Well Testing Report
Prepared for the County of San Diego
Sanders TPM 20765 RPL-2

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List of Terms, Acronyms and Abbreviations

Ac-ft	acre-feet (325,900 gallons)
ac-ft/yr/du	acre-feet per year per dwelling unit
CEQA	California Environmental Quality Act
DPLU	Department of Planning and Land Use, County of San Diego
Ft	feet
GIS	Geographic Information System
gpm	gallons per minute
Guidelines	County of San Diego, Guidelines for Determining Significance and Report Format and Content Requirements Groundwater
id	internal diameter
hp	horsepower
MCL	Maximum contaminant level
mg/l	milligrams per liter
NEPA	National Environmental Policy Act
pCi/L	pico curies per liter
TDS	Total dissolved solids (mg/l)
TOC	Top of casing (measuring point)
TPM	Tentative Parcel Map

Executive Summary

This investigation has been completed to provide the San Diego County Department of Planning and Land Use information regarding available groundwater resources for the proposed Sanders TPM 20765 RPL-2. Both groundwater quantity and groundwater quality has been investigated to determine if any potential impacts to the groundwater system would result from the proposed project. The project is located just north of the community of Pine Valley California (Figure 1 and 2 and Attachment 1 located in Pump Test Plan Appendix A) and includes a planned residential subdivision of 4 single family lots on 32.36 gross acres. This results in an average overall density of 1 dwelling unit per 8.1 acres. The project will be using groundwater since no imported water is available in this area of the County and the project is located outside the district boundaries of the Pine Valley Mutual Water Company.

To accomplish this objective an 8-hour constant rate discharge test was completed on one well and water samples were collected following the end of the test for nitrate, TDS, coliform bacteria, and uranium and gross alpha. The test was completed according to the approved pump test plan dated January 15, 2009 (Appendix B).

Chapter 1

1.0 Introduction

1.1 Purpose of the Report

The purpose of this report is to: 1) document groundwater resource yield potential on the project site to determine if these resources are capable of meeting the projected water demand of the project, 2) identify any adverse potential groundwater resource impacts resulting from the proposed project, 3) evaluate groundwater quality to ensure that the groundwater resources meets all health standards, and/or mitigate significant impacts consistent with federal, state and local rules and regulations including the California Environmental Quality Act (CEQA) and the San Diego County Groundwater Ordinance #9826.

1.2 Project Location and Description

Project Location

The project is located in the unincorporated community of Pine Valley California in the central portion of San Diego County (Figures 1 and 2). The project is located just north of community of Pine Valley and is located off of Old Highway 80.

Project Description

The project is a proposed residential subdivision of 4 single family lots on 32.36 acres (Attachment A in Pump Test Plan). This results in an average overall density of 1 dwelling unit per 8.1 acres. The project will be using groundwater since no imported water is available in this area of the County and as a result the project falls under the requirements of the San Diego County Groundwater Ordinance. The project is estimated to use 2.0 ac-ft per year based on the usage of .5 ac-ft per year per residential unit as defined within the County Groundwater Ordinance #9826.

Well sampling and a constant rate discharge test were completed in compliance with the approved *Pump Test Plan, Sanders TPM 20765 RPL-2, January 15, 2009* (Appendix A). The pump test plan was reviewed and approved by Mr. Jim Bennett, County Groundwater Geologist prior to initiation of the work.

1.3 Applicable Groundwater Regulations

Federal Regulations and Standards

The proposed action does not include lands under Federal jurisdiction and as such the regulations contained within the NEPA do not apply.

State Regulations and Standards

Since the proposed action includes a discretionary permit application the project falls under the requirements of the California Environmental Quality Act (CEQA). Specifically Appendix G, Title 14, Chapter 3, §15000-15387 gives two questions: 1) will the project "***violate any water quality standards or waste discharge requirements***?" and

2) will the project "***substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted***)".

Specific direction has been provided by the County of San Diego within the Guidelines to address these issues from the CEQA Guidelines. This report has been completed following those directions.

County Regulations and Standards

Within the County of San Diego groundwater regulations are contained within the San Diego County Groundwater Ordinance #9826. Since the proposed project will be using groundwater, the action falls under the regulations contained within the Ordinance with specific reference to Section 67.722 B (2) where the following finding must be made for the project:

> "***That groundwater resources are adequate to meet the groundwater demands of the project***". (County of San Diego, 2007)

As identified within the Guidelines (Section 4.1 pages 22 to 24) the threshold for determining significance is:

> "***For proposed projects in fractured rock basins, a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years or precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction.***"

Also the Ordinance identifies specific minimum parcel sizes for residential density (Section 67.722 A). These density requirements as identified within the County Groundwater Limitations Map list the project as having greater than 21 inches of average annual rainfall. This rainfall value results in a minimum parcel size of 4 acres (County Groundwater Ordinance Section 67.722 A 1). The proposed project has an average parcel size of 1 dwelling unit per 8.1 acres with a minimum parcel size of 7.13 gross acres.

The Ordinance also identifies specific requirements (Section 67.722 C) for residential well tests. As required by the Ordinance one well was pump tested on the project for water quality and well yield parameters. The selection of the well site for this yield test was approved by Mr. Jim Bennett, San Diego County Groundwater Geologist prior to testing. The well was pump tested in compliance with the Guidelines for Performing Residential Well Tests. Also as required by the Guidelines a projection of well drawdown to 5 years of continuous production has been completed for this investigation.

Chapter 2

2.1 Well Testing

2.1.1 Guidelines for the Determination of Significance

The project is proposing individual residential wells. As a result according to the Guidelines (page 18) the following thresholds apply:

1. ***Proposed projects requiring groundwater resources for uses associated with single-family residences require well production during the well test to be no less than 3 gpm for each well tested. Proposed projects that cannot meet this requirement will be considered to have a significant impact.***
2. ***Where analysis of a residential well test indicates that greater than 0.5 feet of residual drawdown is projected, the project will be considered to have a significant impact.***
3. ***The analysis of the residential well test must indicate that the amount of drawdown predicted to occur in the well after five years of continual pumping at the rate of projected water demand (a) will not interfere with the continued production of sufficient water to meet the needs of the anticipated residential use(s) and (b) must be less than the saturated depth of water above the pump intake or 100 feet, whichever is less. (The pump intake is assumed to be 50-feet above the bottom of the well). Proposed projects that cannot meet this guideline will be considered to have a significant impact.***

2.2.2 Methodology

As identified by the Mr. Jim Bennett one well, located on the southeastern portion of the project on Lot #1 was selected to be tested for groundwater yield. The well was tested according to the directions provided within the Guidelines and subsequent directions provided by Mr. Bennett (Appendix B).

2.2.2.1 Well Test Description

The well was pump tested for an 8 hour period at an average discharge rate of 7.65 gpm. Over the course of the test 3,701 gallons were produced. Recovery was monitored via an installed data logger for 15 minutes at which time the well had recovery to .7' of residual drawdown. An additional recovery measurement was taken the following morning 987 minutes after termination of production. This measurement recorded a residual drawdown of .2 feet. The test and result are summarized below.

2.2.2.2 Testing Summary

The well was constructed in the southeastern portion of the proposed project on Lot #1 (see Figure 2 and plate in the Pump Test Plan Attachment A) at an elevation of approximately 3,740 feet. The well was completed by Morrison Drilling which is located in Alpine California in early December 1990 (see California Well Log within the pump test plan, Appendix A). The well was drilled to 200 feet with a 31 foot annular seal and with a 6 5/8 inch casing. The well log reports black and white granite from 12 to total

depth of 200 feet. The drillers log reports a static water level of 75 feet and gives an estimated well yield of 60 gpm.

The well was set up on Friday February 6, 2009 using a test submersible pump (with foot valve to prevent backflow) installed to an approximate depth of 190 feet. A 1 inch PVC sounding tube (set to 180 feet) was placed in the well to allow for the installation of a Global Water Data Logger to collect water level measurements during the test. A ¾ inch water flow meter was calibrated to ensure accurate water production data and a gate value was installed to regulate flow rate during the test. At the time of installation the meter had a total cumulative flow value of 3,022.5 cubic feet. Prior to any production, groundwater depth, as measured from the top of the PVC sounding tube, was 60.0 feet (measured by electrical water level indicator). The sounding tube was set 1.0 feet above graded ground surface, and all measured water levels during the test were reported from the top of the sounding tube. Following installation of the equipment the well was turned on to check the installation and to calibrate the flow rate to 7.5 gpm. Also chlorine was added to the well at this time to disinfect the well prior to the test. A total of 567.7 gallons of water was produced to complete this task (a portion of which was recirculated back down the well to allow for full disinfection of the well). This resulted in a meter reading at the beginning of the constant discharge test of 3,098.4 cubic feet.

The constant rate discharge test began at 8:01 am on Tuesday February 10, 2009. Prior to initiation of the test static water level was monitored with the same equipment and was recorded at 60.0 feet below top of sounding tube. As a result the well was determined to have fully recovered from the calibration testing which was completed four days earlier. The test began at a yield of approximately 7.8 gpm. Water production was also checked periodically using a stop watch and calibrated 5 gallon bucket. The water was directed through garden hoses to the east (down gradient) from the site. Approximately 200 feet of hose was used and the discharge water was directed along the access road east of the well.

Production rate was adjusted two different times during the test. The first was within the first 5 minutes of the test when the discharge was lowered and adjusted to 7.8 gpm. The second was about 2 hours into the test when the discharge rate was decreased by about .3 to .4 gpm as the discharge rate had increased up to about 8.2 gpm. This is seen on Figure 3 at 100 to 120 minutes of production. During the pumping interval maximum production was approximately 8.2 gpm and averaged 7.65 gpm. The pumping phase of the test was completed at 16:05 on Tuesday February 10, 2009 for a pumping period of 484 minutes. At the end of the test a total of 3,701 gallons of water (final meter reading of 3,593.2 cubic feet) had been produced for an average discharge rate of 7.65 gpm over the length of the test. This quantity of water equals 18 borehole volumes of water (please note that for this calculation borehole diameter was estimated at 6 inches, since the surface casing was 6 5/8 inch). For the length of the test the well had a maximum drawdown of 12.2 feet (Figure 3 and Table 4). Thus the specific capacity of the well (gpm/ft of drawdown) was .63 gpm/ft.

Recovery was monitored for 15 minutes following the test when residual drawdown was only .7 feet. Also an additional recovery water level was taken the next morning after 987 minutes of recovery when the well had recovered to a residual drawdown of .2 feet. Following the test the data logger was not left in the well overnight due to security issues at the project. Even with the limited data set the well quickly recovered and the projection of drawdown to less than .5 feet of drawdown on the T/t' plot can clearly be made.

