



DOLPHIN/SUMNER MONITORING WELL PROJECT

Soquel Creek Water District

WELL COMPLETION REPORT

Prepared for:

HYDROMETRICS LLC
1611 Telegraph Ave., Suite 404
Oakland, CA 94612

March 2007



March 30, 2007
Project No. 06-0112

HydroMetrics LLC
1611 Telegraph Avenue, Suite 404
Oakland, California 94612

Attention: Mr. Derrik Williams
President

Subject: Well Completion Report; Soquel Creek Water District Dolphin/Sumner
Monitoring Wells.

Dear Derrik:

We are pleased to submit to you this report documenting the subject monitoring well construction project. The report contains maps, well logs, well construction drawings, baseline water level and water quality data, and other information pertinent to the project, and will serve as a useful reference for future work associated with the monitoring well cluster at the Dolphin/Sumner site in Aptos, California.

It was our pleasure and privilege to serve HydroMetrics and the Soquel Creek Water District on this important project. Thank You.

Sincerely,
Pueblo Water Resources, Inc.

A handwritten signature in black ink that reads "Michael S. Burke".

Michael S. Burke
Principal Hydrogeologist

MSB:mb

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EXECUTIVE SUMMARY

Three monitoring wells were drilled and installed for the Soquel Creek Water District near the intersection of Dolphin Drive and Sumner Avenue, in Aptos, California. The wells were installed in three separate boreholes on the same site. Tables ES-1 through ES-3 provide a summary of the installation, location, and design of the wells.

Table ES-1. Summary of Well Information

Well Cluster I.D.:	Dolphin/Sumner Monitoring Wells (SC-A8)
Well Owner:	Soquel Creek Water District
Well Location:	S.E. of Dolphin St./Sumner Avenue Intersection; Aptos, CA.
Township/Range/Section:	T11S R1W Sec.20
GPS Coordinates:	N 36° 57' 15.2" W 121° 52' 43.8"
Well Contractor:	Bradley and Sons, Inc., Madera, California
Drilling Method:	Direct Rotary, with bentonite and additives
Drill Rig:	Ingersoll Rand TH-60
Completion Date:	January 2007
Total Pilot Hole Depth:	700 feet
Geophysical Data:	Welenco: SP, Electric, Gamma, Temp., Induction
Consultants:	HydroMetrics LLC, Oakland, CA Pueblo Water Resources, Inc., Ventura CA

Table ES-2. Well Cluster Construction Details

	Deep Well	Intermediate Well	Shallow Well
Top of Well Vault Elevation (ft., m.s.l.)	82.42	82.22	82.20
Top of Casing Elevation (ft., m.s.l.)	82.02	81.76	82.10
Total Drilled Depth, (ft.)	700	430	180
Borehole Diameter (in.)	8.75	8.75	8.75
Top of Bottom Seal (ft.)	530	N/A	N/A
Casing Depth (ft.)	520	425	175
Casing Diameter (in.)	3	2	2
Casing Material	PVC		
Casing Grade	Sch. 80	Sch. 40 (to 260') Sch. 80 (to 425')	Sch. 40
Screened Interval (ft.)	470 to 490	400 to 420	150 to 170
Gravel Pack Material	Lone Star No. 8		
Top of Gravel Pack (ft.)	460	390	140.5
Top of Bentonite Transition Seal (ft.)	458.5	283	139
Depth of Cement Grout Annular Seal (ft.)	458.5	283	139

Table ES-3. Project Chronology
Dolphin/Sumner Monitoring Well Cluster Construction

Date	Activity
December 11, 2006	Contractor Mobilization
December 12, 2006	Commence Pilot Hole Drilling
December 13, 2006	Complete Pilot Hole and Run Geophysical Log
December 19, 2006	Complete Deep Well Construction
December 21, 2006	Commence and Complete Shallow Well Drilling and Construction
December 26, 2006	Commence Drilling for Intermediate Well
December 28, 2006	Complete Intermediate Well Construction
December 28, 2006	Complete Well Development
January 23, 2007	Sample Water Quality Sampling
January 9 – 24, 2007	Collect Water Level Data
January 24, 2007	Run Dual Induction Log and Complete Field Activities

INTRODUCTION

GENERAL STATEMENT

This report provides documentation of the drilling and construction of the Soquel Creek Water District's (SqCWD) Dolphin/Sumner Monitoring Well Cluster. The report also includes baseline water quality data and water level data collected from wells following completion and development. The work associated with the Dolphin/Sumner Monitoring Well Cluster construction project was performed between December 11, 2006 and January 23, 2007.

The wells are located on a parcel of undeveloped property east of the intersection of Dolphin Drive and Sumner Avenue in Aptos, California. Plate 1 shows the location of the site, and the relative position of each well within the site. Three wells are included in the cluster, and are identified as Dolphin/Sumner Deep, Intermediate, and Shallow Monitoring Wells.

Bradley and Sons, Inc., of Madera, California served as the drilling and well construction Contractor for the project, under direct contract with SqCWD. HydroMetrics LLC served as hydrogeologic consultant to SqCWD. HydroMetrics coordinated the project and prepared the specifications for the well drilling and construction. Pueblo Water Resources, Inc. (PWR) was a subconsultant to HydroMetrics, and served as field representative for SqCWD and HydroMetrics. PWR provided oversight during the collection of hydrogeologic data, documented drilling and well construction activities, and coordinated other field activities. Welenco of Salinas, California provided geophysical survey services for the project. Monterey Bay Analytical Services, Inc. of Monterey, California performed analyses of water quality samples. Mid Coast Engineers surveyed the site and established reference point elevations for each of the wells.

This report compiles all relevant data pertaining to the project, including:

- Lithologic and geophysical data;
- Well construction details and the materials of construction;
- Water quality sampling and analytical results;
- Project photographs.

The documentation cited above is provided within the text of the report and is included in the following appendices:

- Appendix A - Well Logs
- Appendix B - Field Memoranda, Correspondence, and Miscellaneous Documentation
- Appendix C - Water Quality Data
- Appendix D - Project Photographs
- Appendix E – Data CD

FINDINGS

PILOT DRILLING

Drilling was performed using the direct rotary method with a bentonite based fluid. Fluid was circulated and conditioned in a system using mechanical separation of solids. The pilot bore diameter was 8.75 inches. Drill pipe lengths were twenty feet, and following advancement of each joint of pipe the fluid was circulated and cleaned to provide representative cutting samples and a balanced column of fluid. PWR collected cutting samples throughout the pilot boring and prepared a lithologic log of the borehole. In addition to the descriptions of the samples acquired from the pilot bore, the lithologic log prepared by PWR also includes documentation of drilling fluid properties, including electrical conductance.

The total depth of the pilot bore, per the specifications, was 700 feet. This depth was established by HydroMetrics and was based on their estimation of the position and depth of the seawater intrusion front at this location.

A geophysical survey of the well was performed immediately after completing the pilot borehole. The geophysical log includes measurements of natural gamma radiation, spontaneous potential, short-and long-normal resistivities, and single point resistance. Appendix A contains the lithologic log (Plate A-1), the geophysical log, and photographs of the cutting samples (Plates A-2.1 through A-2.4).

Based on observations of the cuttings and information presented on the logs, the pilot bore penetrated brown to reddish brown sand of the Aromas Formation and brown to grayish brown sand, gravel, silt, and clay of the Purisima Formation.

The presence of seawater at this location is clearly demonstrated on the geophysical log. The cutting samples and the lithologic log indicate the presence of a predominance of coarse grained materials throughout the entire boring, and particularly so within the depth interval of 460 to 520 feet, where substantial amounts of gravel were logged. However, the resistivity of the materials starting from the depth of approximately 460 feet to total depth approaches zero, indicating the presence of highly conductive fluids within the aquifer.

WELL CONSTRUCTION AND DEVELOPMENT

The clustered well approach (several wells, separate boreholes) to multiple completions at the site was selected over the nested well approach (several wells within the same borehole) because of the greater confidence in achieving complete isolation of separate completion zones.

The well completion plan was developed by HydroMetrics, with input from PWR and SqCWD. The well cluster consists of three separate monitoring wells. The objectives of the well completion plan were to:

1. Construct a monitoring well within the uppermost intruded portion of the aquifer.
2. Complete a monitoring well in an unintruded zone immediately above, and isolated from, the uppermost intruded zone.
3. Complete a monitoring well in a relatively shallow portion of the aquifer.

Annular seals were placed adjacent to silt/clay layers to isolate the completed zones. A summary of the completion depths are provided in Table 1.

Table 1. Well Completion Summary

	Deep Well	Intermediate Well	Shallow Well
Total Drilled Depth, (ft.)	700	430	180
Top of Bottom Seal (ft.)	530	N/A	N/A
Casing Depth (ft.)	520	425	175
Casing Diameter (in.)	3	2	2
Screened Interval (ft.)	470 to 490	400 to 420	150 to 170
Depth of Cement Grout Annular Seal (ft.)	458.5	283	139

The deepest well was completed within the pilot bore. Because the total depth of the pilot bore was 700 feet and the total completion depth of the deep well was 520 feet, the bottom portion of the boring was sealed with cement grout. The shallow and intermediate wells were completed in separate boreholes, drilled to a depth immediately below the planned completion depth for each well.

The well casings consist of flush-threaded PVC. The deep well casing is 3-inches in diameter and the casing grade is Schedule 80. The diameter of the shallow and intermediate wells is 2-inches. The shallow well casing consists of Schedule 40 PVC. The intermediate well consists of schedule 40 PVC to a depth of 260 feet, and schedule 80 PVC between 260 feet and the total completed depth of 425 feet. The schedule 40 casing was used for the upper portion of the intermediate well to provide a slightly larger diameter that can accommodate submersible pumping equipment. The heavier grade schedule 80 casing within the lower portion of the intermediate well was used to provide for greater collapse strength.

