
Copper	ND	ug/L	50	1000	EPA 200.7	03/07/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	03/07/12	

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Page 3 of 3

ANALYTICAL CHEMISTS  
and  
BACTERIOLOGISTS  
Approved by State of California

TEL: 831-724-5422  
FAX: 831-724-3188

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Felipe Luevano

Work Order #: 2030207  
Reporting Date: March 18, 2012

Date Received: March 7, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-A2RA (27748), sampled 3/6/2012 3:00:00PM  
Sampler Name / Co.: Nick Blyer / Hydrometrics  
Matrix: Water  
Laboratory #: 2030207-01

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	7.7	pH Units	0.1	-	SM4500-H+ B	03/07/12	
* Specific Conductance (EC)	33000	µS/cm	1.0	1600	SM2510B	03/07/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/07/12	
Carbonate as CO <sub>3</sub>	ND	mg/L	2.0	-	SM 2320B	03/07/12	
Bicarbonate as HCO <sub>3</sub>	220	mg/L	2.0	-	SM 2320B	03/07/12	
Total Alkalinity as CaCO <sub>3</sub>	180	mg/L	2.0	-	SM 2320B	03/07/12	
Hardness	11000	mg/L	50	-	SM 2340 B	03/09/12	
* Total Dissolved Solids	38000	mg/L	1000	1000	SM2540C	03/12/12	
Nitrate as NO <sub>3</sub>	ND	mg/L	25	45	EPA 300.0	03/08/12	
* Chloride	14000	mg/L	50	500	EPA 300.0	03/08/12	
* Sulfate as SO <sub>4</sub>	1800	mg/L	50	500	EPA 300.0	03/08/12	
Fluoride	ND	mg/L	5.0	2	EPA 300.0	03/08/12	
Calcium	1800	mg/L	5.0	-	EPA 200.7	03/09/12	
Magnesium	1600	mg/L	5.0	-	EPA 200.7	03/09/12	
Potassium	50	mg/L	5.0	-	EPA 200.7	03/09/12	
Sodium	3700	mg/L	50	-	EPA 200.7	03/09/12	
Iron	ND	ug/L	50	300	EPA 200.7	03/09/12	
* Manganese	360	ug/L	40	50	EPA 200.7	03/09/12	
Copper	ND	ug/L	50	1000	EPA 200.7	03/09/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	03/09/12	

RL - are levels down to which we can quantify with reliability, a result below this level is reported as "ND" for Not Detected.

State Drinking Water Limits - as listed by California Administrative Code, Title 22.

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Page 1 of 3

ANALYTICAL CHEMISTS  
and  
BACTERIOLOGISTS  
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FAX: 831-724-3188

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Felipe Luevano

Work Order #: 2030207  
Reporting Date: March 18, 2012

Date Received: March 7, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-A2RB (27749), sampled 3/6/2012 3:00:00PM  
Sampler Name / Co.: Nick Byler / Hydrometrics  
Matrix: Water  
Laboratory #: 2030207-02

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.1	pH Units	0.1	-	SM4500-H+ B	03/07/12	
Specific Conductance (EC)	1600	µS/cm	1.0	1600	SM2510B	03/07/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/07/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	03/07/12	
Bicarbonate as HCO3	160	mg/L	2.0	-	SM 2320B	03/07/12	
Total Alkalinity as CaCO3	130	mg/L	2.0	-	SM 2320B	03/07/12	
Hardness	570	mg/L	5.0	-	SM 2340 B	03/09/12	
* Total Dissolved Solids	1300	mg/L	10	1000	SM2540C	03/12/12	
Nitrate as NO3	ND	mg/L	1.0	45	EPA 300.0	03/08/12	
Chloride	380	mg/L	2.0	500	EPA 300.0	03/08/12	
Sulfate as SO4	110	mg/L	2.0	500	EPA 300.0	03/08/12	
Fluoride	ND	mg/L	0.20	2	EPA 300.0	03/08/12	
Calcium	90	mg/L	0.50	-	EPA 200.7	03/09/12	
Magnesium	83	mg/L	0.50	-	EPA 200.7	03/09/12	
Potassium	5.0	mg/L	0.50	-	EPA 200.7	03/09/12	
Sodium	59	mg/L	0.50	-	EPA 200.7	03/09/12	
Iron	ND	ug/L	50	300	EPA 200.7	03/09/12	
* Manganese	58	ug/L	20	50	EPA 200.7	03/09/12	
Copper	ND	ug/L	50	1000	EPA 200.7	03/09/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	03/09/12	

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42 HANGAR WAY  
WATSONVILLE  
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Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Felipe Luevano

Work Order #: 2030207  
Reporting Date: March 18, 2012

Date Received: March 7, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-A2RC (2444A), sampled 3/6/2012 3:00:00PM  
Sampler Name / Co.: Nick Byler / Hydrometrics  
Matrix: Water  
Laboratory #: 2030207-03