2.2.2.3 Well Test Analysis

Total drawdown during the test was **12.2 feet**.
Specific Capacity (given as gpm/foot of drawdown) was **.63** (7.65 gpm/12.2 ft of drawdown).
Residual drawdown as projected on the t/t' curve was **0 feet**.
Transmissivity is calculated using the Cooper-Jacobs approximation to the Theis equation which states:

$$T = \frac{2.3 \times Q}{4 \times \Pi \times \Delta s}$$

Where
T = Transmissivity (feet^2/day)
Q = average pumping rate in feet^3/day
$\Pi = 3.14$
Δs = the change is drawdown over 1 log cycle of time (or recovery as shown on the t/t' plot

Using this equation the value for Transmissivity becomes (**pumping**):

$$T = \frac{2.3 \times 1473}{4 \times 3.14 \times 1}$$

T = **269.7 ft^2/day pumping phase**

Using this equation the value for Transmissivity becomes (**recovery**):

$$T = \frac{2.3 \times 1473}{4 \times 3.14 \times .4}$$

T = **674.9 ft^2/day recovery phase**

No estimates of storativity can be given since a monitoring well was not available for the test.

Calculated predicted drawdown after 5 years of production can be estimated by projecting drawdown out to 5 years or 2,600,000 minutes. As shown on Figure 5 the projected drawdown, at a continuous yield of 7.65 gpm would be 18 feet. However this value must be corrected to reflect the continuous yield of 7.65 gpm from the completed pump test. (.31 gpm equals the annual demand of one residential home at an annual

demand of .5 ac-ft/yr/home which is used within these calculations.) This correction is given by:

$$\frac{7.65 \text{ gpm}}{18 \text{ feet} \times (\text{predicted drawdown at 5 years})} = 0.31 \text{ gpm}$$

Thus predicted drawdown at 5 years equals **.73 feet**. This value is less than the threshold as identified in the County Guidelines of 100 feet or less for projected drawdown following 5 years of production.

No offsite or onsite well interference problems are anticipated due to the following factors:

1) Predicted drawdown following 5-years of continuous production is estimated at .73 feet within the pumping well. This also assumes no groundwater recharge over the 5-yr period. Any drawdown away from the well would be even less than at the calculated depth of .73 feet within the pumping well. Thus no offsite impacts are projected from the well.

2.2.3 Significance of Impacts Prior to Mitigation

Low Well Yield: The tested well met all thresholds of significance. The well was pumped for a 24-hour period at a yield of greater than 3 gpm. The well recovered so that projected residual drawdown on the T/T' plot (Figure 4) was less than +.5 feet. Also projected drawdown following 5 years of continuous projection at .31 gpm met identified thresholds of significance. As such the data support the conclusion for the finding of "***less than significant***" for low well yield.

2.2.4 Mitigation Measures and Design Considerations

Since the well testing showed that low well yield is "***less than significant***" no mitigation measures or design considerations are proposed or required.

2.2.5 Conclusions

The well tested met all threshold criteria. The testing showed that the significance level was "***less than significant***" and no mitigation measures or design considerations are proposed.

Chapter 3

3.0 Water Quality Analysis

3.1 Guidelines for Determination of Significance

According to the Guidelines the following threshold of significance must be met for water quality:

> ***Groundwater resources for proposed projects requiring a potable water source must not exceed the Primary State of Federal Maximum Contaminant Levels (MCLs) for applicable contaminants. Proposed projects that cannot demonstrate compliance with applicable MCLs will be considered to have a significant impact. In general, projects will be required to sample water supply wells for nitrate, bacteria (fecal and total coliform) and radionuclide activity.***

3.2 Methodology

Samples were not collected the end of the projection test (completed at 16:05, February 10, 2009) due to the holding time limit of 6 hours for the coliform samples. Rather the samples were taken the next morning when the last recovery water level measurement was collected, (09:30 February 11, 2009). At that time the pump was restarted and samples were collected for: nitrate, total dissolved solids (TDS) and total and fecal coliform and gross alpha and uranium. The lab results are given in Appendix C.

3.2.1 Sampling Procedures

Sample Handling and Transportation: All sample containers used for the samples were provided from the Environmatrix Analytical Lab. This lab is a certified by the California Department of Health Services. Sample containers for gross alpha, uranium, nitrate, and TDS were clean and unpreserved plastic bottles. Sample containers for total and fecal coliform were collected in preserved bottles as provided by the Lab. All samples were collected by me, placed immediately in an ice cooler at 4^0C and transported directly to the lab within the time limits established. Please note that gross alpha and uranium testing was performed at FGL Analytical Chemists located in Stockton California, as a subcontractor to EnvironMatrix Analytical Labs. Chain of custody was directly from me to the lab personnel for all samples.

Analytical Methods: Analytical processes employed for the testing are given in Table 1:

Table 1: Analytical Methods

Analyte	Method	MCL
Nitrate (reported as N)	SM 4500 NO3 E	10 mg/l
Total Dissolved Solids	SM 2540 C	500 mg/l recommended
Gross Alpha	EPA 900.0	15 pCi/L
Uranium	EPA 908.0	20 pCi/l
Total and E Coli	SM 9223	absent

3.2.2 Groundwater Sampling Analysis:

Water samples were collected on Thursday February 11, 2009 the morning following the 8 hour production test. During the 8-hour production test a total of 18 well bore volumes of water were produced (3,701 gallons).

The results for radionuclides are given in Table 2.

Table 2: Radionuclides

Well #	Gross Alpha[1]	Uranium[2]
Lot #1	1.76 +/- 1.49	1.84 +/- 0.837

[1] Given in piCi/L and a MCL of 15
[2] Given in piCi/L and a MCL of 20

Table 3: Water Quality Results

Element	Result
Nitrate[1]	ND[4]
TDS[2]	413
Total Coliform[3]	Absent
E. Coli[3]	Absent

[1] Given in mg/l and a MCL of 10
[2] Given in mg/l and a recommended MCL of < 500
[3] Must be absent
[4] Non detected
All samples were analyzed within laboratory holding time for each constituent.

3.3 Significance of Impacts Prior to Mitigation

Samples collected for gross alpha and uranium are within MCL. Samples collected for nitrate and TDS were well less than MCL and the sample for coliform was recorded as "absent" for both fecal and total coliform bacteria. In summary all water quality samples met identified thresholds.

3.4 Mitigation Measures and Design Considerations

Since all water quality samples were within thresholds no mitigation measures or design considerations are proposed.

3.5 Conclusions

All water quality thresholds have been met and no mitigation measures or design considerations are required. The data supports the finding that impacts to groundwater quality are "***less than significant***".

Chapter 4: Conclusions

Summary of Project Impacts and Mitigation
No significant environmental impacts to groundwater resources were identified within this investigation. Specific results include:

Low Well Yield:
One well was pump tested for an 8 hour interval at a yield of greater than 3 gpm. Recovery within the well indicated full recovery as projected on the t/t' plot. (Figure 4). Also the projected drawdown following 5 years of production, estimated at .73 feet is less than the identified threshold. Thus the well met all thresholds identified by the Guidelines. As such it has been found that the project as proposed met the thresholds set for low well yield and the finding of "***less than significant***" can be support.

Groundwater Quality:
Water quality samples were collected on February 11, 2009, the day after the 8-hour production test. The test results showed that all measured levels met the MCL for the respective elements.

As a result the well met all MCL levels for the identified elements. Due to this the finding "***less than significant***" can be made for the project in relationship to potable water quality.

Within this review no threshold was determined to be above any identified threshold and as a result no mitigation or design considerations are proposed. The project as proposed meets all thresholds as identified with the County Guidelines.

Respectfully Submitted

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Table 4: Raw Water Data "Production"

Date	Time	Feet	Date	Time	Feet
2/10/2009	08:06:32	101	2/10/2009	08:40:14	90.3
2/10/2009	08:07:02	99.8	2/10/2009	08:40:33	90.3
2/10/2009	08:07:32	95.5	2/10/2009	08:45:33	90.3
2/10/2009	08:08:02	92.6	2/10/2009	08:50:32	90.3
2/10/2009	08:08:32	91.3	2/10/2009	08:55:33	90.1
2/10/2009	08:09:02	90.5	2/10/2009	09:00:33	89.7
2/10/2009	08:09:32	90	2/10/2009	09:05:33	89.5
2/10/2009	08:10:02	89.3	2/10/2009	09:10:33	89.8
2/10/2009	08:10:32	89	2/10/2009	09:15:33	89.7
2/10/2009	08:11:02	89	2/10/2009	09:20:33	89.5
2/10/2009	08:11:32	89.3	2/10/2009	09:25:33	89.3
2/10/2009	08:12:02	90	2/10/2009	09:30:33	89.5
2/10/2009	08:12:32	90.5	2/10/2009	09:35:33	89
2/10/2009	08:13:02	90.5	2/10/2009	09:40:33	89.5
2/10/2009	08:13:32	90.6	2/10/2009	09:45:33	88.7
2/10/2009	08:14:02	90.6	2/10/2009	09:50:33	88.5
2/10/2009	08:14:32	91	2/10/2009	09:51:40	88.7
2/10/2009	08:15:02	91	2/10/2009	10:01:40	88.5
2/10/2009	08:15:32	91	2/10/2009	10:11:40	89.7
2/10/2009	08:16:02	91	2/10/2009	10:21:40	89.5
2/10/2009	08:16:32	91	2/10/2009	10:31:40	89.2
2/10/2009	08:17:02	91	2/10/2009	10:41:40	89.5
2/10/2009	08:17:32	90.8	2/10/2009	10:51:40	89.3
2/10/2009	08:18:02	91	2/10/2009	11:01:40	89.3
2/10/2009	08:18:32	90.8	2/10/2009	11:11:40	89.5
2/10/2009	08:19:02	90.8	2/10/2009	11:21:40	89.3
2/10/2009	08:19:32	90.8	2/10/2009	11:31:40	89.3
2/10/2009	08:20:02	90.8	2/10/2009	11:41:40	89.2
2/10/2009	08:20:14	90.8	2/10/2009	11:51:40	89.3
2/10/2009	08:21:14	90.6	2/10/2009	12:01:40	89.3
2/10/2009	08:22:14	90.8	2/10/2009	12:11:40	89.5
2/10/2009	08:23:14	90.3	2/10/2009	12:21:40	89.5
2/10/2009	08:24:14	90.6	2/10/2009	12:31:40	89.3
2/10/2009	08:25:14	90.6	2/10/2009	12:41:40	89.3
2/10/2009	08:26:14	90.6	2/10/2009	12:51:40	89.3
2/10/2009	08:27:14	90.5	2/10/2009	13:01:40	89.5
2/10/2009	08:28:14	90.5	2/10/2009	13:11:40	89.5
2/10/2009	08:29:14	90.6	2/10/2009	13:21:40	89.5
2/10/2009	08:30:14	90.5	2/10/2009	13:31:40	89.5
2/10/2009	08:31:14	90.6	2/10/2009	13:41:40	89.3
2/10/2009	08:32:14	90.3	2/10/2009	13:51:40	89.3
2/10/2009	08:33:14	90.5	2/10/2009	14:01:40	89.2
2/10/2009	08:34:14	90.3	2/10/2009	14:11:40	89.2
2/10/2009	08:35:14	90.3	2/10/2009	14:21:40	89
2/10/2009	08:36:14	90.3	2/10/2009	14:31:40	88.8
2/10/2009	08:37:14	90.1	2/10/2009	14:41:40	89
2/10/2009	08:38:14	90.1	2/10/2009	14:51:40	89.2
2/10/2009	08:39:14	90.5	2/10/2009	15:01:40	89

