GROUNDWATER INVESTIGATION REPORT

TULE WIND FARM
EAST SAN DIEGO COUNTY, CALIFORNIA

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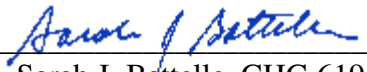

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GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

af	Acre feet
APN	Assessor's Parcel Number
CIMIS	California Irrigation Management Information System
DWR	Department of Water Resources
ETo	Evapotranspiration
Ft	Feet
gpd	Gallons per day
gpm	gallons per minute
msl	mean sea level
SCS	Soil Conservation Survey
t/t'	Time since pumping started divided by time since pumping stopped

EXECUTIVE SUMMARY

A groundwater investigation was conducted to evaluate the groundwater resources within Thing Valley on the Ewiiaapaayp Reservation and Rough Acres Ranch in McCain Valley. The purpose of the investigation was to assess the availability of groundwater as a resource in support of the Tule Wind Farm construction project, which proposes to be extracted at these locations over a nine-month construction period. The groundwater investigation included long-term 72-hour constant rate pumping tests and subsequent analysis of the data to assess the hydraulic properties of the aquifer at each of these locations.

Results of the groundwater investigation suggest that both locations provide viable groundwater resources in support of project construction. Although groundwater resources on Tribal land are not within the jurisdiction of the County, pumping test results indicate that the Reservation well appears to be somewhat limited at the test pumping rate of 80 gallons per minute (gpm). Based on a boundary condition identified during the course of the aquifer pumping test, it is recommended that a reduced pumping rate and a reduced frequency be used at this well. However, pumping from other Reservation wells may be used to supplement pumping from the test well.

At the Rough Acres Ranch, pumping at 50 gpm showed no evidence of well interference, or significant depletion of the groundwater in storage within the pumping well. In fact, analysis of the data suggests that pumping could be doubled without any significant impact. Based on the results of the aquifer test, no significant impacts to this groundwater resource are anticipated associated with pumping at the Rough Acres Ranch test well.

1.0 INTRODUCTION

1.1 Purpose of the Report

This groundwater investigation report describes field conditions, and presents the results of field and analytical procedures used to evaluate groundwater resource availability within the Thing Valley area of the Ewiiaapaayp Reservation and the Rough Acres Ranch area of McCain Valley to support construction of the proposed Tule Wind Project. The Tule Wind Project will include the construction of 134 wind turbines, and associated service roads, transmission lines and ancillary structures over a period of approximately nine months during which time groundwater will be extracted from the underlying aquifers to support construction activities. This investigation also addresses the sustainability of groundwater withdrawal from the aquifers with respect to the existing and proposed future uses. Construction is slated to begin in the third quarter 2011, and the wind turbine facility is scheduled to come on line in the fourth quarter 2012.

Engineering estimates indicate that construction, and associated groundwater extraction, is expected to last approximately nine months. According to the project developer, groundwater demand for the project is expected to occur in four phases. Initially the project will require approximately 120,000 gallons of water per day (gpd) during road building (60 gallons per minute [gpm]), increasing to 250,000 gpd (equivalent to a constant rate of 124 gpm) while both road and turbine foundation construction and construction-related dust suppression. Water demand will then decrease to approximately 130,000 gpd (a constant rate of 65 gpm) following completion of the 72-day road construction portion of the project, while turbine foundation construction continues, and finally decrease to 100,000 gpd (50 gpm) for dust control during the remainder of the project. Subsequent site work is not expected to require additional groundwater supply. The total volume of extracted groundwater to support the project is anticipated to be approximately 65 to 125 acre-feet.

When the Tule Wind Project turbines become operational, only a limited quantity of water will be required, estimated at 2,500 gallons per day to supply the operations and maintenance building services and support staff.

1.2 Project Location and Description

The Tule Wind Farm will be developed on 15,350 acres in eastern San Diego County. The project area is located approximately one mile north in Interstate 8 (I-8), generally between La Posta Truck Trail on the west and McCain Valley Road on the east (Figure 1). Given the large size of the project area and the need for water throughout, two sites were identified for water production: Thing Valley and McCain Valley (Rough Acres Ranch). These areas are described in more detail in the following sections.