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	9.3	pH Units	0.1	-	SM4500-H+ B	03/07/12	
Specific Conductance (EC)	540	µS/cm	1.0	1600	SM2510B	03/07/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/07/12	
Carbonate as CO <sub>3</sub>	21	mg/L	2.0	-	SM 2320B	03/07/12	
Bicarbonate as HCO <sub>3</sub>	75	mg/L	2.0	-	SM 2320B	03/07/12	
Total Alkalinity as CaCO <sub>3</sub>	96	mg/L	2.0	-	SM 2320B	03/07/12	
Hardness	91	mg/L	5.0	-	SM 2340 B	03/09/12	
Total Dissolved Solids	340	mg/L	10	1000	SM2540C	03/12/12	
Nitrate as NO <sub>3</sub>	16	mg/L	1.0	45	EPA 300.0	03/08/12	
Chloride	57	mg/L	1.0	500	EPA 300.0	03/08/12	
Sulfate as SO <sub>4</sub>	74	mg/L	1.0	500	EPA 300.0	03/08/12	
Fluoride	0.23	mg/L	0.10	2	EPA 300.0	03/08/12	
Calcium	31	mg/L	0.50	-	EPA 200.7	03/09/12	
Magnesium	3.2	mg/L	0.50	-	EPA 200.7	03/09/12	
Potassium	2.9	mg/L	0.50	-	EPA 200.7	03/09/12	
Sodium	66	mg/L	0.50	-	EPA 200.7	03/09/12	
* Iron	1800	ug/L	50	300	EPA 200.7	03/09/12	
* Manganese	69	ug/L	20	50	EPA 200.7	03/09/12	
Copper	ND	ug/L	50	1000	EPA 200.7	03/09/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	03/09/12	

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Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Christine Mead

Work Order #: 2030540  
Reporting Date: March 27, 2012

Date Received: March 20, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-9R-E, sampled 3/20/2012 2:00:00PM  
Sampler Name / Co.: Nick Byler / Soquel Creek Water District  
Matrix: Water  
Laboratory #: 2030540-01

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.2	pH Units	0.1	-	SM4500-H+ B	03/20/12	
Specific Conductance (EC)	850	µS/cm	1.0	1600	SM2510B	03/20/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/20/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	03/20/12	
Bicarbonate as HCO3	270	mg/L	2.0	-	SM 2320B	03/20/12	
Total Alkalinity as CaCO3	220	mg/L	2.0	-	SM 2320B	03/20/12	
Hardness	350	mg/L	5.0	-	SM 2340 B	03/22/12	
Total Dissolved Solids	580	mg/L	10	1000	SM2540C	03/21/12	
Nitrate as NO3	ND	mg/L	1.0	45	EP A 300.0	03/21/12	
Chloride	52	mg/L	1.0	500	EP A 300.0	03/21/12	
Sulfate as SO4	160	mg/L	1.0	500	EP A 300.0	03/21/12	
Fluoride	ND	mg/L	0.10	2	EP A 300.0	03/21/12	
Calcium	72	mg/L	0.50	-	EP A 200.7	03/22/12	
Magnesium	41	mg/L	0.50	-	EP A 200.7	03/22/12	
Potassium	4.9	mg/L	0.50	-	EP A 200.7	03/22/12	
Sodium	48	mg/L	0.50	-	EP A 200.7	03/22/12	
* Iron	5300	ug/L	50	300	EP A 200.7	03/22/12	
* Manganese	110	ug/L	20	50	EP A 200.7	03/22/12	
Copper	ND	ug/L	50	1000	EP A 200.7	03/22/12	
Zinc	ND	ug/L	50	5000	EP A 200.7	03/22/12	

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Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Christine Mead

Work Order #: 2030540  
Reporting Date: March 27, 2012

Date Received: March 20, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-9R-C, sampled 3/20/2012 2:00:00PM  
Sampler Name / Co.: Nick Byler / Soquel Creek Water District  
Matrix: Water  
Laboratory #: 2030540-02