Table 4: Raw Water Data "Production" page 2

Date	Time	Feet
2/10/2009	15:11:40	89.2
2/10/2009	15:21:40	89.2
2/10/2009	15:31:40	89.2
2/10/2009	15:41:40	89.3
2/10/2009	15:51:40	89.2
2/10/2009	16:01:40	89.3
2/10/2009	16:05:40	89.3

Table 5: Raw Water Data "Recovery"

Date	Time	Feet
2/10/2009	16:12:18	89.3
2/10/2009	16:12:48	92.3
2/10/2009	16:13:18	97.1
2/10/2009	16:13:48	99.3
2/10/2009	16:14:18	99.8
2/10/2009	16:14:48	99.8
2/10/2009	16:15:18	100
2/10/2009	16:15:48	99.8
2/10/2009	16:16:18	100
2/10/2009	16:16:48	99.8
2/10/2009	16:17:18	100
2/10/2009	16:17:48	100
2/10/2009	16:18:18	100.1
2/10/2009	16:18:48	100
2/10/2009	16:19:18	100.1
2/10/2009	16:19:48	100.1
2/10/2009	16:20:18	100.1
2/10/2009	16:20:48	100.1
2/10/2009	16:21:18	100.1
2/10/2009	16:21:48	100.1
2/10/2009	16:22:18	100.1
2/10/2009	16:22:48	100.1
2/10/2009	16:23:18	100.1
2/10/2009	16:23:40	100.1
2/10/2009	16:25:40	100.1
2/10/2009	16:27:40	100.3
2/10/2009	16:29:40	100.3
2/10/2009	16:31:40	100.3
2/10/2009	16:33:40	100.3
2/10/2009	16:34:33	100.3
2/11/2009	8:45:00	0.2

8:45 Measurement taken with Electric Meter

Figure 3
Sanders TPM 20765 RPL-2
Production

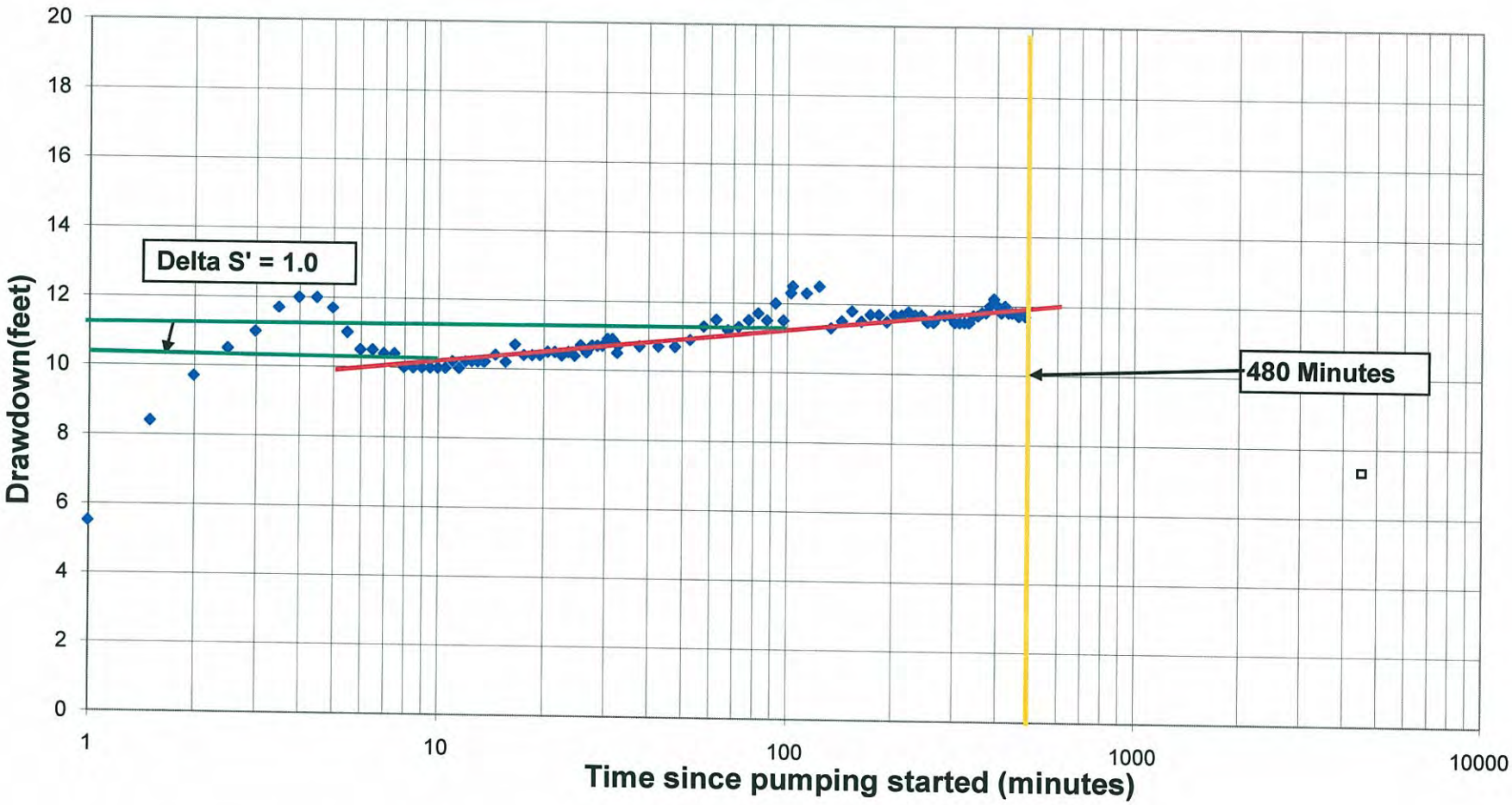


Figure 4
SandersTPM 20765 RPL-2
Recovery Graph

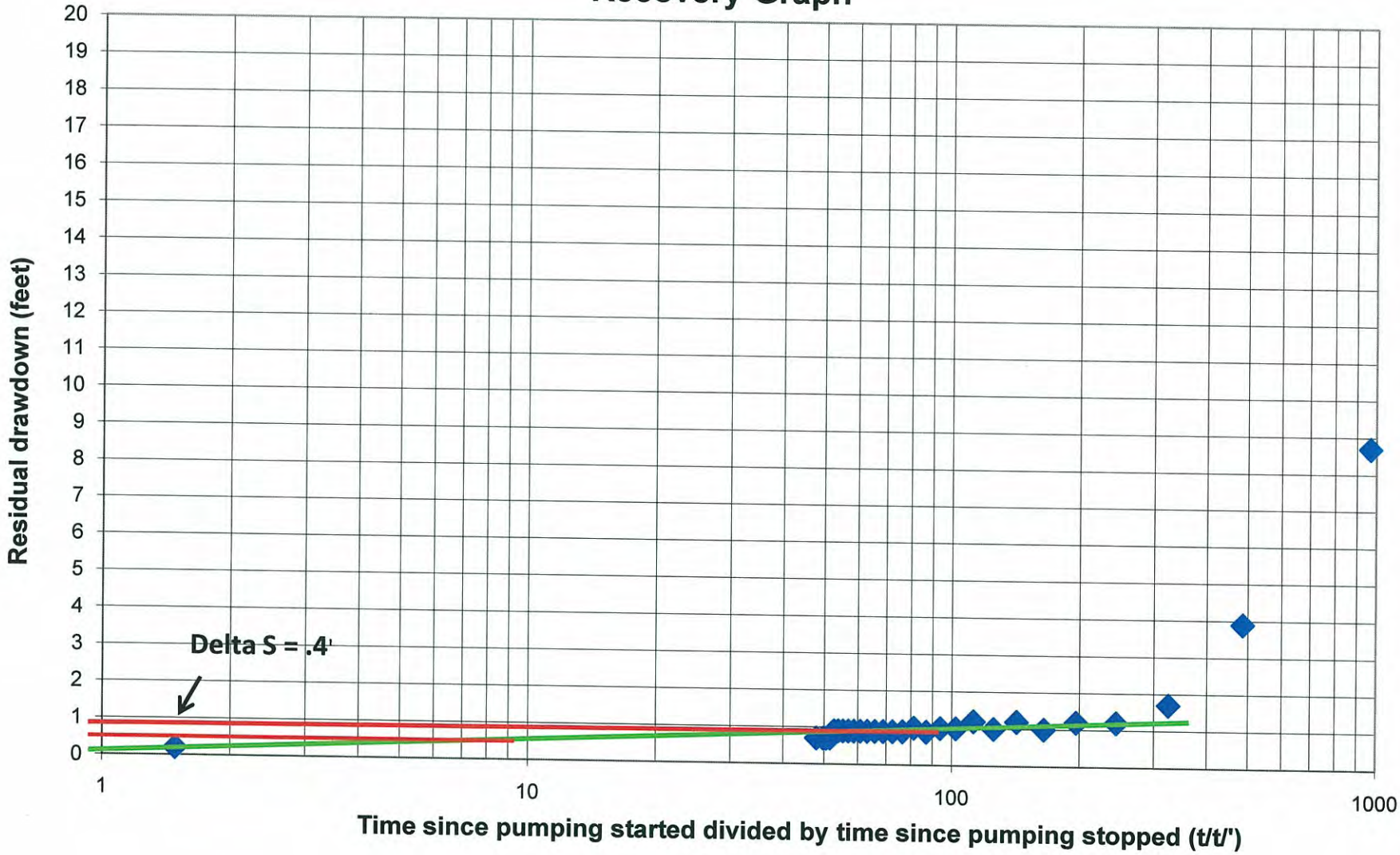
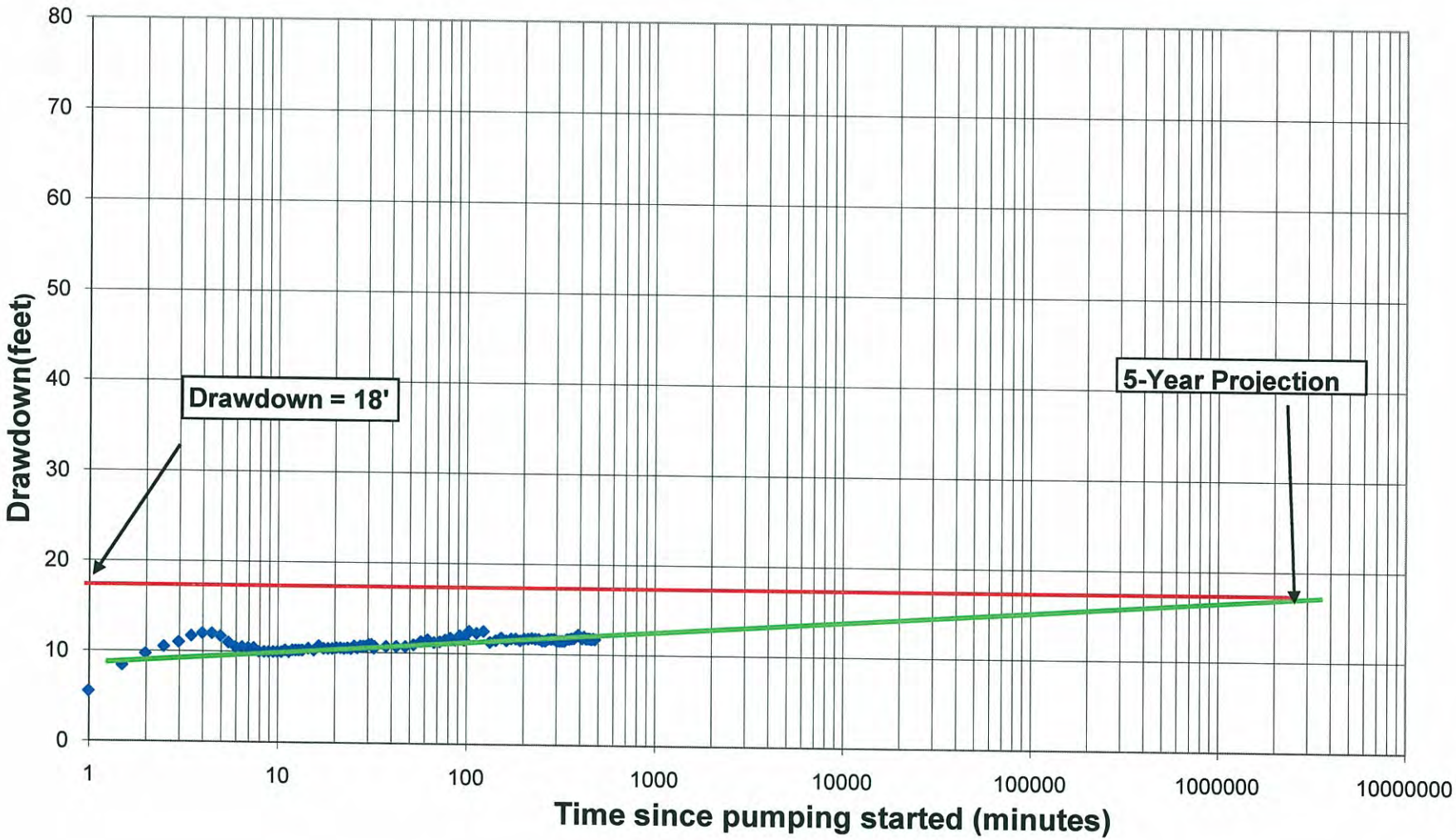