Casing perforations were 0.040-inch, machine cut horizontal slots. The casings were centered in the borehole with PVC guides (no metal). Centering guides were placed immediately above and below the well screens, and at approximate 80-feet intervals throughout the blank portions of the monitoring wells.

Gravel pack for all of the wells consisted of an RMC Pacific Materials No. 8 blend. Gravel pack was installed into the annulus through tremie pipe, which was placed in the boring prior to installation of the casing. The gravel packing was monitored and documented, and the final depth to the gravel pack was measured and recorded once gravel placement operations were completed.

Cement grout annular seals were installed in each of the wells. The grout consisted of a 10-sack sand slurry supplied by Granite Rock. Bentonite was added to the mixture to slow the curing process, reduce the heat generated during curing, and protect the integrity of the well casings. A Santa Cruz County inspector was present to witness sealing operations for each well. Prior to pumping the cement grout seal a volclay (bentonite) grout transitional seal was installed to prevent invasion of the cement grout into the gravel pack.

Each well was provided with a water-tight, flush-mounted, traffic-rated circular well vault set in place with concrete. For each well, surveyed elevations were established for the top edge of the well vault, and the top of the PVC casing.

A drawing showing the general construction features of the wells is provided on Plate 2. A depiction of the completion of each well with respect to the subsurface hydrogeology (represented by the lithologic and geophysical logs) is presented on Plate 3.

The wells were developed by airlifting and surging. Development was performed until the discharge of each well following surges remained relatively clear. Field water quality measurements were performed and documented throughout the development.

WATER LEVEL DATA

The wells were instrumented with pressure transducers/data loggers (MiniTrols) following well construction, and water level data were collected from each of the wells between January 9 and January 24, 2007. The MiniTrols were programmed to collect depth to water measurements at 10-minute intervals. The data collected from each of the wells are presented graphically on Plate 4. Plate 4 also presents along with the monitoring well water level data, the tide height data for the Monterey Bay during this same period.

The monitoring well hydrographs show a tidal induced cyclical fluctuation in the data for the deep and intermediate wells, both of which are completed in confined zones within the Purisima Formation. The unconfined shallow zone does not display the same pattern or influence. For the confined zones, the magnitude of the tidally influenced fluctuation is greater at the Intermediate Well than at the Deep Well. It is also apparent in the data that the head in the intermediate zone is approximately three feet higher than the head in the deep zone. While analysis of head variations between the different zones is beyond the scope of this documentation report, the fact that a notable difference exists indicates that the two zones are isolated from each other.

WATER QUALITY

The wells were sampled on January 23, 2007. Purgging and sampling was performed using a small, portable, electric submersible pump (Grundfos Redi-Flo 2). The submersible pump was set at a minimum depth of approximately 100 feet in each well (static water levels were in the range of approximately 72 to 75 feet), and a minimum of three casing/annulus volumes of water was purged from each well prior to sampling. In the case of all three wells, the water was clear prior to sampling, with turbidity values less than 0.5 NTUs. Field documentation of sampling operations (including field water quality) is included in Appendix C.

Samples were transported immediately after collection to the laboratory. The samples were analyzed for basic general mineral constituents. A summary of the analytical data is presented in Table 2, and laboratory reports and chain-of-custody documentation are included in Appendix C.

**Table 2. Summary of Water Quality Data
Dolphin/Sumner Monitoring Well Cluster**

	Shallow	Intermediate	Deep
Sample Date	January 23, 2007	January 23, 2007	January 23, 2007
Turbidity, NTUs	0.10	0.25	0.15
Specific Conductance, $\mu\text{mhos}/\text{cm}$	478	500	20,320
TDS, mg/l	283	289	12,000
Calcium, mg/l	38	33	1,780
Magnesium, mg/l	17	25	810
Potassium, mg/l	3.0	3.9	55
Sodium, mg/l	30	29	877
Chloride, mg/l	39	32	7,000
Sulfate, mg/l	26	52	600
Alkalinity (CaCO_3), mg/l	129	152	70
Nitrate (NO_3), mg/l	30	4	Not Detected

INDUCTION LOGGING

An induction log was performed within the Deep Well casing on January 24, 2007. The induction log presents measurements of the conductivity of fluids within aquifer materials. Copies of the induction log are included in Appendix A. Induction log data are also presented graphically on Plate 3, along with the other geophysical data and the lithologic profile.

The induction log data exhibit a sharp and dramatic increase in fluid conductivities starting at a depth of approximately 450 feet. The induction log data are consistent with the resistivity surveys, both indicating the presence of seawater in this portion of the aquifer.

The deep well was designed with a sufficiently large diameter (3-inches as opposed to the 2-inch diameter of the other two wells) to allow for periodic induction logging. The induction log performed as part of the monitoring well construction project will serve as a basis for comparison with subsequent induction surveys, which will facilitate tracking the movement of the seawater intrusion front.

CONCLUSIONS

The Dolphin/Sumner Monitoring Well Construction Project was successfully executed and the following objectives for the project were met:

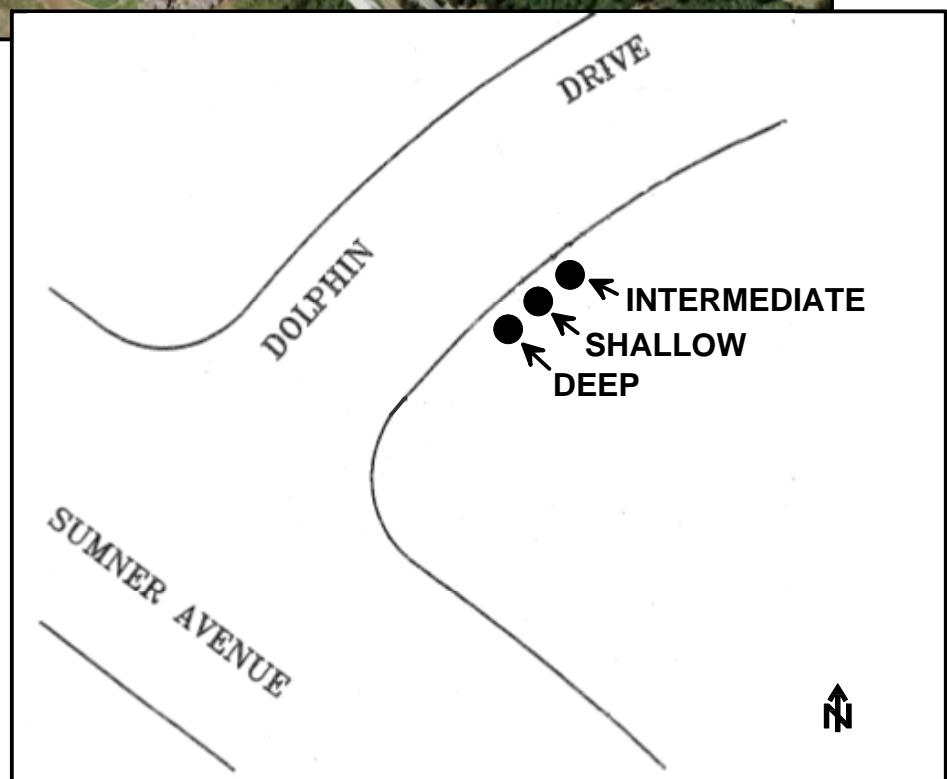
- Acquiring key hydrogeologic data and characterizing the aquifer at this location.
- Using site specific data to finalize preliminary well design plans developed by HydroMetrics.
- Identifying and documenting the presence of seawater in the aquifer beneath the site.
- Installing three discreet and separate monitoring wells to allow for baseline characterization of water quality and providing a mechanism to monitor water quality trends.
- Verifying geophysical data through water quality analysis.
- Providing baseline geophysical fingerprinting for comparison with data to be collected in the future.