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.3	pH Units	0.1	-	SM4500-H+ B	03/20/12	
Specific Conductance (EC)	720	µS/cm	1.0	1600	SM2510B	03/20/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/20/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	03/20/12	
Bicarbonate as HCO3	310	mg/L	2.0	-	SM 2320B	03/20/12	
Total Alkalinity as CaCO3	250	mg/L	2.0	-	SM 2320B	03/20/12	
Hardness	110	mg/L	5.0	-	SM 2340 B	03/22/12	
Total Dissolved Solids	450	mg/L	10	1000	SM2540C	03/21/12	
Nitrate as NO3	ND	mg/L	1.0	45	EP A 300.0	03/21/12	
Chloride	39	mg/L	1.0	500	EP A 300.0	03/21/12	
Sulfate as SO4	69	mg/L	1.0	500	EP A 300.0	03/21/12	
Fluoride	0.11	mg/L	0.10	2	EP A 300.0	03/21/12	
Calcium	29	mg/L	0.50	-	EP A 200.7	03/22/12	
Magnesium	8.4	mg/L	0.50	-	EP A 200.7	03/22/12	
Potassium	8.0	mg/L	0.50	-	EP A 200.7	03/22/12	
Sodium	120	mg/L	0.50	-	EP A 200.7	03/22/12	
* Iron	2600	ug/L	50	300	EP A 200.7	03/22/12	
* Manganese	74	ug/L	20	50	EP A 200.7	03/22/12	
Copper	ND	ug/L	50	1000	EP A 200.7	03/22/12	
Zinc	ND	ug/L	50	5000	EP A 200.7	03/22/12	

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USA

Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Christine Mead

Work Order #: 2030540  
Reporting Date: March 27, 2012

Date Received: March 20, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-9R-A, sampled 3/20/2012 2:00:00PM  
Sampler Name / Co.: Nick Byler / Soquel Creek Water District  
Matrix: Water  
Laboratory #: 2030540-03

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.3	pH Units	0.1	-	SM4500-H+ B	03/20/12	
Specific Conductance (EC)	650	µS/cm	1.0	1600	SM2510B	03/20/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/20/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	03/20/12	
Bicarbonate as HCO3	250	mg/L	2.0	-	SM 2320B	03/20/12	
Total Alkalinity as CaCO3	200	mg/L	2.0	-	SM 2320B	03/20/12	
Hardness	27	mg/L	5.0	-	SM 2340 B	03/22/12	
Total Dissolved Solids	440	mg/L	10	1000	SM2540C	03/21/12	
Nitrate as NO3	ND	mg/L	1.0	45	EPA 300.0	03/21/12	
Chloride	29	mg/L	1.0	500	EPA 300.0	03/21/12	
Sulfate as SO4	73	mg/L	1.0	500	EPA 300.0	03/21/12	
Fluoride	0.77	mg/L	0.10	2	EPA 300.0	03/21/12	
Calcium	7.7	mg/L	0.50	-	EPA 200.7	03/22/12	
Magnesium	1.8	mg/L	0.50	-	EPA 200.7	03/22/12	
Potassium	4.4	mg/L	0.50	-	EPA 200.7	03/22/12	
Sodium	130	mg/L	0.50	-	EPA 200.7	03/22/12	
* Iron	620	ug/L	50	300	EPA 200.7	03/22/12	
Manganese	ND	ug/L	20	50	EPA 200.7	03/22/12	
Copper	ND	ug/L	50	1000	EPA 200.7	03/22/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	03/22/12	

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Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Christine Mead

Work Order #: 2030714  
Reporting Date: April 4, 2012

Date Received: March 28, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-8R-F, sampled 3/28/2012 12:30:00PM  
Sampler Name / Co.: Nick Byler / Soquel Creek Water District  
Matrix: Water  
Laboratory #: 2030714-01

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.0	pH Units	0.1	-	SM4500-H+ B	03/28/12	
Specific Conductance (EC)	490	µS/cm	1.0	1600	SM2510B	03/28/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	03/28/12	
Carbonate as CO <sub>3</sub>	ND	mg/L	2.0	-	SM 2320B	03/28/12	
Bicarbonate as HCO <sub>3</sub>	210	mg/L	2.0	-	SM 2320B	03/28/12	
Total Alkalinity as CaCO <sub>3</sub>	170	mg/L	2.0	-	SM 2320B	03/28/12	
Hardness	160	mg/L	5.0	-	SM 2340 B	04/02/12	
Total Dissolved Solids	300	mg/L	10	1000	SM2540C	03/28/12	
Nitrate as NO <sub>3</sub>	ND	mg/L	1.0	45	EPA 300.0	03/28/12	
Chloride	43	mg/L	1.0	500	EPA 300.0	03/28/12	
Sulfate as SO <sub>4</sub>	22	mg/L	1.0	500	EPA 300.0	03/28/12	
Fluoride	ND	mg/L	0.10	2	EPA 300.0	03/28/12	
Calcium	20	mg/L	0.50	-	EPA 200.7	04/02/12	
Magnesium	25	mg/L	0.50	-	EPA 200.7	04/02/12	
Potassium	10	mg/L	0.50	-	EPA 200.7	04/02/12	
Sodium	39	mg/L	0.50	-	EPA 200.7	04/02/12	
* Iron	1200	ug/L	50	300	EPA 200.7	04/02/12	
* Manganese	90	ug/L	20	50	EPA 200.7	04/02/12	
Copper	ND	ug/L	50	1000	EPA 200.7	04/02/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	04/02/12	