Figure 5
Sanders TPM 20765 RPL-2
5-Year Projection



Appendix A

Pump Test Plan

Pump Test Plan
Sanders TPM 20765 RPL-2
January 15, 2008

John Peterson

Professional Geologist #3713
Certified Hydrogeologist #90
Peterson Environmental Services
5580 La Jolla Blvd. #398
La Jolla Ca. 92037
858-454-9984
Cell 858-220-0877
Fax 858-551-7549

Project Description and Location

The Sanders TPM is located in Pine Valley California (Figures 1 and 2). The project is composed of 32.36 gross acres and is proposing four single family residential lots with a minimum parcel size of 7.13 gross acres. This results in an average density of 1 dwelling unit per 8.1 acres for overall project. As identified by the County Groundwater Ordinance (Section 67.703.1) one well is required to be constructed and tested to prove adequate well yield on the project.

Well Description:

As identified by Jim Bennett, County Groundwater Geologist (personal meeting held on January 12, 2009) a well was selected to be tested. This is an existing well on Parcel #1 on the south side of the project (Figure 2 and Attachment A Tentative Parcel Map, located in pocket at the end of this report).

The well was drilled by Morrison Drilling located in Alpine California. The well was completed in December 1990 and is located at GPS location of N 32 49.917, W 116 32.077 elevation 3,564 feet. The well was drilled to 200 feet (see Appendix A for Well Completion Log). The Well Completion Log reports an anticipated well yield of 60 gpm (gallons per minute). The borehole was installed with a steel casing to the total depth of 20 feet with a concrete seal. The well log also reports that the well was installed with a steel 6 5/8 inch surface casing to 31 feet.

Proposed Production Rate

The well will be pumped at 3 gallons per minute (gpm) for a 24 hour period of production and will be monitored for a similar 24-hour period of recovery. The well is currently not in use.

Pump Test Plan:

The pump test will be run according to the following conditions.

1) Static groundwater level will be recorded prior to production testing. The well will be set up for the test the day prior to the production test and a water level will be taken at that time. Note that static water level was monitored on January 6, 2009 during the initial site review. Static water level was monitored at 60.9 feet below top of casing which is .8 feet above surrounding ground surface. Thus static water level is approximately 60.1 feet below ground surface.
2) The well currently has an installed submersible pump and motor (see photos of the well Appendix B). The facility will need to be retrofitted with a 1 inch sounding tube to allow access for the data logger. The pump has a check value installed to prevent siphoning of water when the pump is shut down. A gate value and cumulative and instantaneous flow meter will also be installed. During the test flow will also be monitored periodically by timing the filling of a container of a known volume to confirm production rate.
3) Following configuration of the well with pump and motor the well will be allowed to be rested for at least a 24 hour period or which time full recovery has been documented. At that time groundwater levels will also be compared to previously collected levels to ensure that true static groundwater levels have been reached prior to beginning the pumping test.
4) On January 14, 2008 I met with Flip Boerman, Manager of the Pine Valley Mutual Water Company. I showed him the location of the pump test and asked him regarding the location of any nearby wells. It stated that no other wells are known to existing within 1,000 feet of the test well. The closest neighboring wells are likely on the valley floor to the north northeast of the test well and are greater than 1,000 feet away from the well. As a result it is proposed that no off site wells will be monitored during the test.
5) The discharge will be directed through garden hoses that will extend about 250 feet to the north of the test well. The water will be discharged along the access driveway to the site down gradient to the well. It is expected that all discharged water will be infiltrated on the subject parcel.
6) During the test groundwater levels will be collected via a Global Water data logger installed in the pumping well. The data logger

John Peterson, Peterson Environmental Services
California Registered Geologist #3713, Certified Hydrogeologist #90
5580 La Jolla Blvd. #398 La Jolla Ca. 92037

will be set to record water levels on a logarithmic basis (following direction contained within Section 3.1 of the *Guidelines for Performing Residential Well Tests*). Also periodic water levels will also be collected via electric line to confirm the data.

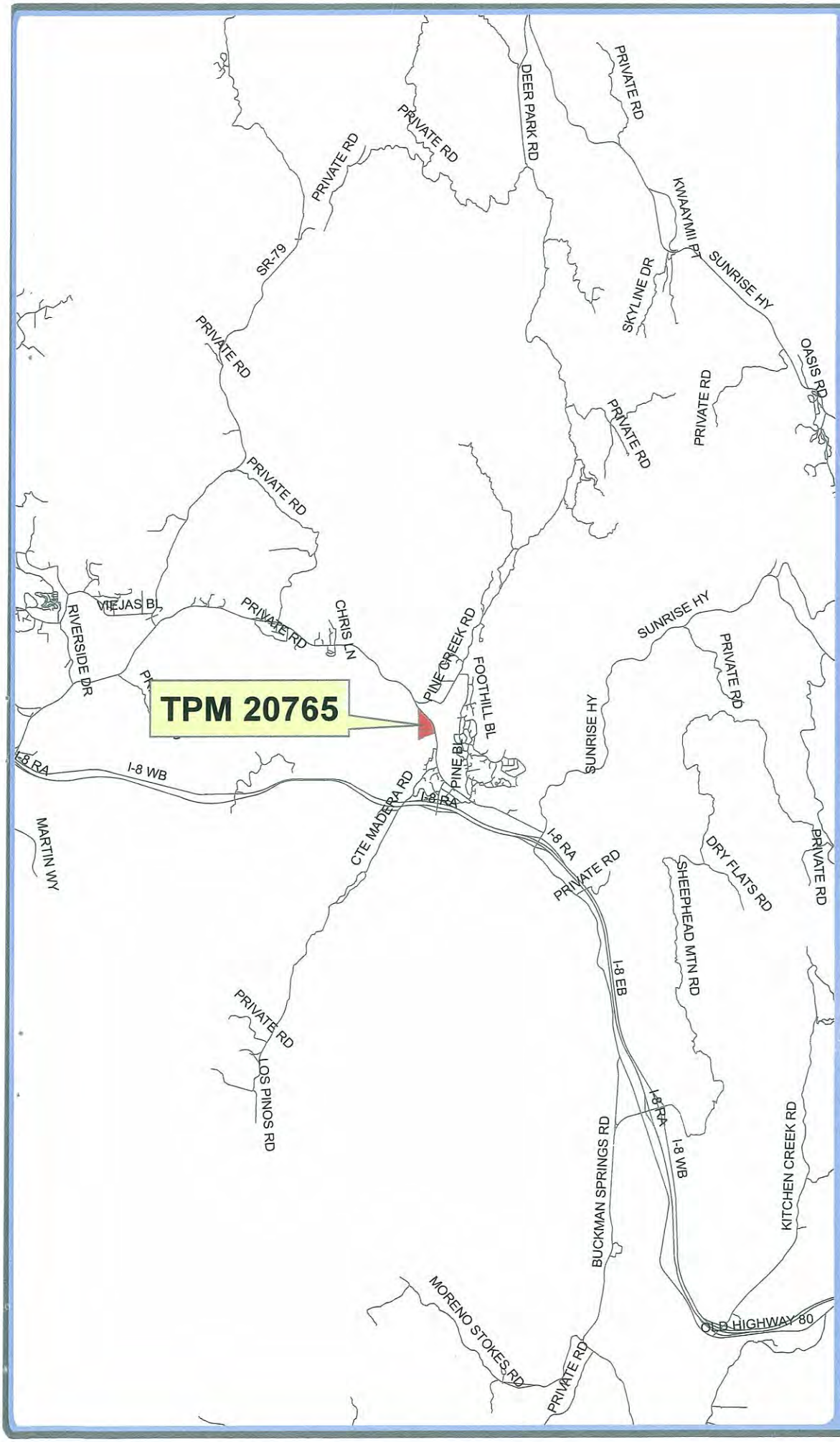
7) The length of the test could be extended if straight line conditions have not been encountered within the production well following consultation with the County Groundwater Geologist.
8) At the end of the test water samples will be collected for nitrate, TDS coliform (fecal and total) bacteria, uranium and gross alpha. The samples will be collected within lab supplied containers, and taken to the lab within allocated time according to standard procedures.
9) Recovery will run for at least 24-hours following production with the use of the data logger. Following recovery the well will be returned to original condition and all equipment removed from the field.