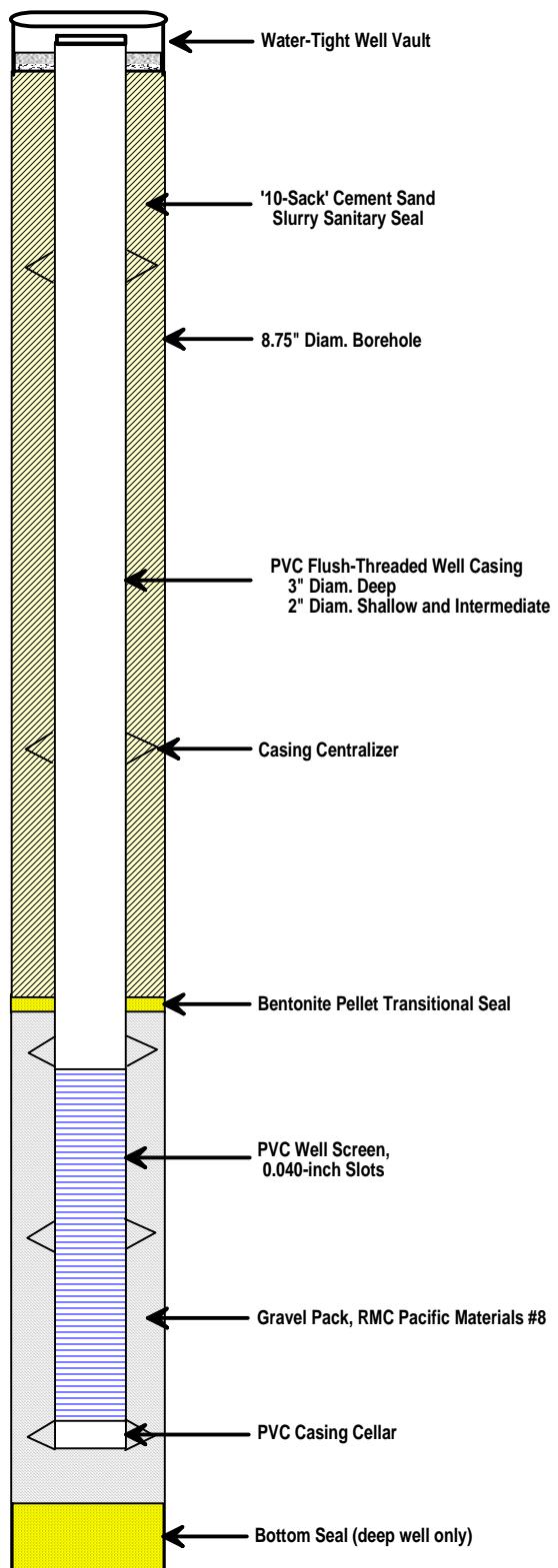
This report has been prepared for the exclusive use of HydroMetrics LLC, for specific application to the Dolphin/Sumner site in Santa Cruz County, California. The findings, conclusions, and recommendations presented herein were prepared in accordance with generally accepted hydrogeologic practices. No other warranty, expressed or implied, is made.

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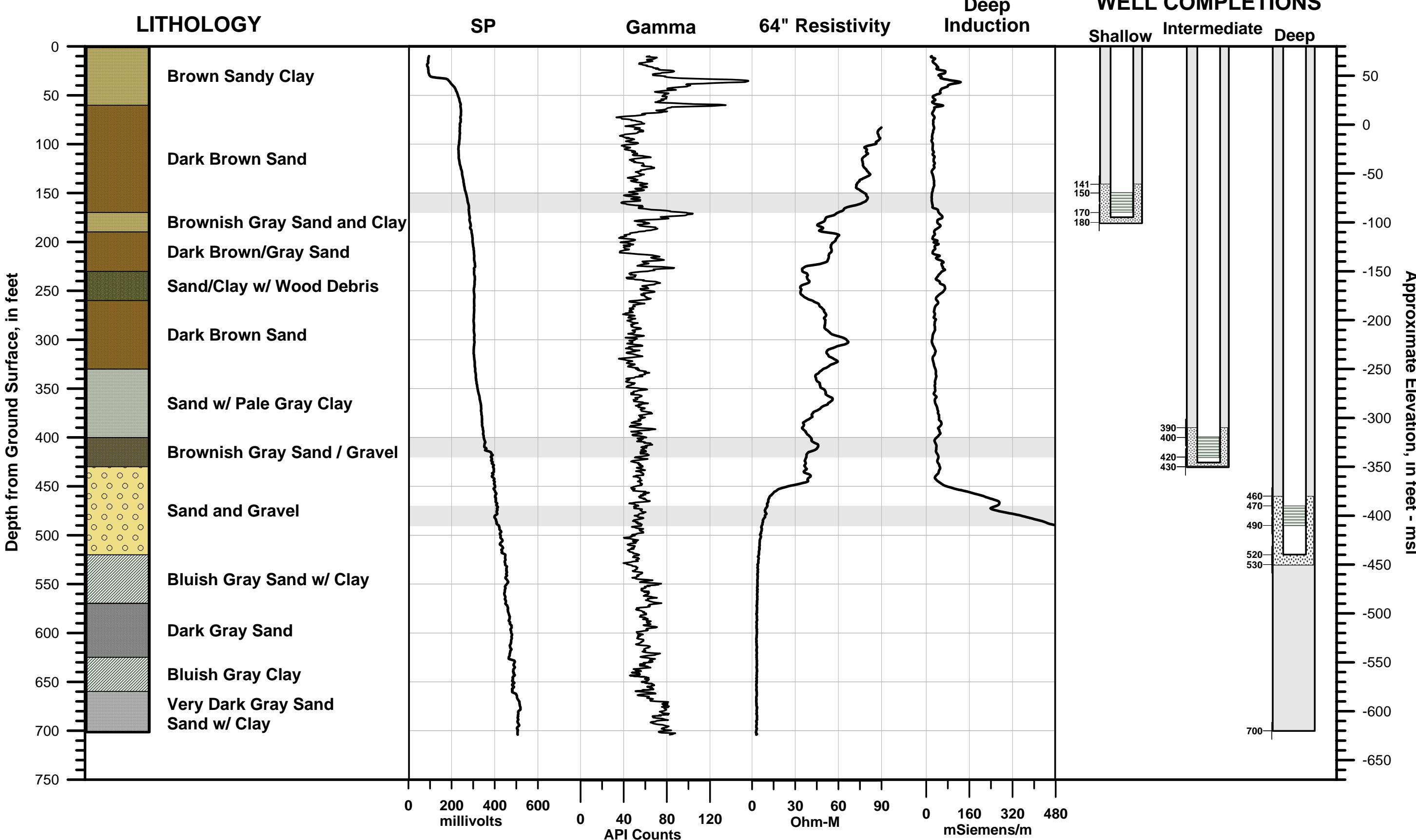


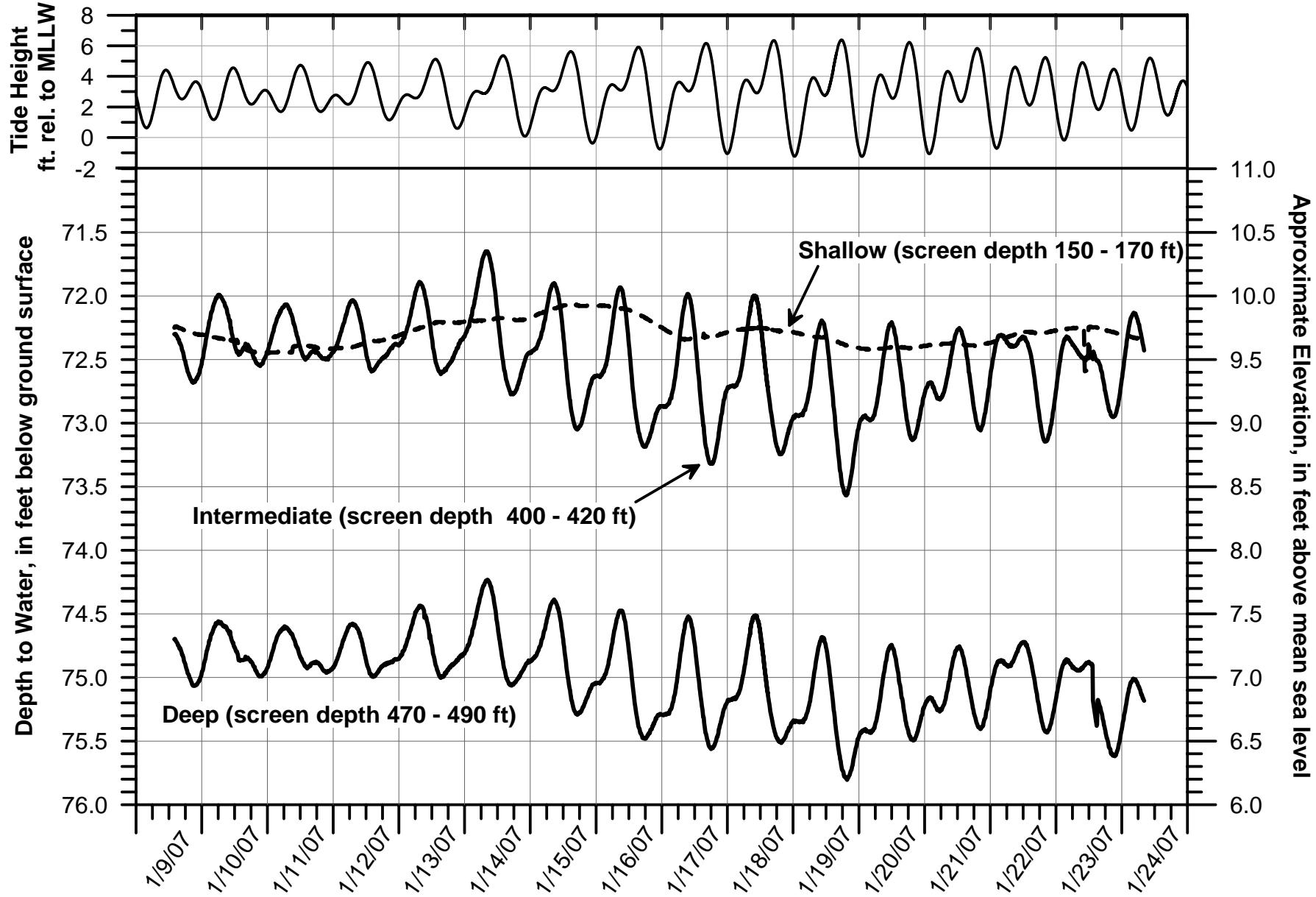
PLATES





GEOPHYSICS







APPENDIX A WELL LOGS

DRILLING AND WELL COMPLETION LOG

Client: Hydrometrics LLC/Soquel Creek Water District	Project No.: 06-0112
Well Name: Dolphin/Sumner Seawater Monitoring Cluster	Project Manager: Michael Burke
Well Location: Seascape; NE Corner of Dolphin St./Sumner Ave.	Logging Personnel: Michael Burke
Intersection.	Rig Type: Ingersoll Rand TH-60
Township/Range/Section: T11S R1W Sec.20	Drilling Method: Direct Rotary
GPS Coordinates: N 36° 57' 15.2"; W 121° 52' 43.8"	Fluid System: Bentonite, Shaker, Desanding Cones
Ground Surface Elevation: Approx. 82 ft.	E-log Info.: Welenco; NGam, SP, Long/Short Normal, S.Pt..
Pilot Hole Depth: 700 ft.	Gravel Pack: Lonestar #8
Start Date: 12/12/06	Other Info.: Pilot bore and deepest completion of 3 well
Drilling Company: Bradley and Sons, Madera, CA Lic. # 414178	cluster. E-log, gamma and dual induction log by Welenco.
Drilling Crew: Rod (Supt.), Mike (Driller), Josh and Rob (Helpers)	Additional well completion information provided below.