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Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Christine Mead

Work Order #: 2040413  
Reporting Date: April 19, 2012

Date Received: April 13, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-22-AA, sampled 4/12/2012 5:24:00PM  
Sampler Name / Co.: Nick Byler / Soquel Creek Water District  
Matrix: Water  
Laboratory #: 2040413-02

	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
<b>General Mineral</b>							
pH	8.5	pH Units	0.1	-	SM4500-H+ B	04/13/12	
Specific Conductance (EC)	1100	µS/cm	1.0	1600	SM2510B	04/13/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	04/13/12	
Carbonate as CO <sub>3</sub>	ND	mg/L	2.0	-	SM 2320B	04/13/12	
Bicarbonate as HCO <sub>3</sub>	200	mg/L	2.0	-	SM 2320B	04/13/12	
Total Alkalinity as CaCO <sub>3</sub>	160	mg/L	2.0	-	SM 2320B	04/13/12	
Hardness	270	mg/L	5.0	-	SM 2340 B	04/17/12	
Total Dissolved Solids	810	mg/L	10	1000	SM2540C	04/16/12	
Nitrate as NO <sub>3</sub>	ND	mg/L	1.0	45	EPA 300.0	04/13/12	
Chloride	41	mg/L	1.0	500	EPA 300.0	04/13/12	
Sulfate as SO <sub>4</sub>	360	mg/L	1.0	500	EPA 300.0	04/13/12	
Fluoride	0.21	mg/L	0.10	2	EPA 300.0	04/13/12	
Calcium	51	mg/L	0.50	-	EPA 200.7	04/17/12	
Magnesium	33	mg/L	0.50	-	EPA 200.7	04/17/12	
Potassium	17	mg/L	0.50	-	EPA 200.7	04/17/12	
Sodium	150	mg/L	0.50	-	EPA 200.7	04/17/12	
* Iron	920	ug/L	50	300	EPA 200.7	04/17/12	
* Manganese	56	ug/L	20	50	EPA 200.7	04/17/12	
Copper	ND	ug/L	50	1000	EPA 200.7	04/17/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	04/17/12	

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Soquel Creek Water District  
P.O. Box 1550  
Capitola, CA 95010  
Attn: Christine Mead

Work Order #: 2040413  
Reporting Date: April 19, 2012

Date Received: April 13, 2012  
Project # / Name: None / CWO 10-006  
Water System #: 4410017 SOQUEL CREEK WATER DISTRICT  
Sample Identification: SC-22-AAA, sampled 4/12/2012 5:24:00PM  
Sampler Name / Co.: Nick Byler / Soquel Creek Water District  
Matrix: Water  
Laboratory #: 2040413-03

General Mineral	Results	Units	RL	State Drinking Water Limits	Analysis Method	Date Analyzed	Flags
pH	8.3	pH Units	0.1	-	SM4500-H+ B	04/13/12	
Specific Conductance (EC)	1100	uS/cm	1.0	1600	SM2510B	04/13/12	
Hydroxide as OH	ND	mg/L	2.0	-	SM 2320B	04/13/12	
Carbonate as CO3	ND	mg/L	2.0	-	SM 2320B	04/13/12	
Bicarbonate as HCO3	280	mg/L	2.0	-	SM 2320B	04/13/12	
Total Alkalinity as CaCO3	230	mg/L	2.0	-	SM 2320B	04/13/12	
Hardness	130	mg/L	5.0	-	SM 2340 B	04/17/12	
Total Dissolved Solids	680	mg/L	10	1000	SM2540C	04/16/12	
Nitrate as NO3	ND	mg/L	1.0	45	EPA 300.0	04/13/12	
Chloride	68	mg/L	1.0	500	EPA 300.0	04/13/12	
Sulfate as SO4	220	mg/L	1.0	500	EPA 300.0	04/13/12	
Fluoride	0.24	mg/L	0.10	2	EPA 300.0	04/13/12	
Calcium	31	mg/L	0.50	-	EPA 200.7	04/17/12	
Magnesium	13	mg/L	0.50	-	EPA 200.7	04/17/12	
Potassium	9.1	mg/L	0.50	-	EPA 200.7	04/17/12	
Sodium	190	mg/L	0.50	-	EPA 200.7	04/17/12	
Iron	76	ug/L	50	300	EPA 200.7	04/17/12	
Manganese	22	ug/L	20	50	EPA 200.7	04/17/12	
Copper	ND	ug/L	50	1000	EPA 200.7	04/17/12	
Zinc	ND	ug/L	50	5000	EPA 200.7	04/17/12	

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## **APPENDIX D: ELECTRICAL CONDUCTIVITY PROFILING**



## TECHNICAL MEMORANDUM

To: Taj Dufour, Interim General Manager, Soquel Creek Water District

From: Georgina King and Nick Byler

Date: October 2, 2012

Subject: Conductivity Profiling: SC-5A, SC-8RF, SC-9RA, and SC-22A

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To assist in locating the QED Well Wizard bladder pumps at their optimal location within monitoring wells with long screen intervals, vertical profiling was conducted on June 28 and 29, 2012. Profiling provides a downhole record of electrical conductivity which correlates to salinity. Ideally, pump intakes are to be located above areas of current salt water intrusion so changes in water quality can be detected in the future.