Test Well Analysis

The following will be evaluated and reported within the final Pump Test Report (following direction within the Groundwater Resources Guidelines for Determining Significance (March 19, 2007 pages19 to 20).

1) Total drawdown will be given including projected drawdown after 5 years of sustained pumping.
2) Specific capacity will be reported.
3) Residual drawdown will be given including an Excel graph showing residual drawdown on a T/T' plot.
4) Estimated transmissivity will be given, although storativity will not be report given that a monitoring well is not present for the test.
5) Report on potential offsite and onsite well interference will be included.
6) Specific discussion will be given for:
    a. Low well yield and
    b. Offsite and onsite well interference.

Figure 1
Location Map
TPM 20765



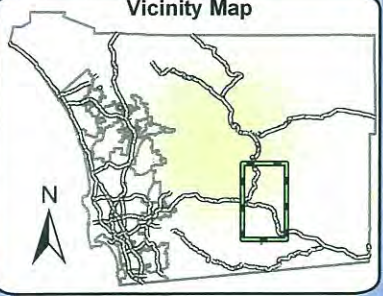
Roads

Subject Parcels

0 3,800 7,600 15,200 Feet

1 inch = 9,350 feet

Vicinity Map



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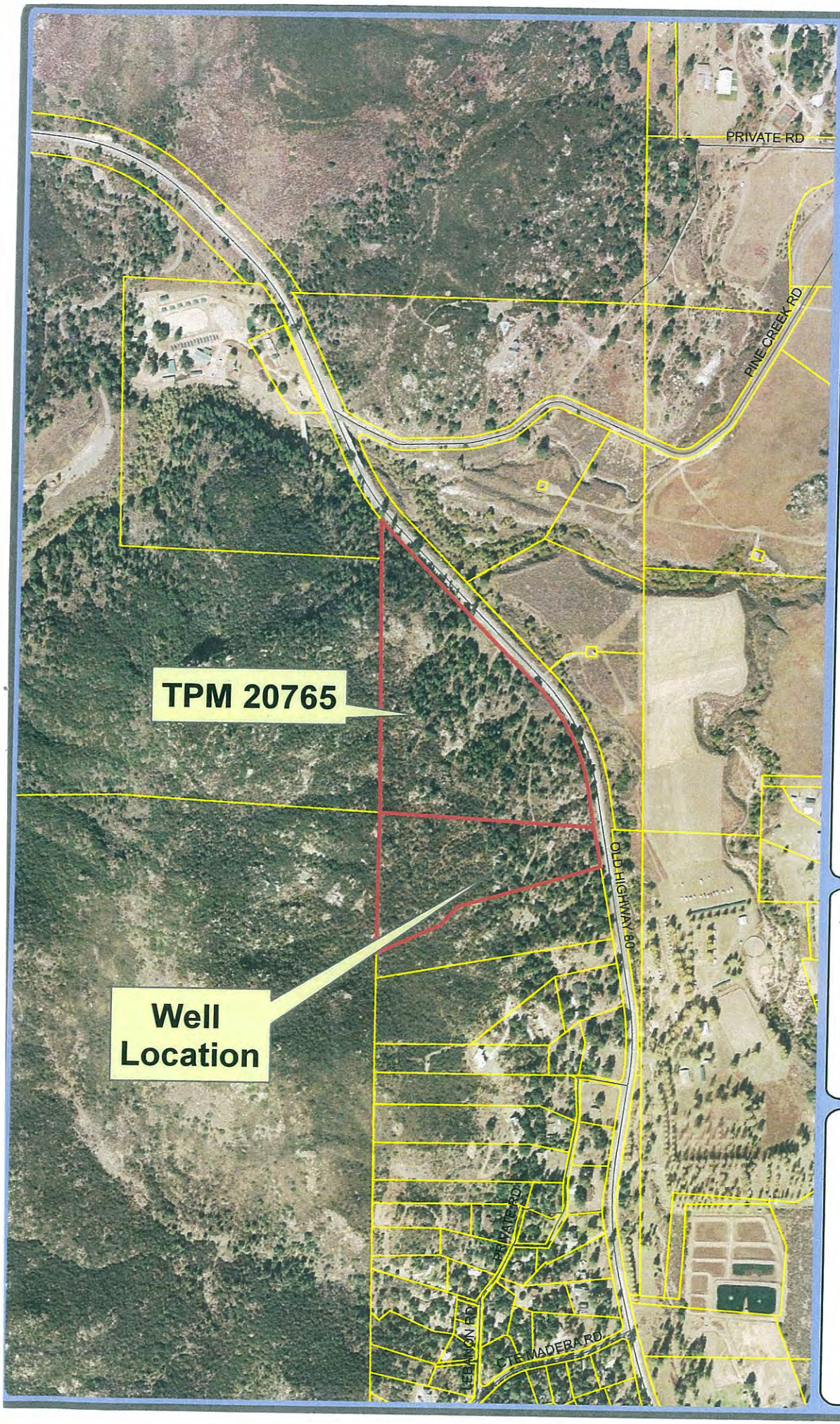
Plot Date: 01/12/09

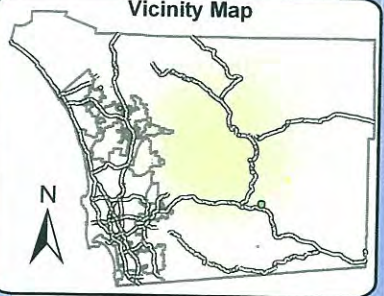
Figure 2
Well Location
TPM 20765



Roads
Subject Parcels
Parcels

0 270 540 1,080 Feet
1 inch = 667 feet

Vicinity Map



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Plot Date: 01/12/09

Appendix A

Well Completion Log

County Mail Station —A-21

(was W03088)

ASSESSORS PARCEL NUMBE
410 010 07

FIRST CARBON COPY

COUNTY OF SAN DIEGO
DEPARTMENT OF HEALTH SERVICES
1700 PACIFIC HIGHWAY, SAN DIEGO, CA 92101-2417

Permit or Intent No. _____
Local Permit No. or Date _____

WATER WELL DRILLERS REPORT
(INSERT under ORIGINAL PAGE w/carbon of State Form)

State Well No. W03088
Other Well No. _____

(1) OWNER: Name JOE SIMPKINS
Address P.O. BOX 336
City PINE VALLEY, CA Zip 92062

(2) LOCATION OF WELL (See instructions):
County SAN DIEGO Owner's Well Number _____
Well address if different from above 28659 OLD HWY 80, PINEVALLEY
Township 15S Range 4E Section 30
Distance from cities, roads, railroads, fences, etc. _____

DEPARTMENT USE ONLY
Completed Well Construction:
Date _____
Date Inspected _____
Comments _____
Water Sample Taken? _____
Sanitarian's Approval: _____

(3) TYPE OF WORK:
New Well XX Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item (12))

(4) PROPOSED USE:
Domestic XX
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

(5) Equipment:
Rotary ☐ Reverse ☐
Cable ☐ Air XX
Other ☐ Bucket ☐

(6) Gravel Pack:
Yes XX No ☐ Size 5/16
Diameter of above 5/16
Packed from 0 to 200 ft.

(7) Casing Installed:
Steel XX Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot Size
0	31	6 5/8"	188	120	140	.020
				160	180	

(8) Perforations:
Type of perforation or size of screen

(9) WELL SEAL:
Was surface sanitary seal provided? Yes XX No ☐ If yes, to depth 31 ft.
Were strata sealed against pollution? Yes ☐ No XX Interval _____ ft.
Method of sealing _____

(10) WATER LEVELS:
Depth of first water, if known 108-117 ft.
Standing level after well completion 75 ft.

(11) WELL TESTS:
Well test made? Yes XX No ☐ If yes, by whom?
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge 60 gal/min after _____ hours Water temperature cool
Chemical analysis made? Yes ☐ No XX If yes, by whom?
Was electric log made? Yes ☐ No XX If yes, attach copy to this report

(12) WELL LOG: Total depth 200 ft. Depth of completed well 200 ft.
from ft. to ft. Formation (Describe by color, character, size of material)

0 - 12	DECOMPOSED GRANITE
12-17	Brown/white granite
17-28	Decomposed granite
28-47	Black/white/brown granite
47-200	Black/white granite

FRACTURES:

47'	Brown/white granite/dry
62-68'	White/brown/green granite/dry
80'	Brown/white granite/dry
108-117'	Broken black/brown/white granite/
125	Brown/white granite/water

LINED & GRAVEL PACKED ENTIRE DEPTH OF WELL. (0 - 200')

Work Started 12/11 1990 Completed 12/14 1990

WELL DRILLERS STATEMENT: I hereby declare under penalty of perjury that the information provided in this report is true. This water well was installed in compliance with San Diego County Code and State of California, Department of Water Resources, Bulletin No. 74.

SIGNED Bud Morrison (Well Driller)

NAME MORRISON DRILLING
(Person, firm, or Corporation) (Type or Print)