Depth, ft.	Hole Diam., in.	Casing Diam., in.	Casing Material:
Deep Well			
520	8.75	3	Sch. 80 PVC
Intermediate Well			
0 - 260	8.75	2	Sch. 40 PVC
260 - 425	8.75	2	Sch. 80 PVC
Shallow Well			
175	8.75	2	Sch. 40 PVC

<u>Well Screen Depth Intervals, ft.:</u>			
Deep:	470	to	490
Intermediate:	400	to	420
Shallow:	150	to	170
<u>Abbreviations:</u>			
CO - Circulate Out; NB - New Bit; NR - No Returns; POOH - Pull Out of Hole; PR - Poor Returns; SC - Sand Content (%); VIS - Viscosity (sec); WL - Water Loss (cc); WT - Fluid Weight (lbs. /cu.ft.); FC - Filter Cake (in.)			

CLAY SILT SAND GRAVEL

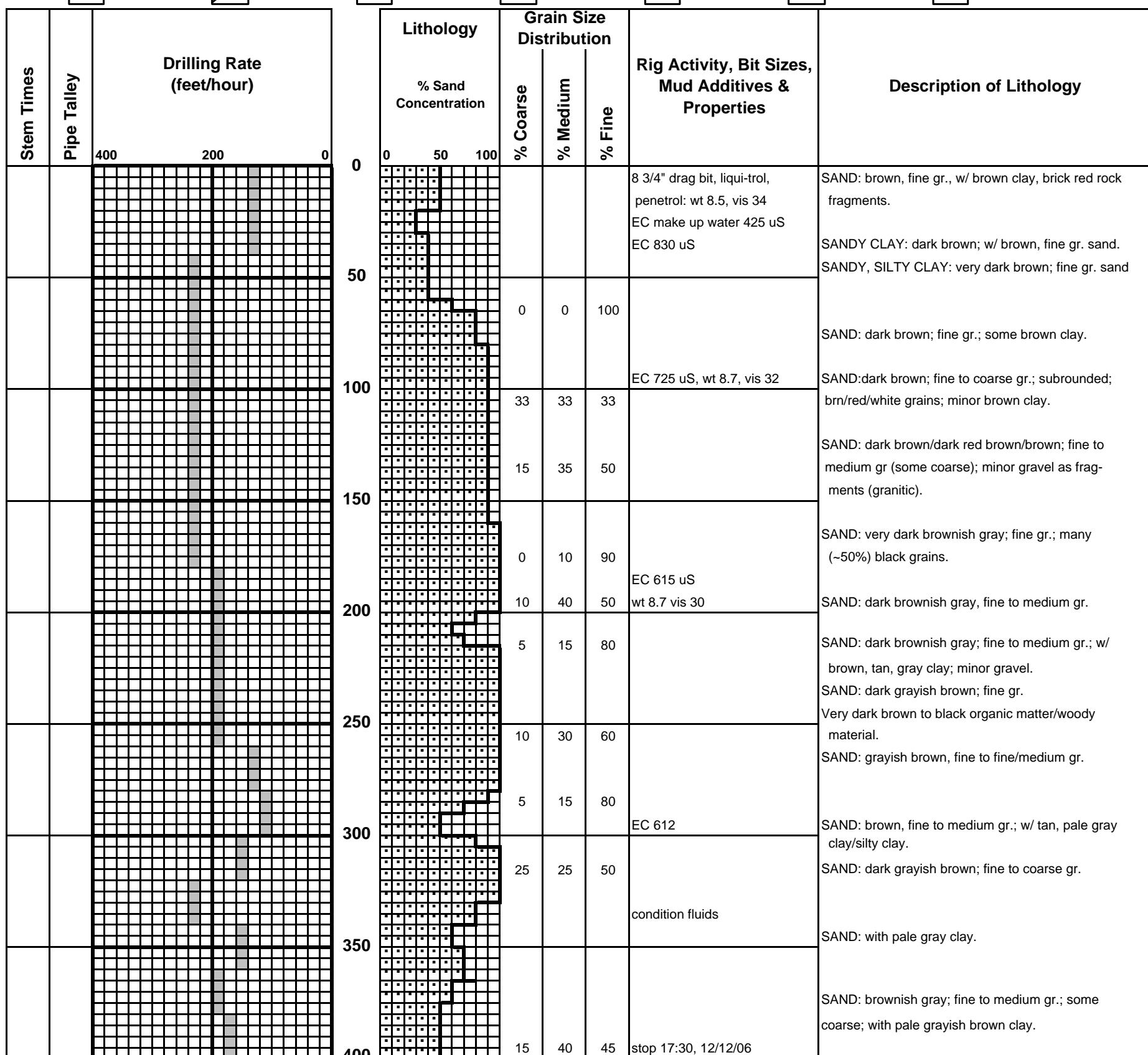


Plate A-1.1. Lithologic Log: Dolphin/Sumner Site
Hydrometrics LLC/Soquel Creek Water District

Client: Hydrometrics LLC/Soquel Creek Water District	Project No.: 06-0112
Well Name: Dolphin/Sumner Site	Project Manager: M.Burke