Monitoring wells with the longest screened intervals were profiled: SC-5A, SC-8RF, SC-9RA, and SC-22A. One of these wells, SC-5A, is not a newly constructed monitoring well but its previously installed Grundfos pump was to be replaced with a bladder pump. Therefore, it was profiled together with the new wells. The monitoring wells were not purged before profiling. An In-Situ Aqua-Troll 200 probe that measures and records water pressure, temperature and conductivity was used together with an external battery pack. Prior to profiling, static groundwater levels were measured. These levels were used to calculate the depth of the probe over time as it was lowered or raised through the water column. The probe equilibrated for ten minutes at the top of the water column before being lowered down the well using a cable reel. With the probe set to record data every one second, it was lowered or raised through the water column at a rate of approximately 3.5 seconds per foot. A stop watch and metronome were used to achieve this rate. The wells were profiled first from top to bottom, and thereafter from bottom to top. A combination of temperature and conductivity provides electrical conductivity adjusted to 25°C, which is also known as specific electrical conductance.

Results show that electrical conductivity generally increased with depth with the exception of SC-9RA (Figure 1 through Figure 4). In SC-9RA, conductivity increased with depth in the blank casing, but dropped sharply at the top of the screened interval only to increase again near the bottom of the screen (Figure 3). This supports the probability that the decreased electrical conductivity is from groundwater flowing through the screened interval.

All charts show a spike in electrical conductivity at the bottom of the well and higher electrical conductivity on the upwards profile than the downwards profile. This effect is largest on the plot for SC-22A (Figure 4). The probe was coated with bentonite when it was retrieved at the surface, which likely artificially increased the electrical conductivity readings on the upwards profile. Like the SC-22A well, SC-8RF is open from top to bottom but has a much smaller spike at the bottom (Figure 3). The retrieved probe was not coated with bentonite but likely contacted bentonite at the bottom of the well. SC-9RA was filled up with 48 feet of sediment to 862 feet bgs. Similarly, SC-5A had 78 feet of sediment above its completed depth to 692 feet bgs. The probe likely contacted bentonite in the sediments accumulated in the cellar of these wells causing the spike at the profile bottoms and higher readings on the upward profiles (Figure 1 and Figure 2). This consistent pattern indicates that the spike at the bottom of a profile does not indicate a freshwater-saltwater interface. Therefore, no seawater intrusion was detected in any of the wells, and no other anomalies were evident to warrant moving the bladder pump intake from the middle of the screened interval.

Based on these results, the District's standard practice of placing the bladder pump intake in the middle of the screened interval for each monitoring well is recommended for SC-5A, SC-8RF, SC-9RA, and SC-22A.