ADDRESS P.O. BOX 117

CITY ALPINE, CA ZIP 92001

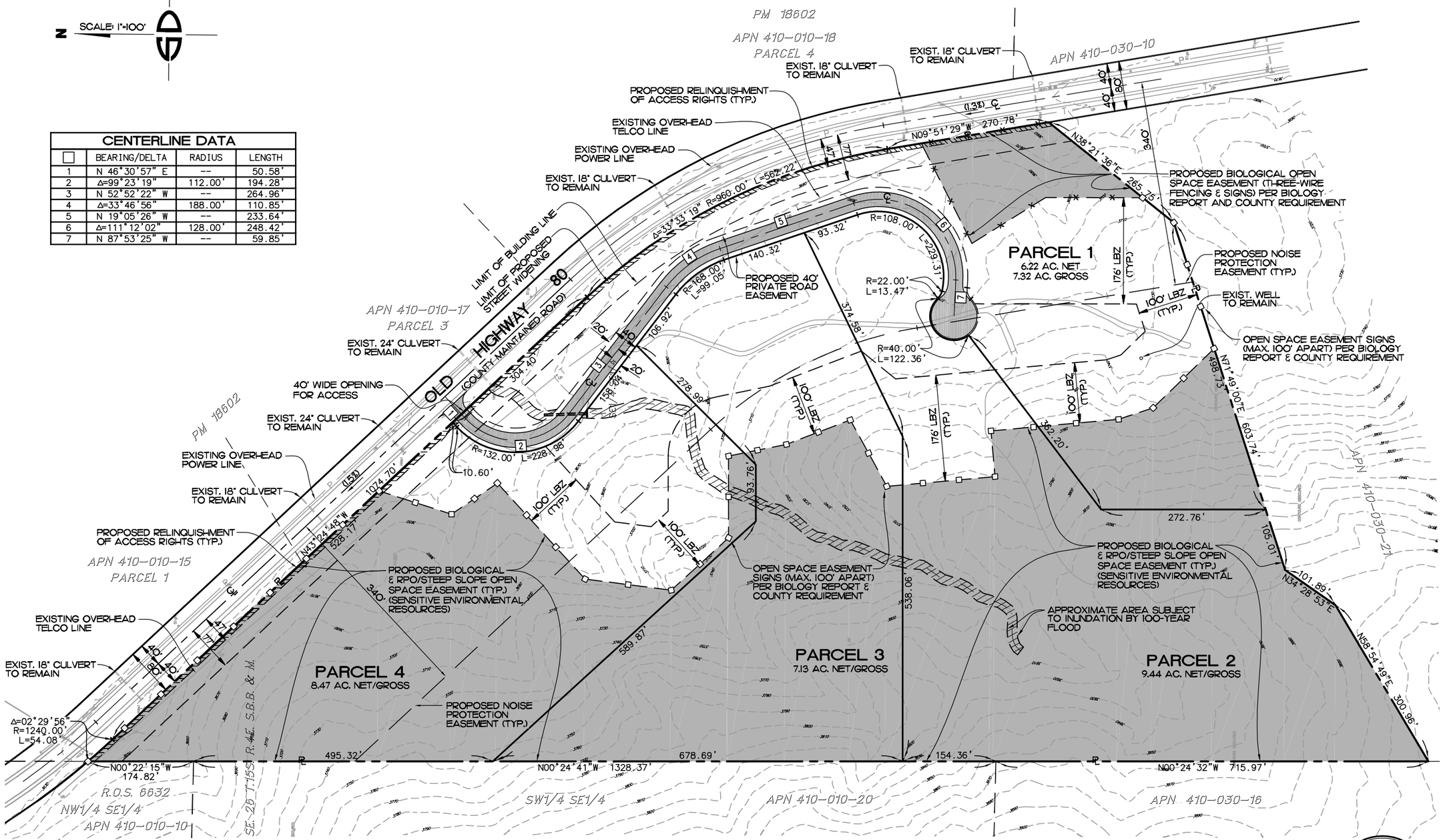
LICENSE NO. 297450 DATE THIS REPORT 12/18/90

DHS:EHP-732 (83) CONFIDENTIAL — NOT FOR PUBLIC USE — WATER CODE SEC. 1375

TENTATIVE PARCEL MAP

N SCALE: 1"=100'

CENTERLINE DATA			
	BEARING/DELTA	RADIUS	LENGTH
1	N 46°30'57" E	--	50.58'
2	Δ=99°23'19"	112.00'	194.28'
3	N 52°52'22" W	--	264.96'
4	Δ=33°46'56"	188.00'	110.85'
5	N 19°05'26" W	--	233.64'
6	Δ=111°12'02"	128.00'	248.42'
7	N 87°53'25" W	--	59.85'



ENGINEER OF WORK
SNIPES-DYE ASSOCIATES
CIVIL ENGINEERS AND LAND SURVEYORS
8348 CENTER DRIVE, STE. G, LA MESA, CA 91942
TELEPHONE (619) 697-9234 FAX (619) 460-2033

WILLIAM A. SNIPES R.C.E. 50477
EXPIRES 06-30-11

REGISTERED PROFESSIONAL ENGINEER
WILLIAM A. SNIPES
No. 50477
Exp. 06-30-11
CIVIL
STATE OF CALIFORNIA

S:\SNIPES\PV014X\DWG\TENTATIVE PARCEL MAP\TPM\TPM-2.DWG (Z-1)

TPM 20765 RPL-2
LOG NO. 03-15-006

Appendix B

County Correspondence

ERIC GIBSON
INTERIM DIRECTOR

County of San Diego

DEPARTMENT OF PLANNING AND LAND USE

5201 RUFFIN ROAD, SUITE B, SAN DIEGO, CALIFORNIA 92123-1666
INFORMATION (858) 694-2960
TOLL FREE (800) 411-0017

June 3, 2008

William A. Snipes, P.E., L.S.
Principal
8348 Center Drive, Suite G
La Mesa, CA 91942-2910

Re: TPM 20765 The Slope, Outstanding Groundwater Issue – Well Testing and Radionuclides

Dear Applicant,

It has recently come to the attention of the Department of Planning and Land Use (DPLU) that there is a potential risk for naturally-occurring radionuclides to be present at levels above drinking water standards in wells used for domestic supply in areas underlain by fractured crystalline bedrock. Since elevated radionuclide concentrations above the MCL could pose a threat to human health, water quality sampling will be required to ensure that there is a safe and potable water supply for your project. In addition, there is still an outstanding requirement for a 24 hour well test to be conducted to meet the residential well testing requirements within the San Diego County Groundwater Ordinance.

Please find attached a map produced by the County Department of Environment Health (DEH) of potential radionuclide problem areas in the County. Problem areas mapped are based on a subset of wells in which radionuclides (gross alpha and uranium) have exceeded their respective maximum contaminant levels (MCLs) in groundwater samples analyzed. The map is based on a limited set of analytical data from water systems regulated by DEH and the State. There is no data available over a vast portion of the County, and there are likely areas with potential problems that are unmapped. As a result, DPLU is requiring all discretionary projects underlain by fractured crystalline bedrock (proposing the use of groundwater for onsite domestic use) to conduct water quality sampling for radionuclides.

Groundwater Water Quality Sampling Procedures: The well which will be used for aquifer testing to meet Groundwater Ordinance well testing requirements for the project shall be sampled for:

- Gross alpha particles by Standard Method 7110C
- Uranium by EPA Method 908.0/Standard Method 7500

Water quality sampling and reporting <u>must</u> be conducted under the direct supervision of a Professional Geologist or a consultant/subcontractor under the direct supervision of

the Professional Geologist. Water samples shall be collected after at least two well bore volumes have been purged from the well. Please follow standard sampling procedures and collect the samples in laboratory certified bottles, place samples in a cooler with ice which must be maintained at a temperature of 4 degrees C, handle in accordance with standard chain-of-custody procedures, and ensure that samples are analyzed within laboratory holding times. It should be noted on the chain-of-custody that the samples are for drinking water. Also, please use a California-certified laboratory. A letter report shall document all sampling procedures as outlined above including the dates/times samples were collected, field procedures, the methodologies used, whether or not the samples met holding times, what bottles were used, and the chain-of-custody procedures. Please also include all laboratory documentation of the results in an appendix/attachment.

Outstanding Well Testing Requirement: As previously scoped by the County on June 29, 2006, the Groundwater Ordinance requires one well test for all projects having between 1 and 10 lots. One well test must be performed on the lot that appears to have the least access to a viable groundwater supply as determined in advance by the County Groundwater Geologist.

Prior to performing any well test, a well test plan must be prepared and submitted to the County Groundwater Geologist for approval. The well test plan and final well test report must be prepared by a California Professional Geologist. Additionally, all field work associated must be under the direct supervision of the California Professional Geologist. Submittal and approval of this plan will ensure that the well tests are conducted in compliance with the necessary requirements for the project. For items to include in the plan, please refer to Section 1.0, Well Test Plan in Attachment A of the County Report Format Guidelines and Content Requirements for Groundwater Resources which can be found at
http://www.sdcounty.ca.gov/dplu/Resource/docs/3~pdf/GRWTR-Report-Format.pdf

The County recommends that the well test and water quality sampling be performed as soon as possible. For gross alpha/uranium found at levels above the MCL (after four quarters of sampling conclusively demonstrates this), a small water system regulated by DEH would be necessary to bring radionuclides into MCL compliance. This may prove to be economically infeasible for a minor subdivision. If you have any questions regarding these comments, please contact me at 858-694-3820 or jim.bennett@sdcounty.ca.gov.

Sincerely,

Marisa Smith, Project Manager
Regulatory Planning

JB:jb

Attachment: Map of Potential Nitrates and Radioactive Elements Problem Areas

CC: James Sanders; PO Box 232; Brawley, CA 92227-0232

ATS Laboratories
104 S 8th Street
Brawley, Ca 92227
760-344-2532
760-344-3459

Lab no: 9709 **Reported: 12-9-08**

Client: J. Sanders **Received: 11-6-08**

Sample: Water

Identification: 32+ acres adjacent to Old Hwy 80, Pine Valley

Analysis	Results	Units	DLR	Analyst	Date Analyzed	Method
Gross Alpha	1.82 +/- 0.92	PCi/L	NA	NA	11/22/08	7110c
Uranium	1.41 +/- 0.67	Pci/L	NA	NA	**11/24/08**	908.0

Analysis by Truesdail Laboratories, copy of report enclosed

Linda L Webster

Linda L. Webster
Lab supervisor

TRUESDAIL LABORATORIES, INC.

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Established 1931

14201 FRANKLIN AVENUE
TUSTIN, CALIFORNIA 92780-7008
(714) 730-6239 · FAX (714) 730-6462
www.truesdail.com

REPORT

Client: D-TEK Analytical Laboratories, Inc.
2722 Loker Ave. West, Suite B
Carlsbad, CA 92010
Attn: Ellen Atienza

Report Date: 12/05/08
Date Received: 11/13/08
Reported By: RT

Laboratory Number: 979812
Matrix: Water / 1

Project Name: 08-7547

Investigation: Gross Alpha by SM 7110C
Total Uranium by EPA 908.0

Results Summary

Truesdail ID	Client ID	Analysis	Method	Result pCi/L	2 Sigma Error, pCi/L	MDA pCi/L	Date Sampled	Time Sampled	Date Analyzed
979812	08-7547	Gross Alpha	SM 7110C	1.82	0.92	1.25	11/06/08	NA	11/22/08
979812	08-7547	Total Uranium	EPA 908.0	1.41	0.67	0.66	11/06/08	NA	11/24/08

Quality Control Summary

Batch ID	Analysis	Method	LCS Recovery pCi/L	LCS Two sigma Error pCi/L	True Value pCi/L	Recovery %
08C-11-K	Gross Alpha	SM 7110C	24.4	2.85	29.2	84
08U-11-E	Total Uranium	EPA 908.0	12.6	1.23	14.6	88

Respectfully Submitted,
TRUESDAIL LABORATORIES, INC.

Rossina Tomoff, Project Manager
Environmental Services

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public, and these laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from Truesdail Laboratories.

COUNTY OF SAN DIEGO • DEPARTMENT OF PLANNING AND LAND USE

Memorandum

TO: Marisa Smith, Project Planner
FROM: Jim Bennett, Groundwater Geologist
SUBJECT: Groundwater Well Test Plan (Peterson Environmental Services, January 15, 2009); Project Number TPM 20765 The Slope; APN 410-010-07-00, 410-010-07-00; Kiva Number 05-0060205;
DATE: January 22, 2009

INFORMATION/DOCUMENT	# OF COPIES	LEAD REVIEW /SECTION or Dept.
Well Test Report	2	Planner (1); Groundwater Geologist (1)

Jim Bennett, County Groundwater Geologist, has reviewed the Pump Test Plan prepared by Peterson Environmental Services and submitted to the County on January 15, 2009. The plan is accepted with no comments and the well testing can proceed. The Well Test Report will be required with the next official submittal.