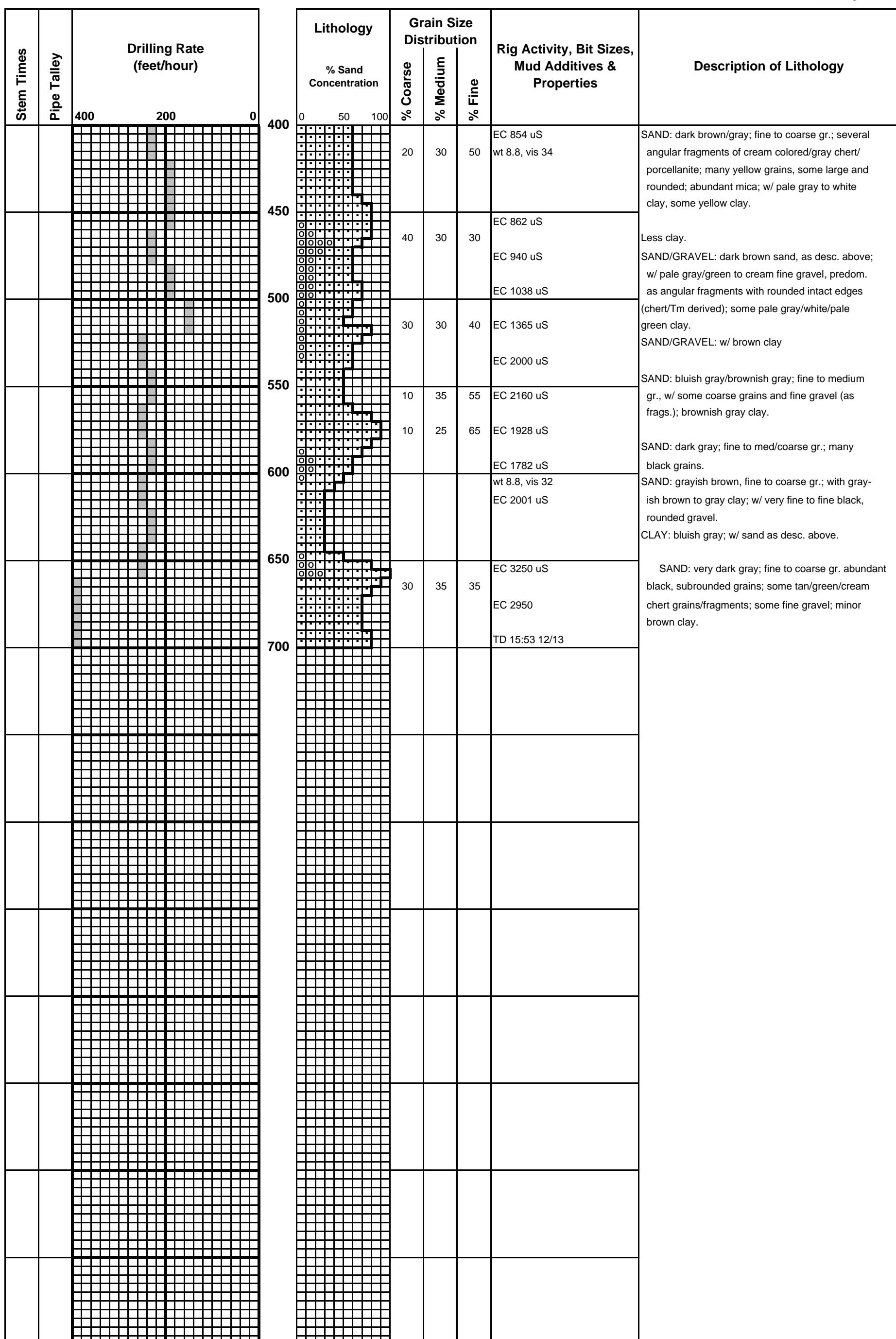
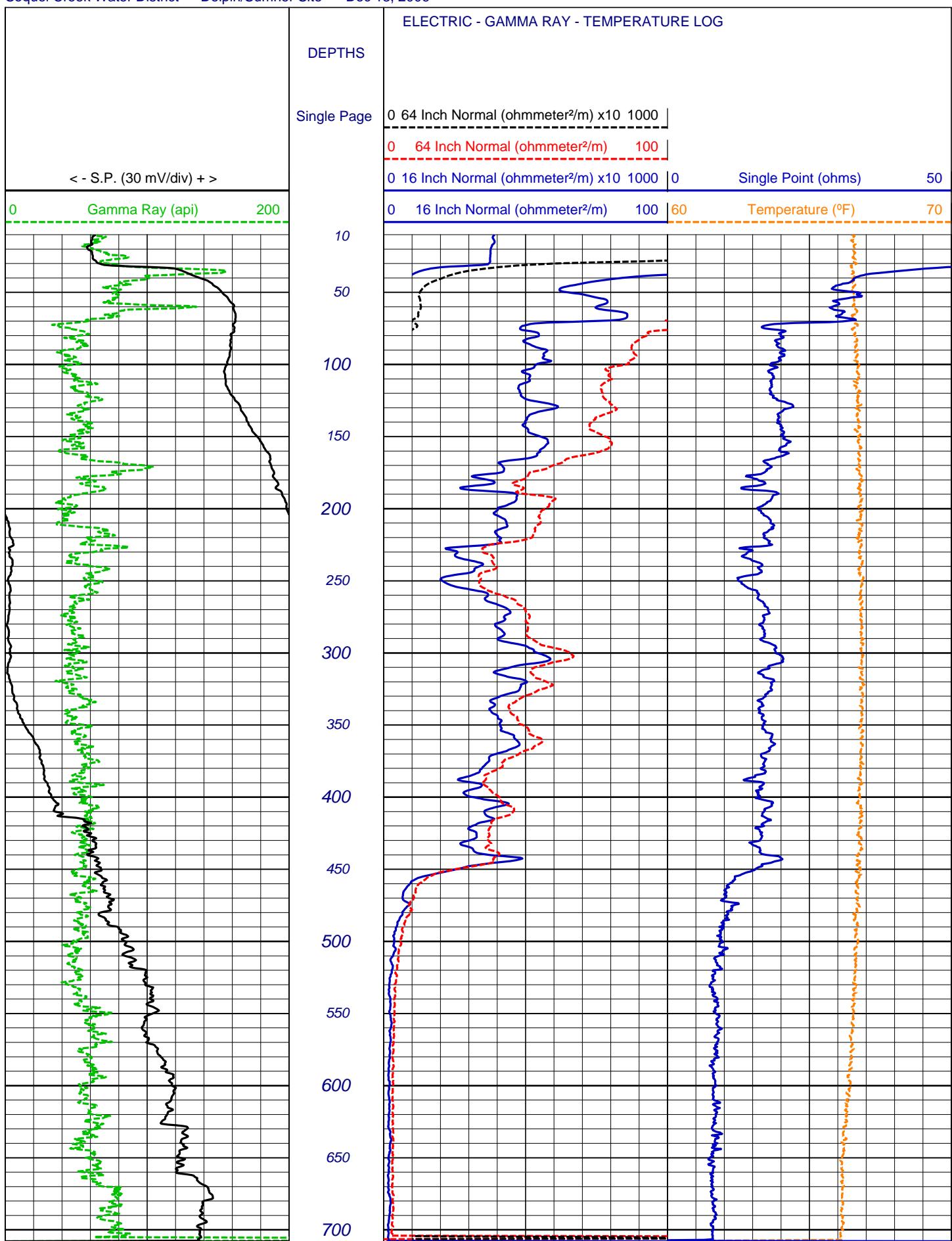
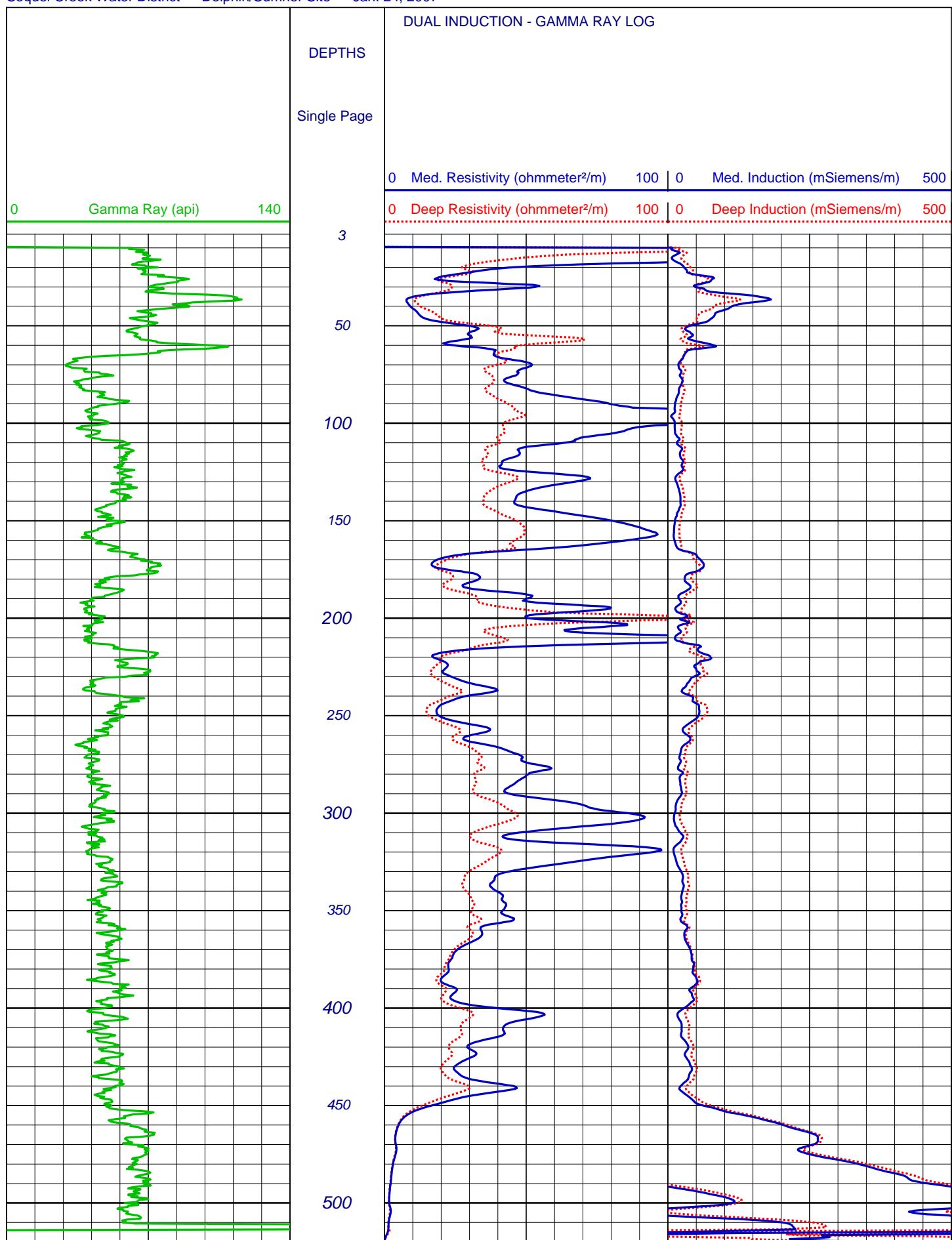


Plate A-1.2. Lithologic Log: Dolphin/Sumner Site Hydrometrics LLC/Soquel Creek Water District





March 2007
Project No. 06-0112



PLATE A-2.1. CUTTINGS PHOTO NO. 1
Dolphin/Sumner Seawater Intrusion Monitoring Wells
HydroMetrics LLC/Soquel Creek Water District

March 2007
Project No. 06-0112







DUPLICATE
Driller's Copy

Page 1 of 1

Owner's Well No. #1

Date Work Began 12/12/2006, Ended 12/15/2006

Local Permit Agency SANTA CRUZ COUNTY HEALTH SERV.