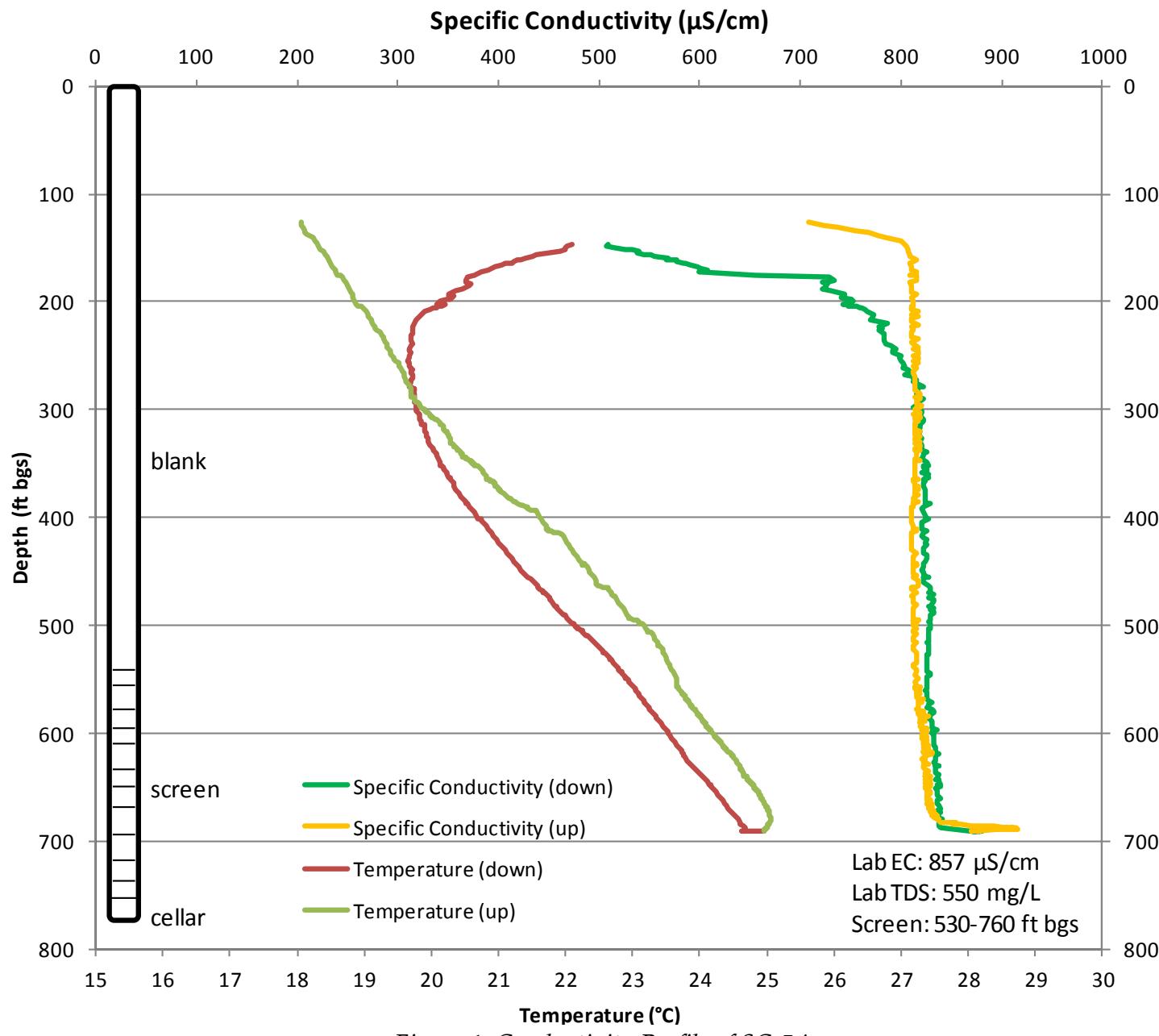


Figure 1: Conductivity Profile of SC-5A

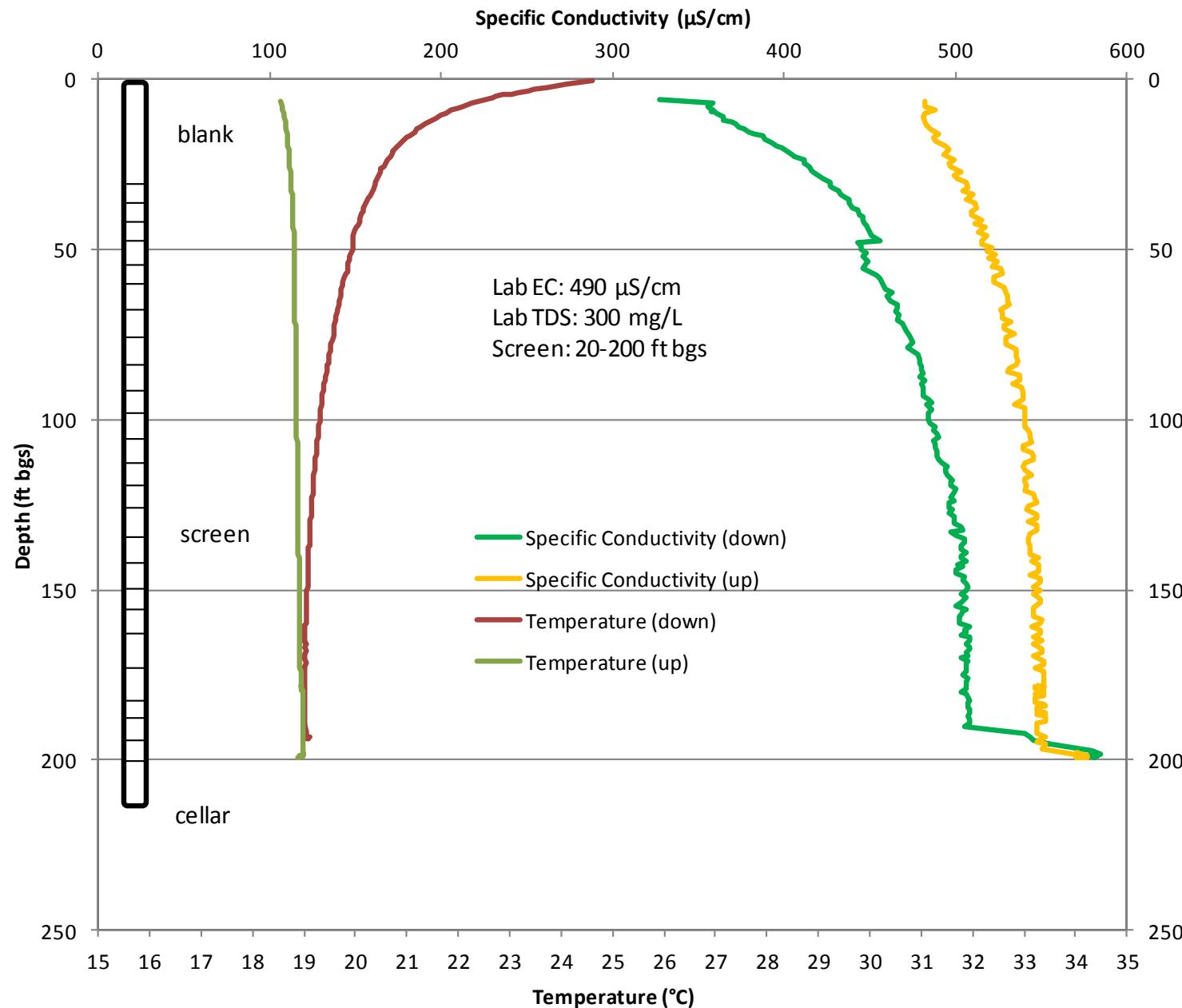