1.2.1 Thing Valley Water Production Area

The Thing Valley Water Production Area is located approximately 10 miles north of I-8 off La Posta Truck Trail/Thing Valley Road on the Ewiiaapaayp Reservation (Figure 2A). The reservation is located in an isolated, triangular-shaped, southeasterly-draining

valley near the headwaters of La Posta Creek. Ground surface elevations range from 5000 to 5100 feet on the valley floor, but rise to over 6200 feet along the surrounding ridgelines. Reservation structures dot the valley floor, and include a fire station, an abandoned water bottling facility, and several abandoned, vacant, or partially-occupied residential structures. Two groundwater production wells ("north well" and "south well") were constructed in August 1980 near the center of the valley. The "south well" is connected to a series of solar panels that power an electric submersible pump. This well pumps water to a storage tank at the northwestern end of the valley, and the stored water supplies the Reservation. The "north well" is located approximately 60 feet northeast of the "south well". It is equipped with an electric submersible pump, but it is not currently used for water production. According to personal communications with the tribal representative and review of the tribal website, there are no permanent inhabitants within the valley, through tribal members visit the location periodically. The nearest residence is approximately 4 miles south of the subject valley in the larger Thing Valley. The "north well" and "south well" occupy Assessor's Parcel Number (APN) 4130800300, and the remainder of the valley spans APNs 4131503000, 4130800100, and 4130800200. The "far field" observation well is located within APN 4131503200.

1.2.2 Rough Acres Ranch Water Production Area

The Rough Acres Ranch Water Production Area is located approximately one mile north of I-8 between Ribbonwood Road on the west and McCain Valley Road on the east (Figure 2B). This site occupies the broad alluviated, southeasterly-draining McCain Valley that, within the project area, is bounded on the north and south by low-relief granitic hills. Ground surface elevations in the valley range from approximately 3600 feet above mean sea level at the northwestern corner of the project area and along the northern bounding hills to about 3450 feet above mean sea level at the southeastern corner of the project area. Within the project area, Rough Acres Ranch is surrounded by scattered residences on the west and south, a low-security detention facility and landing strip on the east, and open space on the north. The valley floor is used for livestock grazing. The Rough Acres Ranch property is crossed by a series of graded dirt roads, and contains a number of active and idle groundwater production wells that are used for domestic and agricultural supply. The area of the aquifer test spans APNs 6110600300, 6110700100, 6110900200, 6110900300, 6110900400, 6110901800, and 6111100100.

1.2.3 Project Description

The Tule Wind Farm project will include the construction of up to 134 wind turbines and associated roads, transmission lines and support facilities. Based on information provided by the project developer, IBR, the following water requirements have been estimated for the project construction (all work is anticipated to be performed over five-day work weeks):

1. Road Construction – Up to 120,000 gallons per work day will be required over a 72-day construction period. This translates to an average pumping rate of approximately 60 gpm assuming sufficient storage is available to allow for pumping seven days a week (83 gpm if the pumps are only active during work days).

2. Turbine Foundation Concrete Mixing – Turbine foundation construction is estimated to require 7,500 to 15,000 gallons of water per foundation. With 134 foundations to build, water demand will be approximately 15,000 and 30,000 gpd (assuming that two foundations are constructed each day in accordance with the 72-day work schedule). This much water use equals an average maximum pumping rate of approximately 15 gpm. The maximum continuous pumping rate (24-hours per day, seven days per week), required to support concrete mixing for three turbine foundations per day (45,000 gallons) is equivalent to 31 gpm.

3. Dust Control – During subsequent construction activities, approximately 50,000 to 100,000 gallons of water per working day will be required for dust control on project roads. The average continuous pumping rate required during these activities would be 50 gpm for an estimated nine-month construction period.

The pumping rates stipulated above are based on the assumption that there will be sufficient storage space to allow for groundwater extraction 24 hours per day, seven days per week. If there is insufficient water storage capacity to allow for continuous pump operation, higher incremental pumping rates would be required. Based on the aquifer testing performed for this report, the wells may not be able to pump at higher incremental pumping rates for peak demand.