Permit No. 06-240 Permit Date 12/12/2006

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. **e048129**

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 ROTARY FLUID WATER			
Ft. to Ft.	DEscription	Describe material, grain, size, color, etc.			
0	20	TOPSOIL, SAND, SAME GRAVEL, GRANITE			
		MEDIUM TO COARSE SAND W/CLAY			
20	60	MEDIUM TO COARSE SAND/CLAY			
60	80	FINE SAND			
80	100	COARSE SAND AND GRAVEL			
100	120	COARSE SAND, GRAVEL AND MEDIUM SAND			
120	140	MEDIUM TO COARSE SAND			
140	160	MEDIUM TO COARSE SAND W/SOME GRAVEL			
160	200	MEDIUM AND FINE SAND			
200	220	MEDIUM AND FINE SAND W/SOME CLAY			
220	340	MEDIUM AND FINE SAND			
340	400	MEDIUM AND COARSE SAND/SOME CLAY			
400	460	MEDIUM, COARSE AND FINE SAND/SOME CLAY			
460	480	MEDIUM COARSE SAND, SOME GRAVEL AND			
		SOME CLAY			
480	500	MEDIUM AND COARSE SAND/SOME CLAY			
500	560	MEDIUM AND COARSE SAND SOME CLAY			
		AND GRAVEL			
560	580	MEDIUM AND COARSE SAND, SOME CLAY			
580	620	MEDIUM AND COARSE SAND/CLAY			
620	640	MEDIUM AND COARSE SAND/SOME CLAY			
640	660	COARSE SAND			
660	700	MEDIUM AND COARSE SAND/SOME CLAY			
TOTAL DEPTH OF BORING 700 (Feet)					
TOTAL DEPTH OF COMPLETED WELL 515 (Feet)					

WELL OWNER

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

Address DOLPHIN DRIVE AND SUMNER AVENUE
City APTOS CA
County SANTA CRUZ

APN Book 054 Page 083 Parcel 02
Township Range Section
Latitude

DEG. MIN. SEC. DEG. MIN. SEC.
LOCATION SKETCH NORTH 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

TEST LENGTH (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						
		TYPE (✓)	BLANK	SCREEN	CONDUCTOR	FILL PIPE		MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CEMENT (✓)	BENTONITE (✓)	FILL (✓)
0	470	8 3/4	✓				PVC	3	SCH 80					
470	490	8 3/4	✓				PVC	3	SCH 80	.040				
490	515	8 3/4	✓				PVC	3	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

WELL DRILLER/AUTHORIZED REPRESENTATIVE

DEL REY

CITY

CA 93616

STATE ZIP

01/31/07 DATE SIGNED

414178 C-57 LICENSE NUMBER



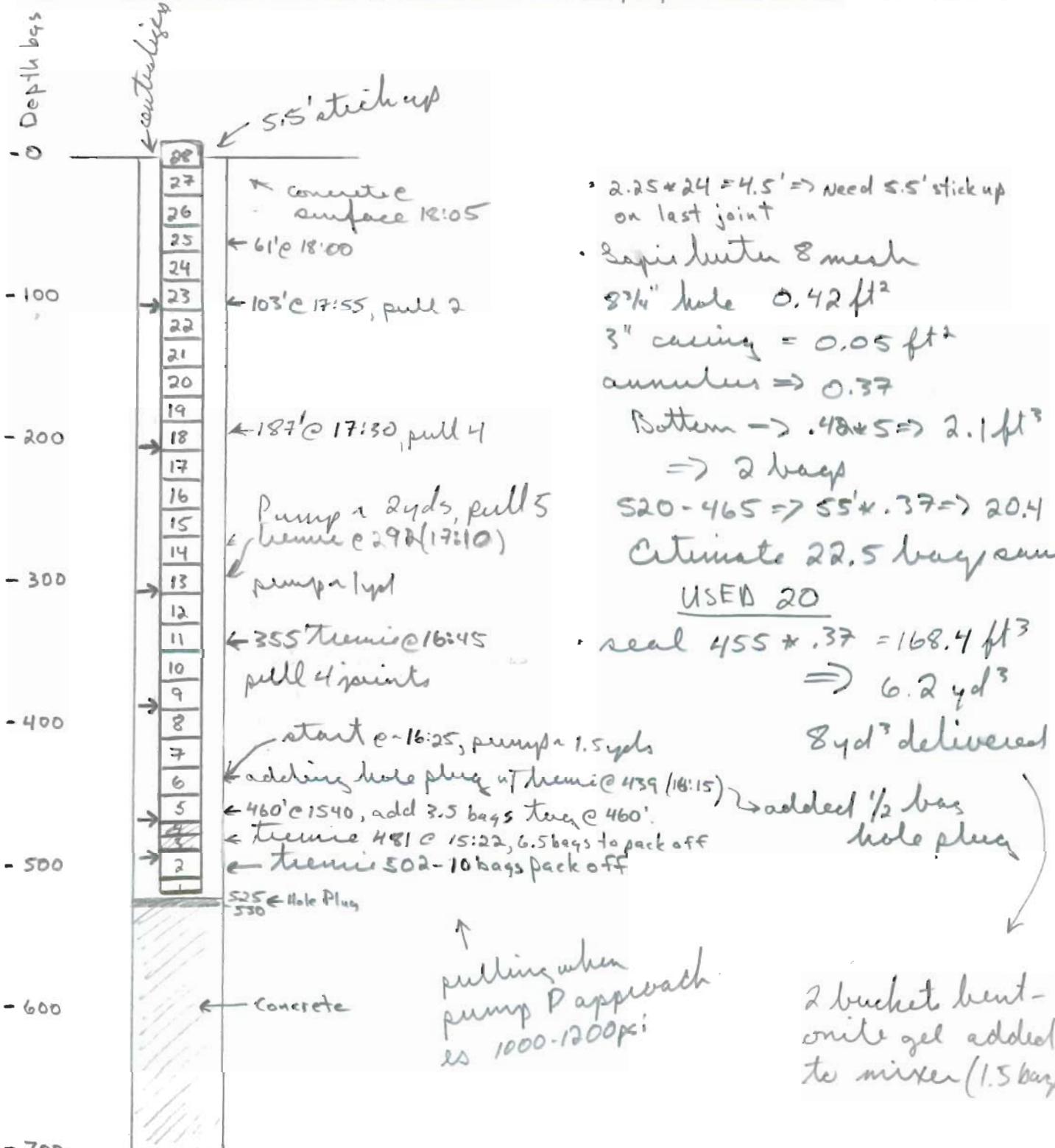
APPENDIX B
FIELD MEMORANDA, CORRESPONDENCE, AND MISCELLANEOUS
DOCUMENTATION

Subject: Dolphin/Sumner Well Construction Documentation

Project: SWI Monitoring Well Installation

Client: Soquel Creek Water Dist. / Hydro Metrics LLC

Project No.: 06-0112 By: MSB Date: 12/19/06 Sheet No.: 1 of 1

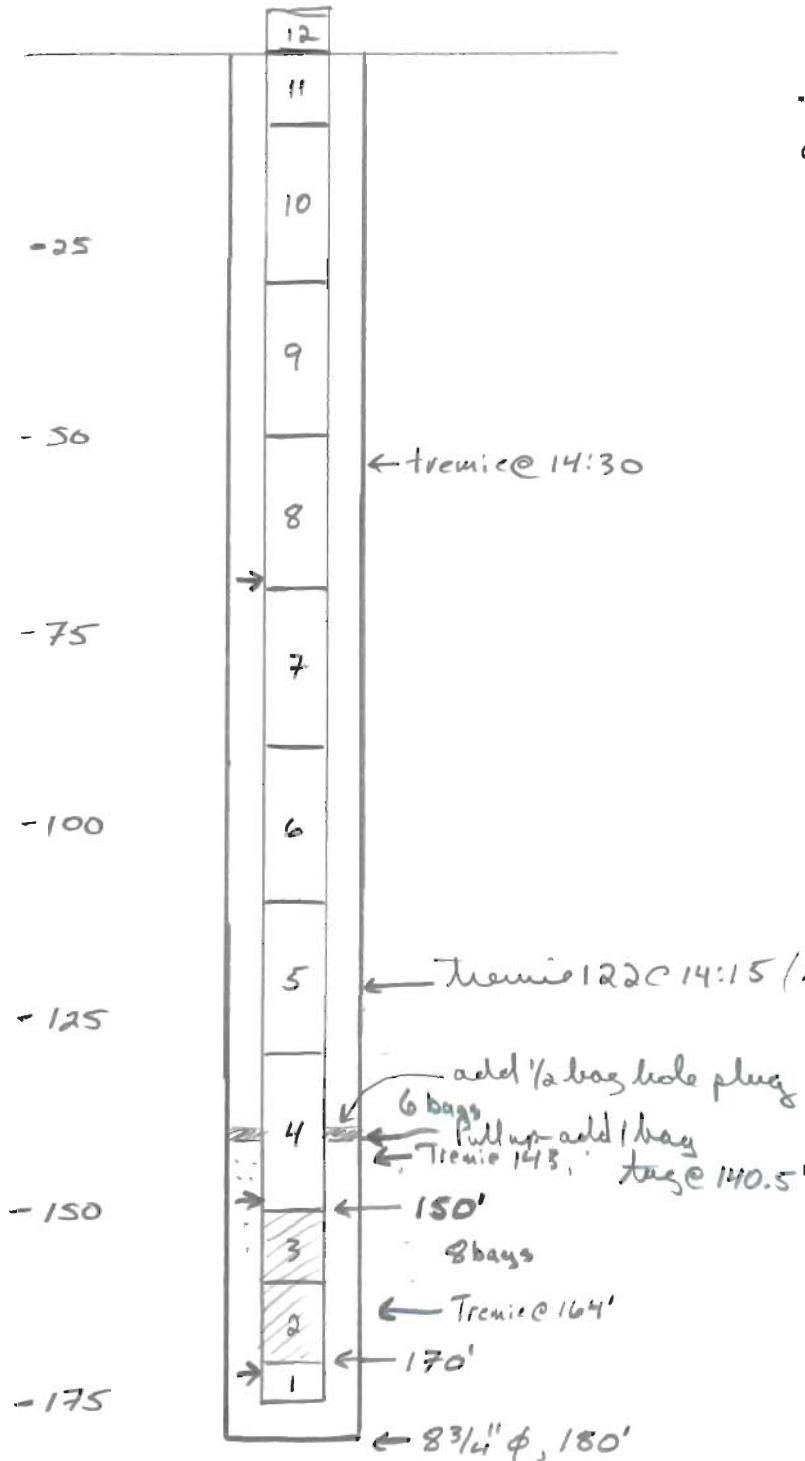


Notes: 1) 12/14 cement to 515', drilled out to 530'.