Figure 2: Conductivity Profile of SC-8RF

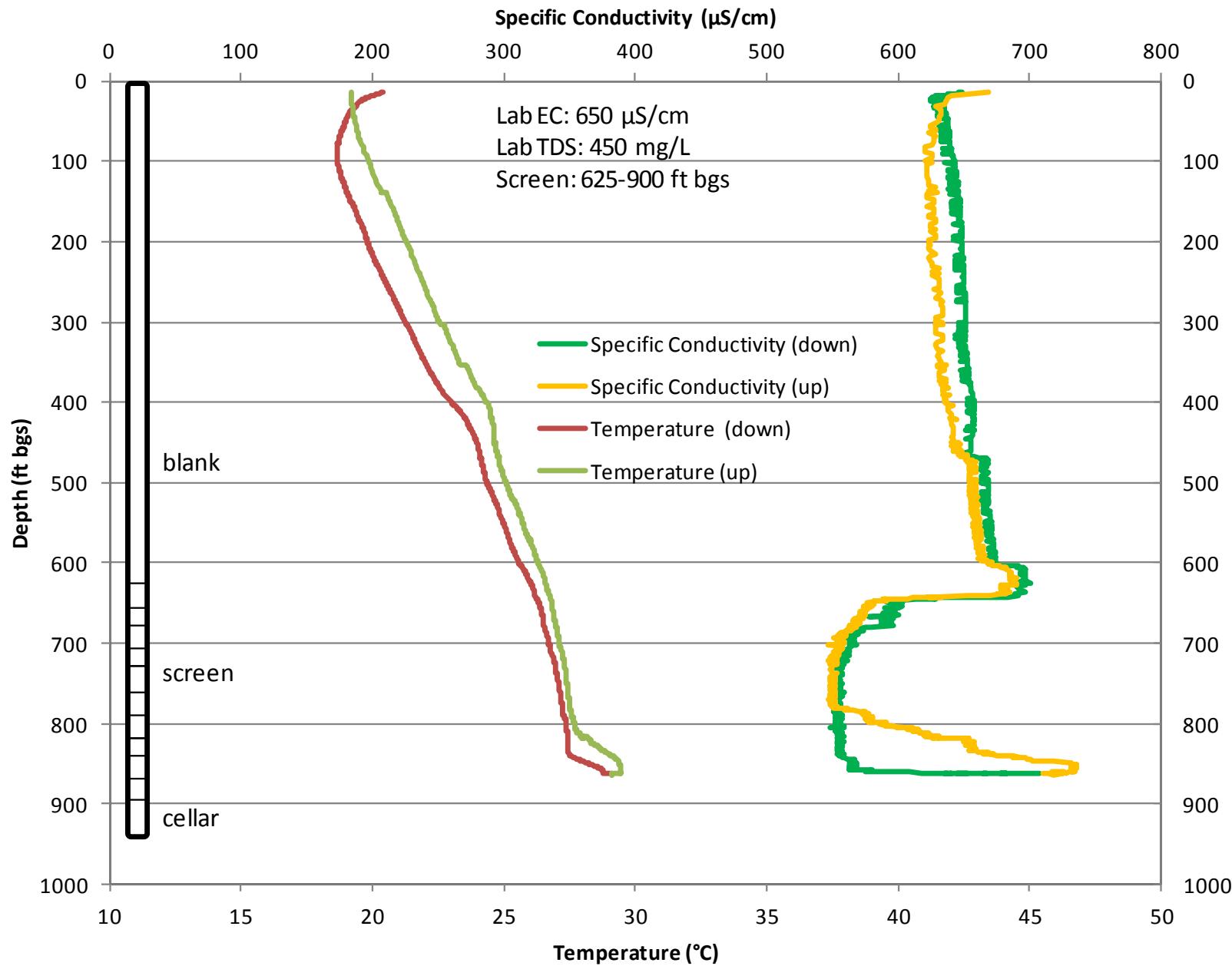