Please contact Jim Bennett, County Groundwater Geologist, at 858-694-3820 if you have any questions regarding these comments.

Appendix C

Water Quality Test Results

EnviroMatrix Analytical, Inc.

22 February 2009

Peterson Environmental Services
Attn: John Peterson
5580 La Jolla Blvd, Suite 398
La Jolla, CA 92037

EMA Log #: 0902312

Project Name: Sanders

Enclosed are the results of analyses for samples received by the laboratory on 02/11/09 10:35. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon
Laboratory Director

CA ELAP Certification #: 2564

4340 Viewridge Avenue, Suite A • San Diego, California 92123 • (858) 560-7717 • Fax (858) 560-7763
Analytical Chemistry Laboratory

Client Name: Peterson Environmental Services
Project Name: Sanders

EMA Log #: 0902312

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Sanders	0902312-01	Drinking Water	02/11/09 09:30	02/11/09 10:35

NOTE: Uranium and Gross Alpha analyses were performed by a sub-contract laboratory, results to follow in a separate report.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: Peterson Environmental Services
Project Name: Sanders

EMA Log #: 0902312

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sanders (0902312-01) Drinking Water	**Sampled: 02/11/09 09:30**		**Received: 02/11/09 10:35**						
Nitrate as N	ND	0.05	mg/l	1	9021803	02/18/09	02/18/09	SM4500 NO3 E	W-02
Total Dissolved Solids	**413**	20	"	"	9021401	02/14/09	02/15/09	SM2540 C	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: Peterson Environmental Services
Project Name: Sanders

EMA Log #: 0902312

Microbiological Parameters by Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sanders (0902312-01) Drinking Water	**Sampled: 02/11/09 09:30**		**Received: 02/11/09 10:35**						
Total Coliforms	Absent		None	1	9021363	02/11/09	02/12/09	SM9223	
E. Coli	Absent		"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: Peterson Environmental Services
Project Name: Sanders

EMA Log #: 0902312

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9021401										
Blank (9021401-BLK1)				Prepared: 02/14/09	Analyzed: 02/15/09					
Total Dissolved Solids	ND	20	mg/l							
Duplicate (9021401-DUP1)		**Source: 0902278-01**		Prepared: 02/14/09	Analyzed: 02/15/09					
Total Dissolved Solids	629	20	mg/l		616			2	20	
Reference (9021401-SRM1)				Prepared: 02/14/09	Analyzed: 02/15/09					
Total Dissolved Solids	307	20	mg/l	312		98	39.1-110.5			
Batch 9021803										
Blank (9021803-BLK1)				Prepared & Analyzed: 02/18/09						
Nitrate as N	ND	0.05	mg/l							
LCS (9021803-BS1)				Prepared & Analyzed: 02/18/09						
Nitrate as N	0.54	0.05	mg/l	0.500		108	80-120			
LCS Dup (9021803-BSD1)				Prepared & Analyzed: 02/18/09						
Nitrate as N	0.55	0.05	mg/l	0.500		110	80-120	2	20	
Duplicate (9021803-DUP1)		**Source: 0902269-01**		Prepared & Analyzed: 02/18/09						
Nitrate as N	0.20	0.05	mg/l		0.18			9	20	
Matrix Spike (9021803-MS1)		**Source: 0902269-01**		Prepared & Analyzed: 02/18/09						
Nitrate as N	0.67	0.05	mg/l	0.500	0.18	98	80-120			
Matrix Spike Dup (9021803-MSD1)		**Source: 0902269-01**		Prepared & Analyzed: 02/18/09						
Nitrate as N	0.70	0.05	mg/l	0.500	0.18	103	80-120	4	20	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: Peterson Environmental Services
Project Name: Sanders

EMA Log #: 0902312

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9021803										
Reference (9021803-SRM1)				Prepared & Analyzed: 02/18/09						
Nitrate as N	0.67	0.05	mg/l	0.688		97	90.12-107.7			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Notes and Definitions

W-02	The sample for nitrate analysis was preserved with H2SO4 after the nitrite portion of the analysis was completed to extend the holding time for the sample. Nitrate results are corrected for the nitrite contribution per the method.
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CHAIN-OF-CUSTODY FORM

NMCO Lab
8/430-0379
Bac-T

EnviroMatrix Analytical, Inc.

page____of____

4340 Viewridge Ave., Ste. A · San Diego, CA 92123 · Phone (858) 560-7717 · Fax (858) 560-7763

EMA LOG #: 0902312

Client: Peterson Env Services
Attn: John Peterson
Sampler(s): John Peterson
Address: 5580 La Jolla Blvd #398
La Jolla Ca. 92037
Phone: 8/454-9984 Fax: 8/551-7549
Email: Petersonenv@hotmail.com
Billing Address: same as above

Project ID: Sanders
Project #: PO#:

SAMPLE DETAILS

#	Client Sample ID	Sample Date/Time	Sample Matrix	Container(s) # of / Type
01	Sanders	2/11	GW	
02		0930	DW	
03				
04				
05				
06				
07				
08				
09				
10				

REQUESTED ANALYSIS

#	Oil & Grease ☐413.1 ☐413.2 ☐1664	418.1 (Total Recoverable Petroleum Hydrocarbons)	8015B (TPH) ☐Gas ☐Diesel ☐Ext ☐ASTM D2887	624 / 8260 (VOC) ☐Full ☐BTXE ☐MTBE ☐Oxy ☐Nap	625 / 8270 (Semi Volatile Organics) ☐ PAH only	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (Organotin Compounds)	pH Conductivity (EC) TSS TDS	Nitrate Nitrite TKN NH3	TTLC Metals (CAC Title 22) / (CAM 17)	STLC Metals (CAC Title 22) / (CAM 17)	TCLP (RCRA) Metals Organics	Cd Cr Cu Pb Ni Ag Zn Dissolved	Coliform, Total (MTF) Fecal (MTF) Colilert,T+E.Coli	Enterococcus, MTF Idexx	Heterotrophic Plate Count (HPC)						
01										X	X					X			X	X			
02																							
03																							
04																							
05																							
06																							
07																							
08																							
09																							
10																							

Microbiology Notes: Sent to FGL for analysis Cost of delivery covered by Peterson Env. LWL

Sample Comments:

Sample Matrix Codes: GW=ground water WW=waste water DW=drinking water SW=storm water
A=air SED=sediment O=oil T=tissue S=solid other (specify) L=liquid other (specify)

Shipped By: Courier UPS FedEx USPS ☒Client drop off ☐Other_____
[1]Turnaround Time: Same day 24 hr 48 hr 3 day 4 day 5 day ☒STD (7 day)
[1]Reporting Requirements: Fax PDF Excel Geotracker EDF ☐Other _____
[1]Sample Disposal: By Laboratory [2]Return to client: P/U or Delivery ☐Archive until ____/____/____

SAMPLE INTEGRITY

Correct Containers: Yes No N/A
Containers Properly Preserved: Yes No N/A
Custody Seals Intact: Yes No N/A
Temperature @ Receipt: _____
COC/Labels Agree: Yes No N/A
Sampled By: Client EMA ☐Autosampler

Project Comments:

CHAIN-OF-CUSTODY RECORD

RELINQUISHED BY		RECEIVED BY		DATE/TIME STAMP
Signature	[signature]	Signature	[signature]	2/11/09
Print	John Peterson	Print	Sean Flory	10:35
Company	Peterson Env Services	Company	EMA Inc.	
Signature		Signature		
Print		Print		
Company		Company		
Signature		Signature		
Print		Print		
Company		Company		

[1]Additional costs may apply, consult a project manager for details.
[2]EMA reserves the right to return any samples that do not match our waste profile.

White - EMA Canary - Accounting Pink - Client (w/Report) Goldenrod - Client (Relinquish Samples)

Note: By relinquishing samples to EnviroMatrix Analytical, Inc., client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of the invoice. Sample(s) will be disposed of after 30 days unless otherwise noted. All work is subject to EMA's terms and conditions.

T=8°. on ice

EnviroMatrix Analytical, Inc.

11 March 2009

Peterson Environmental Services
Attn: John Peterson
5580 La Jolla Blvd, Suite 398
La Jolla, CA 92037

EMA Log #: 0902312

Project Name: Sanders

Enclosed with this letter are the test results performed by subcontract laboratory for the following analyses:

- Uranium
- Gross Alpha

The samples were received by EnviroMatrix Analytical, Inc. intact and with chain-of-custody documentation. The test results and pertinent quality assurance/quality control data are listed on the attached tables.

I certify that this data report is in compliance both technically and for completeness. Release of the data contained in this hard copy data report has been authorized by the following signature.

Dan Verdon
Laboratory Director

4340 Viewridge Avenue, Suite A • San Diego, California 92123 • (858) 560-7717 • Fax (858) 560-7763
Analytical Chemistry Laboratory

ENVIRONMENTAL

Analytical Chemists
March 10, 2009

Enviro Matrix Analytical, Inc.
4340 Viewridge Avenue
Suite A
San Diego, CA 92123

Lab ID : SP 0901807
Customer : 2-19971

Laboratory Report

Introduction: This report package contains total of 3 pages divided into 3 sections:

Case Narrative	(1 pages)	: An overview of the work performed at FGL.
Sample Results	(1 page)	: Results for each sample submitted.
Quality Control	(1 page)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab ID #	Matrix
0902312-01	02/11/2009	02/24/2009	SP 0901807-001	DW

Sampling and Receipt Information: The sample was received, prepared and analyzed within the method specified holding times. All samples arrived at room temperature. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the attached Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to the following tables:

Radio QC

900.0	03/06/2009:203056 All analysis quality controls are within established criteria
	03/03/2009:202251 All preparation quality controls are within established criteria
908.0	03/05/2009:202979 All analysis quality controls are within established criteria
	03/03/2009:202235 All preparation quality controls are within established criteria

Certification:: I certify that this data package is in compliance with NELAC standards, both technically and for completeness, except for any conditions listed above. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature.