2) 5 bags hole plug added 12/18.

3) each casing section 2 1/4 shorter than 20

Subject: Well Construction Sog. D/S Shallow
 Project: Dolphin Summer Monitoring Well Constr.
 Client: Sacramento Co. Water Dist. / HydroMetrics
 Project No.: 06-0112 By: MSB Date: 12/21/06 Sheet No.: 1 of 1



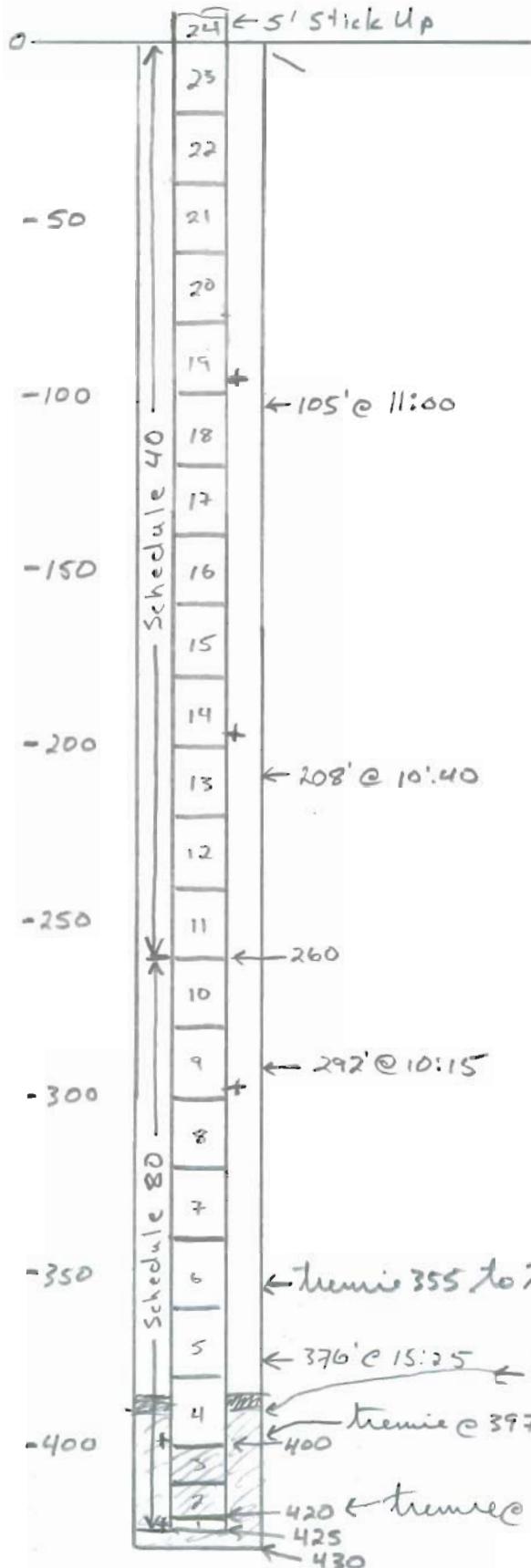
- Casing landed @ 10:47a
 • $8\frac{3}{4}'' \Rightarrow 0.42 \text{ ft}^2$
 2" $\Rightarrow 0.02$
 annulus $\Rightarrow 0.4 \text{ ft}^2$
 5' open hole $\Rightarrow 2.1 \text{ ft}^3$
 35' annulus $\Rightarrow 14 \text{ ft}^3$
 $\Rightarrow 16 \text{ bags sand } / 15 \text{ sec}$

- Deel Vol.
 $4 \times 139 \Rightarrow 56 \text{ ft}^3$
 $\Rightarrow 2.1 \text{ yds}^3$
 3 c.y delivered to site

Deel done @ 14:35
 Rev done @ 14:15

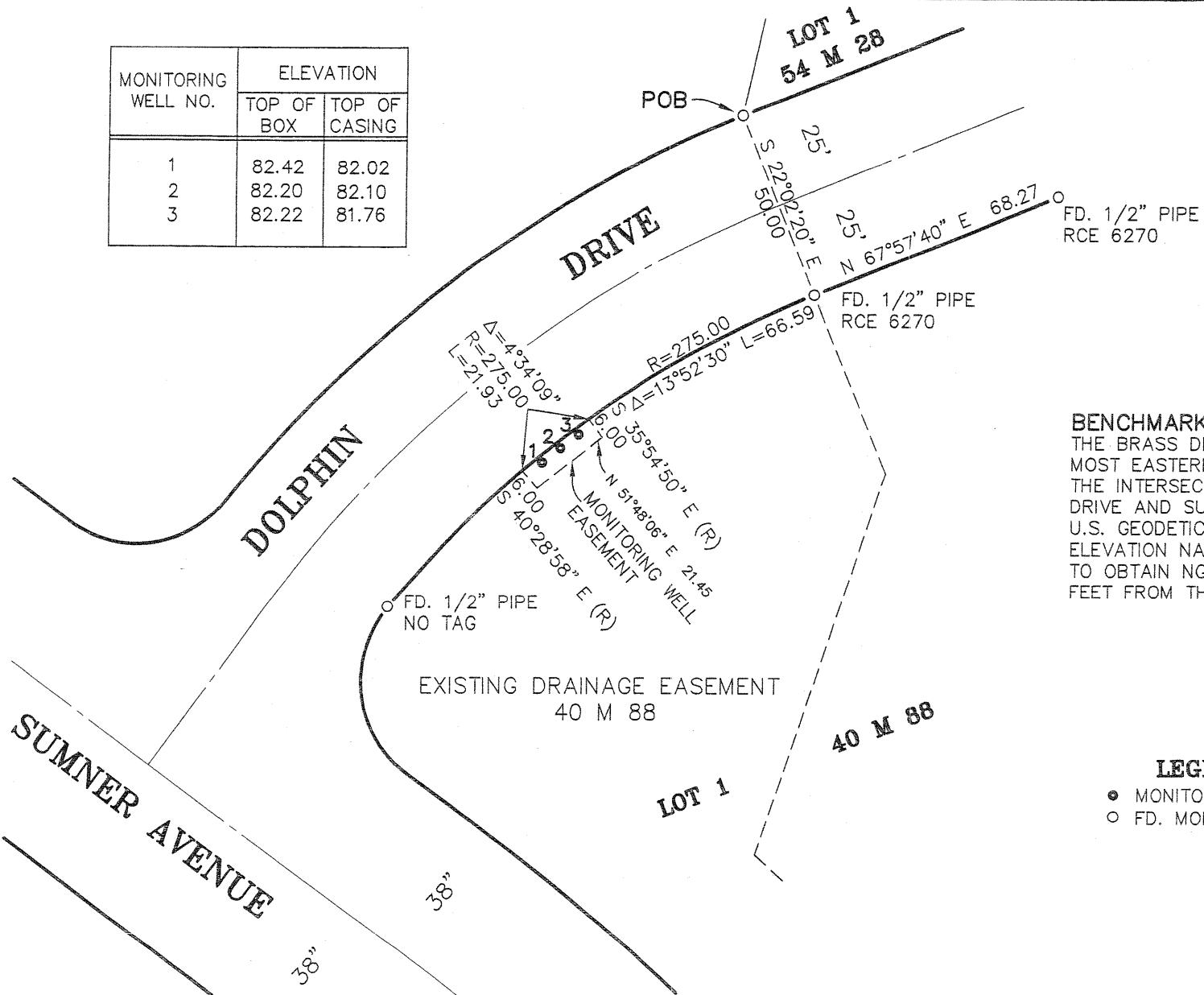
Subject: Determined Well Completion Info
 Project: Soguel C.W.D. SWI Monitor Well
 Client: Soguel C.W.D. / HydroMetrics

Project No.: 06-0112 By: WSB Date: 12/27/06 Sheet No.: 1 of 1



- Casing in @ 14:40
- Sand in @ 15:35 → 28+ 50# sacks
⇒ 14 full sacks
- 12/28 7 yd³ ordered & delivered
- constant pressure of water in well during seal.
- Tracy Boone onsite
- cement @ surface 11:11
- Tag concrete
- KCP Pumping / Granite
831-458-2020
- Driver set 6.5 yds³ used.

MONITORING WELL NO.	ELEVATION	
	TOP OF BOX	TOP OF CASING
1	82.42	82.02
2	82.20	82.10
3	82.22	81.76



BENCHMARK FOR THIS SURVEY IS
THE BRASS DISK LOCATED ON THE
MOST EASTERN CURB RETURN AT
THE INTERSECTION OF CLUBHOUSE
DRIVE AND SUMNER AVENUE STAMPED
U.S. GEODETIC SURVEY 1972, G 1237.
ELEVATION NAVD 88 = 125.18 FEET.
TO OBTAIN NGVD 29 SUBTRACT 2.743
FEET FROM THE ELEVATIONS SHOWN.