Figure 3: Conductivity Profile of SC-9RA

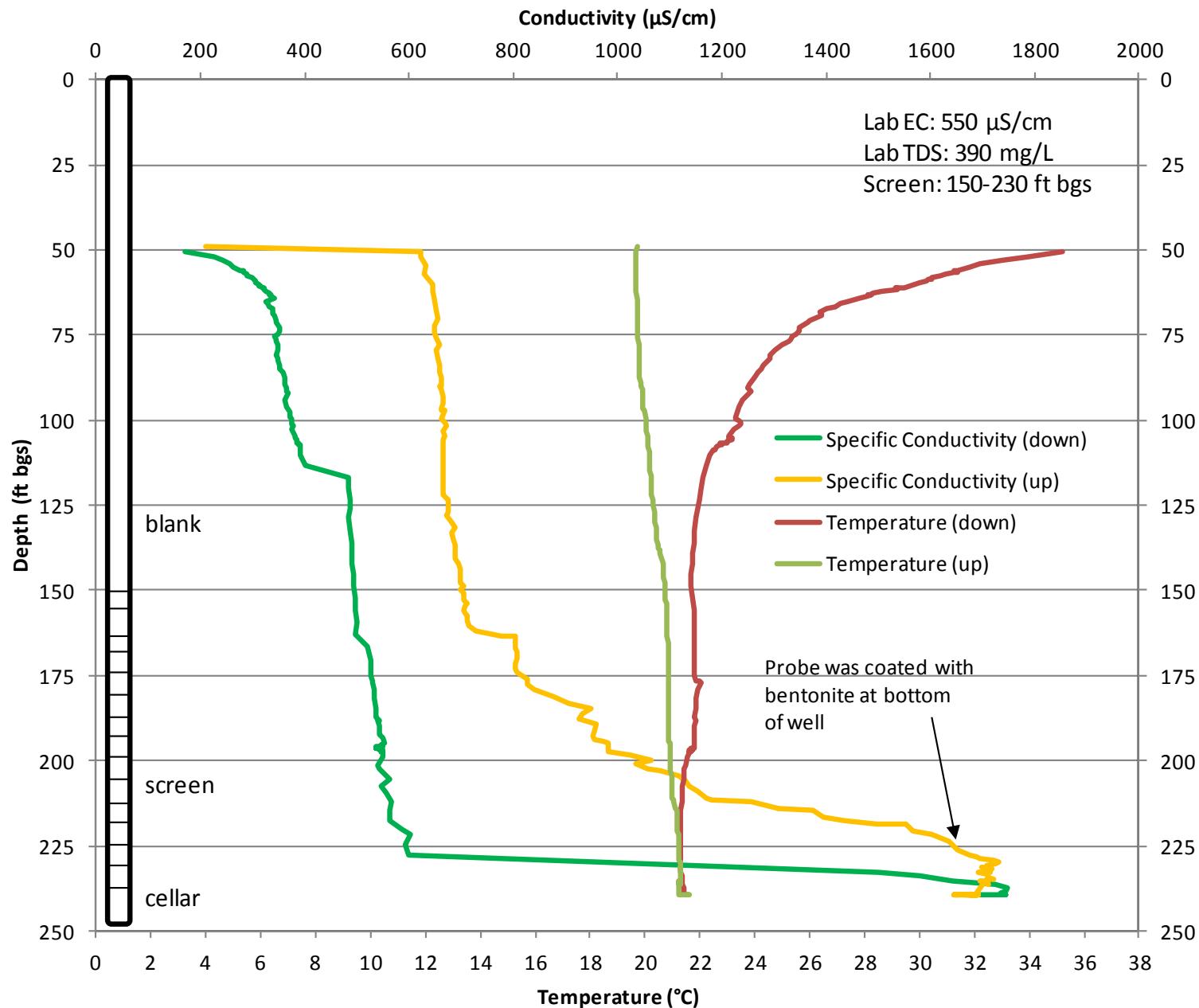


Figure 4: Conductivity Profile of SC-22A