Approved By **David Terz, B.A., M.B.A.** Digitally signed by David Terz, B.A., M.B.A. Title: QA Director Date: 2009-03-10

KD:DMB

Corporate Offices & Laboratory
853 Corporation Street
Santa Paula, CA 93060
TEL: 805/392-2000
FAX: 805/525-4172
CA NELAP Certification No. 01110CA

Office & Laboratory
2500 Stagecoach Road
Stockton, CA 95215
TEL: 209/942-0182
FAX: 209/942-0423
CA ELAP Certification No. 1563

Office & Laboratory
563 E. Lindo Avenue
Chico, CA 95926
TEL: 530/343-5818
FAX: 530/343-3807
CA ELAP Certification No. 2670

Field Office
Visalia, California
TEL: 559/734-9473
Mobile: 559/737-2399
FAX: 559/734-8435

March 10, 2009

Enviro Matrix Analytical, Inc.
4340 Viewridge Avenue
Suite A
San Diego, CA 92123

Description : 0902312-01
Project : 0902312

Lab ID : SP 0901807-001
Customer ID : 2-19971

Sampled On : February 11, 2009-09:30
Sampled By : Not Available
Received On : February 24, 2009-10:50
Matrix : Drinking Water

Sample Result - Radio

Constituent	Result ± Error	MDA	Units	MCL/AL	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Radio Chemistry[P:]								
Gross Alpha	1.76 ± 1.49	1.52	pCi/L	15/5	900.0	03/03/09:202251	900.0	03/06/09:203056
Uranium	1.84 ± 0.837	0.278	pCi/L	20	908.0	03/03/09:202235	908.0	03/05/09:202979

ND=Non-Detected. PQL=Practical Quantitation Limit. Containers: (P) Plastic Preservatives: N/A

MDA = Minimum Detectable Activity (Calculated at the 95% confidence level) = Data utilized by DHS to determine matrix interference.
MCL / AL = Maximum Contamination Level / Action Level. Alpha's Action Level of 5 pCi/L is based on the Assigned Value (AV).
AV = (Gross Alpha Result + (0.84 x Error)). CCR Section 64442: Drinking Water Compliance Note: Do the following
If Gross Alpha's (AV) exceeds 5 pCi/L run Uranium. If Gross Alpha's (AV) minus Uranium exceeds 5 pCi/L run Radium 226.

Drinking Water Compliance:
Gross Alpha (AV) minus Uranium is less than or equal to 15 pCi/L
Uranium is less than or equal to 20 pCi/L
Radium 226 + Radium 228 is less than or equal to 5 pCi/L

Note: Samples are held for 3-6 months prior to disposal.

Corporate Offices & Laboratory
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FAX: 209/942-0423
CA ELAP Certification No. 1563

Office & Laboratory
563 E. Lindo Avenue
Chico, CA 95926
TEL: 530/343-5818
FAX: 530/343-3807
CA ELAP Certification No. 2670

Field Office
Visalia, California
TEL: 559/734-9473
Mobile: 559/737-2399
FAX: 559/734-8435

March 10, 2009 | Lab ID : SP 0901807
Enviro Matrix Analytical, Inc. | Customer : 2-19971

Quality Control - Radio

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Radio								
Alpha	900.0	03/06/2009:203056	CCV	cpm	10840	80.0 %	62 - 107	
			CCB	cpm		0.0600	0.13	
Gross Alpha	900.0	03/03/2009:202251	Blank	pCi/L		-0.04	3	
			LCS	pCi/L	150.4	109 %	75-125	
			MS	pCi/L	150.4	80.8 %	60-140	
		(CH 0971655-001)	MSD	pCi/L	150.4	77.8 %	60-140	
			MSRPD	pCi/L	150.4	3.8%	≤30	
Alpha	908.0	03/05/2009:202979	CCV	cpm	10850	80.2 %	62 - 107	
			CCB	cpm		0.0500	0.29	
Uranium	908.0	03/03/2009:202235	RgBlk	pCi/L		-0.02	1	
			LRS	pCi/L	20.27	74.0 %	54-105	
			BS	pCi/L	20.27	97.6 %	75-125	
			BSD	pCi/L	20.27	98.0 %	75-125	
			BSRPD	pCi/L	20.27	0.4%	≤20	

Definition

CCV	: Continuing Calibration Verification - Analyzed to verify the instrument calibration is within criteria.
CCB	: Continuing Calibration Blank - Analyzed to verify the instrument baseline is within criteria.
Blank	: Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
RgBlk	: Method Reagent Blank - Prepared to correct for any reagent contributions to sample result.
LCS	: Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
MS	: Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD	: Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.
BS	: Blank Spikes - A blank is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
BSD	: Blank Spike Duplicate of BS/BSD pair - A blank duplicate is spiked with a known amount of analyte. It is prepared to verify that the preparation process is not affecting analyte recovery.
MSRPD	: MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
BSRPD	: BS/BSD Relative Percent Difference (RPD) - The BS relative percent difference is an indication of precision for the preparation and analysis.
DQO	: Data Quality Objective - This is the criteria against which the quality control data is compared.

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TEL: 530/343-5818
FAX: 530/343-3807
CA ELAP Certification No. 2670

Field Office
Visalia, California
TEL: 559/734-9473
Mobile: 559/737-2399
FAX: 559/734-8435

SUBCONTRACT ORDER

EnviroMatrix Analytical, Inc.

0902312

901807

SENDING LABORATORY:

EnviroMatrix Analytical, Inc.
4340 Viewridge Ave., Ste. A
San Diego, CA 92123
Phone: (858) 560-7717
Fax: (858) 560-7763
Project Manager: Jamey A. Cote

RECEIVING LABORATORY:

FGL (Fruit Growers Lab) [S]
853 Corporation Street
Santa Paula, CA 93060
Phone :(805) 392-2000
Fax: (805) 525-4172

TAT=Standard

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: 0902312-01	**Water**	**Sampled:02/11/09 09:30**	[redacted]	
Uranium	~~02/23/09 16:00~~	08/10/09 09:30		
Gross alpha	~~02/23/09 16:00~~	08/10/09 09:30		
Containers Supplied:				
1L Poly - Unpres (B)	1L Poly - Unpres (C)			

Send report to jbeyer@enviromatrixinc.com, llvick@enviromatrixinc.com, & report@enviromatrix.com

Please return cooler & blue ice

Released By	Date	Received By	Date
[signature]	2/23/09 0900		
Fedex	2/24/09 1050	[signature]	2/24/09 1050.
Released By	Date	Received By	Date

Nuco Lab
8/430-0339
Bac-T

CHAIN-OF-CUSTODY FORM

EnviroMatrix Analytical, Inc.

page____of____

4340 Viewridge Ave., Ste. A · San Diego, CA 92123 · Phone (858) 560-7717 · Fax (858) 560-7763

EMA LOG #: 0902312

Client: Peterson Env services
Attn: John Peterson
Sampler(s): John Peterson
Address: 5580 La Jolla Blvd #398
La Jolla Ca. 92037
Phone: 8/454-9984 Fax: 8/551-7549
Email: Petersonenv@hotmail.com
Billing Address: same as above

Project ID: Sanders
Project #: PO#:

SAMPLE DETAILS

#	Client Sample ID	Sample Date/Time	Sample Matrix	Container(s) # of / Type
01	Sanders	2/11	GW	
02		0930	DW	
03				
04				
05				
06				
07				
08				
09				
10				

REQUESTED ANALYSIS

#	Oil & Grease ☐413.1 ☐413.2 ☐1664	418.1 (Total Recoverable Petroleum Hydrocarbons)	8015B (TPH) ☐Gas ☐Diesel ☐Ext ☐ASTM D2887	624 / 8260 (VOC) ☐BTXE ☐MTBE ☐Oxy ☐Nap	625 / 8270 (Semi Volatile Organics) ☐PAH only	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (Organotin Compounds)	☐pH ☐Conductivity (EC) ☐TSS ☒TDS	☒Nitrate ☐Nitrite ☐TKN ☐NH3	TTLC Metals (CAC Title 22) / (CAM 17)	STLC Metals (CAC Title 22) / (CAM 17)	TCLP (RCRA) ☐Metals ☐Organics	Cd Cr Cu Pb Ni Ag Zn ☐Dissolved	☒Coliform, ☐Total (MTF) ☐Fecal (MTF) ☒Colilert, T+E.Coli	Enterococcus, ☐MTF ☐Idexx Presence	Heterotrophic Plate Count (HPC) Absence	Uranium	Gross Alpha		Sent to FGL for analysis	Cost of delivery covered by Peterson Env. LWL	Microbiology Notes:
01										X	X					X			X	X					Sample Comments:
02																									
03																									
04																									
05																									
06																									
07																									
08																									
09																									
10																									

Sample Matrix Codes: GW=ground water WW=waste water DW=drinking water SW=storm water
A=air SED=sediment O=oil T=tissue S=solid other (specify) L=liquid other (specify)

Shipped By: ☐Courier ☐UPS ☐FedEx ☐USPS ☒Client drop off ☐Other_____

[1]Turnaround Time: ☐Same day ☐24 hr ☐48 hr ☐3 day ☐4 day ☐5 day ☒STD (7 day)

[1]Reporting Requirements: ☐Fax ☐PDF ☐Excel ☐Geotracker EDF ☐Other_____

[1]Sample Disposal: ☐By Laboratory ☐[2]Return to client: P/U or Delivery ☐Archive until ____/____/____

SAMPLE INTEGRITY

Correct Containers: Yes No N/A
Containers Properly Preserved: Yes No N/A
Custody Seals Intact: Yes No N/A
Temperature @ Receipt: _____
COC/Labels Agree: Yes No N/A
Sampled By: ☐Client ☐EMA ☐Autosampler

Project Comments:

CHAIN-OF-CUSTODY RECORD

	RELINQUISHED BY	RECEIVED BY	DATE/TIME STAMP
Signature	John Peterson	[signature]	2/11/09
Print	John Peterson	Sean Flavey	10:35
Company	Peterson Env Service	EMA Inc	
Signature			
Print			
Company			
Signature			
Print			
Company			

[1]Additional costs may apply, consult a project manager for details.
[2]EMA reserves the right to return any samples that do not match our waste profile.

White - EMA Canary - Accounting Pink - Client (w/Report) Goldenrod - Client (Relinquish Samples)

Note: By relinquishing samples to EnviroMatrix Analytical, Inc., client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of the invoice. Sample(s) will be disposed of after 30 days unless otherwise noted. All work is subject to EMA's terms and conditions.

T=8°C on ice

SUBCONTRACT ORDER

EnviroMatrix Analytical, Inc.

0902312

SENDING LABORATORY:

EnviroMatrix Analytical, Inc.
4340 Viewridge Ave., Ste. A
San Diego, CA 92123
Phone: (858) 560-7717
Fax: (858) 560-7763
Project Manager: Jamey A. Cote

RECEIVING LABORATORY:

FGL (Fruit Growers Lab) [S]
853 Corporation Street
Santa Paula, CA 93060
Phone :(805) 392-2000
Fax: (805) 525-4172

TAT=Standard

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: 0902312-01	**Water**	**Sampled:02/11/09 09:30**		
Uranium	~~02/23/09 16:00~~	08/10/09 09:30		
Gross alpha	~~02/23/09 16:00~~	08/10/09 09:30		
Containers Supplied:				
1L Poly - Unpres (B)	1L Poly - Unpres (C)			

Send report to jbeyer@enviromatrixinc.com, llvick@enviromatrixinc.com, [illegible]

Please return cooler & blue ice

Released By	Date	Received By	Date
[signature]	2/23/09 0900		
Released By	Date	Received By	Date