EXHIBIT B

LEGEND

- MONITORING WELL
 - FD. MONUMENT AS SHOWN

EASEMENT LOCATION FOR

SOQUEL CREEK WATER DISTRICT

LOT 1, TRACT NO. 414, APTOS SEASCAPE, UNIT 1-A, 40 M 88

APN 054-083-03

COUNTY OF SANTA CRUZ

CALIFORNIA



MID COAST ENGINEERS
CIVIL ENGINEERS AND LAND SURVEYORS
70 PENNY LANE SUITE A WATSONVILLE, CA 95076
(831) 724-2580

SCALE:	1"=40'
JOB NO.	05247
DATE:	MAR. 2, 2007
SHEET:	1 OF 1



APPENDIX C

WATER QUALITY DATA



4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS
montereybayanalytical@usa.net
ELAP Certification Number: 2385

Pueblo Water Resources
Michael Burke
4478 Market St., Suite 705
Ventura, CA 93003

Monday, February 05, 2007

Lab Number: AA36984

Collection Date/Time: 1/23/2007 11:40 Sample Collector: BURKE M
Submittal Date/Time: 1/24/2007 13:51 Sample ID

Sample Description: S.C.W.D. Dolphin / Sumner Shallow MW

Analyte	Method	Unit	Result	Qual	PQL	Date Analyzed
Alkalinity, Total (as CaCO ₃)	SM2320B	mg/L	129	10	2/2/2007	
Calcium	SM3111B	mg/L	38	1	1/28/2007	
Chloride	EPA300.0	mg/L	39	1	1/25/2007	
Color, Apparent (Unfiltered)	SM2120B	Color Units	5	1	1/26/2007	
Fluoride	EPA300.0	mg/L	0.18	0.10	1/25/2007	
Hardness (as CaCO ₃)	SM2340B	mg/L	165	10	1/28/2007	
Magnesium	SM3111B	mg/L	17	1	1/28/2007	
Nitrate as NO ₃	EPA300.0	mg/L	30	1	1/25/2007	
Nitrite as NO ₂ -N	EPA300.0	mg/L	0.07	0.05	1/25/2007	
Odor Threshold at 60 C	SM2150B	TON	1	1	1/26/2007	
o-Phosphate-P	EPA300.0	mg/L	0.30	0.05	1/25/2007	
pH (Laboratory)	SM4500-H+B	STD. Units	8.2		1/24/2007	
Potassium	SM3111B	mg/L	3.0	0.5	1/28/2007	
Salinity @ 15 Deg. C	Calculation	ppt	0.3		2/5/2007	
Sodium	SM3111B	mg/L	30	1	1/28/2007	
Specific Conductance (E.C.)	SM2510B	umhos/cm	478	1	1/24/2007	
Sulfate	EPA300.0	mg/L	26	1	1/25/2007	
Total Diss. Solids	SM2540C	mg/L	283	10	1/27/2007	
Turbidity	EPA180.1	NTU	0.10	0.05	1/29/2007	

Sample Comments:

Report Approved by:

Laboratory Director
Sigrid Weidner-Holland



4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS
montereybayanalytical@usa.net
ELAP Certification Number: 2385

Pueblo Water Resources
Michael Burke
4478 Market St., Suite 705
Ventura, CA 93003

Monday, February 05, 2007

Lab Number: AA36985

Collection Date/Time: 1/23/2007 13:25 Sample Collector: BURKE M
Submittal Date/Time: 1/24/2007 13:51 Sample ID

Sample Description: S.C.W.D. Dolphin / Sumner Intermediate MW

Analyte	Method	Unit	Result	Qual	PQL	Date Analyzed
Alkalinity, Total (as CaCO ₃)	SM2320B	mg/L	152		10	2/2/2007
Calcium	SM3111B	mg/L	33		1	1/28/2007
Chloride	EPA300.0	mg/L	32		1	1/25/2007
Color, Apparent (Unfiltered)	SM2120B	Color Units	3		1	1/26/2007
Fluoride	EPA300.0	mg/L	0.14		0.10	1/25/2007
Hardness (as CaCO ₃)	SM2340B	mg/L	185		10	1/28/2007
Magnesium	SM3111B	mg/L	25		1	1/28/2007
Nitrate as NO ₃	EPA300.0	mg/L	4		1	1/25/2007
Nitrite as NO ₂ -N	EPA300.0	mg/L	Not detected		0.05	1/25/2007
Odor Threshold at 60 C	SM2150B	TON	1		1	1/26/2007
o-Phosphate-P	EPA300.0	mg/L	Not detected		0.05	1/25/2007
pH (Laboratory)	SM4500-H+B	STD. Units	8.2			1/24/2007
Potassium	SM3111B	mg/L	3.9		0.5	1/28/2007
Salinity @ 15 Deg. C	Calculation	ppt	0.3			2/5/2007
Sodium	SM3111B	mg/L	29		1	1/28/2007
Specific Conductance (E.C.)	SM2510B	umhos/cm	500		1	1/24/2007
Sulfate	EPA300.0	mg/L	52		1	1/25/2007
Total Diss. Solids	SM2540C	mg/L	289		10	1/27/2007
Turbidity	EPA180.1	NTU	0.25		0.05	1/29/2007

Sample Comments:

Report Approved by:

Laboratory Director
Sigrid Weidner-Holland



4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS
montereybayanalytical@usa.net
ELAP Certification Number: 2385

Pueblo Water Resources
Michael Burke
4478 Market St., Suite 705
Ventura, CA 93003

Monday, February 05, 2007

Lab Number: AA36986

Collection Date/Time: 1/23/2007 14:45 Sample Collector: BURKE M
Submittal Date/Time: 1/24/2007 13:51 Sample ID

Sample Description: S.C.W.D. Dolphin / Sumner Deep MW

Analyte	Method	Unit	Result	Qual	PQL	Date Analyzed
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	70	10	2/2/2007	
Calcium	SM3111B	mg/L	1780	1	1/28/2007	
Chloride	EPA300.0	mg/L	7000	1	2/2/2007	
Color, Apparent (Unfiltered)	SM2120B	Color Units	1	1	1/26/2007	
Fluoride	EPA300.0	mg/L	Not detected	0.10	1/25/2007	
Hardness (as CaCO3)	SM2340B	mg/L	7780	10	2/5/2007	
Magnesium	SM3111B	mg/L	810	1	1/28/2007	
Nitrate as NO3	EPA300.0	mg/L	Not detected	1	1/25/2007	
Nitrite as NO2-N	EPA300.0	mg/L	Not detected	0.05	1/25/2007	
Odor Threshold at 60 C	SM2150B	TON	1	1	1/26/2007	
o-Phosphate-P	EPA300.0	mg/L	Not detected	0.05	1/25/2007	
pH (Laboratory)	SM4500-H+B	STD. Units	7.6		1/24/2007	
Potassium	SM3111B	mg/L	55	0.5	1/28/2007	
Salinity @ 15 Deg. C	Calculation	ppt	15.3		2/5/2007	
Sodium	SM3111B	mg/L	877	1	1/28/2007	
Specific Conductance (E.C.)	SM2510B	umhos/cm	20320	1	1/24/2007	
Sulfate	EPA300.0	mg/L	600	1	1/25/2007	
Total Diss. Solids	SM2540C	mg/L	12000	10	1/27/2007	
Turbidity	EPA180.1	NTU	0.15	0.05	1/29/2007	

Sample Comments:

Report Approved by:

Laboratory Director
Sigrid Weidner-Holland

REPORT OF FIELD OBSERVATIONS

Job No.:	06-0112	Date:	1/23/07	M	T	W	T	F	S	S
Client:	Sequel Co. Water / HydroMetrics	Location:	D/S							
Project:	Dolphin/Sumner MWs	Weather:	clear, cool							
Activity:	Sampling	Observer:	MSB							

Shallow Well

10:25 static 72.58'

tubing approx 103'

pump set @ ~88', pumping started @ 11:00

5 gal / 40 sec. \Rightarrow 7.5 gpm

2" \Rightarrow $0.02 \text{ ft}^2 \times (180 - 72) = 2.4 \text{ ft}^3 = 18 \text{ gallons}$

3 casing vol = 54 gallons

11:10 \rightarrow 65°F/444 μS; 11:20 \rightarrow 65°/465 μS; 11:30 \rightarrow 65°F/460 μS

Water clear

Sample @ 11:35

Intermediate Well

11:37 static 72.78', pump set @ 83' approx
start @ 11:42

casing vol = 54 gal, Q =

11:50 air, breaking suction = stop

reset pump to ~95', restart @ 11:59

breaking suction again - reset to 103'

resume pumping @ 12:23 Q 3.75 gpm.

3 casing vol \Rightarrow 43 min.

12:35 \rightarrow 67°/494 μS; 68°/490 μS @ 13:09; 13:25 \rightarrow 68°/490 μS

Sample @ 13:25.

Page 1 of 2

REPORT OF FIELD OBSERVATIONS

Job No.: 06-0112	Date: 11/23/07	M	T	W	T	F	S	S
Client: Soquel Cr. Water/HydroMetrics	Location: Dolph/Sum							
Project: Dolphin/Sumner MWs	Weather: Clear, cool							
Activity: Sampling	Observer: MSA							

Deep Well

static 75.2' c 13:35

start pumping @ 13:40, Q = 7.5 gpm

casing I.D. $2\frac{1}{8}'' \Rightarrow 0.045 \mu^2 \times (520 - 75) = 20 \text{ ft}^3$

casing vol = 150 gal

150 gal @ 7.5 gpm = 1 hour

13:45 $\rightarrow 67^\circ/15.98 \mu S$; 14:30 $\rightarrow 67^\circ/16.88 \mu S$; 14:40 $\rightarrow 67/16.50 \mu S$

Sample @ 14:45

Water clear.



APPENDIX D

PROJECT PHOTOGRAPHS

March 2007
Project No. 06-0112



March 2007
Project No. 06-0112



March 2007
Project No. 06-0112



March 2007
Project No. 06-0112



March 2007
Project No. 06-0112



March 2007
Project No. 06-0112





APPENDIX E DATA CD