1.3 Applicable Groundwater Regulations

Groundwater utilization for projects within the County of San Diego must address the requirements in the *County of San Diego Groundwater Ordinance No. 9826*, which stipulates that development and utilization of groundwater will not affect those who are dependent upon groundwater unless it can be demonstrated that there is an adequate supply to provide both the project and the existing users. In addition, since the project is proposing to use more than 20,000 gallons per day, it is considered a water intensive project according to the Groundwater Ordinance, and requires an evaluation of the cumulative groundwater impacts. The Ordinance provides for methods of analysis to determine potential impacts to the groundwater resource, and this investigation endeavors to address those potential impacts following the Ordinance-prescribed guidelines.

This project will result in groundwater extraction and utilization that may affect the local environment, a unique resource, and groundwater-dependent habitats. As a result, the California Environmental Quality Act (CEQA) requires an evaluation of environmental impacts associated with groundwater extraction, as well as other components of the project.

2.0 EXISTING CONDITIONS

This section of the water investigation report describes the existing conditions of the project areas, including topography, climate, geology and hydrogeology, surrounding land use, hydrology, and water quality.

2.1 Topographic Setting

2.1.1 Thing Valley Water Production Area

The Thing Valley Production area is situated in a triangular shaped valley near the headwaters of La Posta Creek. Ground surface elevations range from approximately 5100 feet above mean sea level (amsl) at the north end of the valley floor to about 5000 feet amsl at the south end of the valley floor (Figures 3A). Bounding ridgelines rise to over 6300 feet amsl. The watershed for the production area is approximately 2310 acres, draining the area to the northwest that includes the eastern flanks of the Laguna Mountains to the west and the southwestern flanks of the Sawtooth Mountains to the northeast.

2.1.2 Rough Acres Ranch Water Production Area

The Rough Acres Ranch Water Production Area is situated in McCain Valley, a broad south- to southeasterly trending valley that is generally bounded by the eastern flanks of the Laguna Mountains to the west and the In-Ko-Pah Mountains to the north and east. The valley is over 13 miles long, extending from the In-Ko-Pah Mountains to the north, and draining into Tule Canyon and Carrizo Gorge at the southeast. McCain Valley includes a large number of tributaries, including Tule Creek that passes through the Rough Acres Ranch study area as a dry wash at most times of the year. Because of the vast expanse of the drainage area, for purposes of this investigation and following guidance from the County Hydrogeologist, the watershed area is defined as an area of one-half mile radius surrounding the proposed production well (Figure 3B).

2.2 Climate

For purposes of this water supply study, the climate factors of most concern include precipitation and evapotranspiration. Data provided in this section comes from the County of San Diego Department of Planning and Land Use General Plan Update – Groundwater Study, State of California Department of Water Resources, and the California Irrigation Management System (CIMIS) databases.

2.2.1 Climate of the Thing Valley Water Production Area

At elevations of over 5000 feet, the Thing Valley WPA has a relatively mild climate. The site is located just east of the Laguna Mountains, and as a result, it sits in the rain shadow of these mountains. Historical climate data from the Campo area were used to conservatively represent conditions at this site. Based on information available from the California Department of Water Resources, the area receives an average of 15.6 inches of rainfall per year, with 80 percent of the rainfall occurring between November and March of each year. According to the State of California Reference Evapotranspiration Map developed by CIMIS, the site is located in Evapotranspiration Zone 16, with an average of 62.5 inches of evapotranspiration per year.

2.2.2 Climate of the Rough Acres Ranch Water Production Area

While 2000 feet lower in elevation, and about 10 miles east of the Thing Valley WPA, the Rough Acres Ranch WPA has similar values for rainfall and evapotranspiration. Using historical precipitation records from a monitoring station in Boulevard, California (approximately 2 miles south of the site), the average annual precipitation for the area is approximately 15.8 inches. The Rough Acres and Thing Valley WPAs are located in the same Evapotranspiration Zone, which indicates an average annual evapotranspiration of 62.5 inches.

2.3 Land Use

2.3.1 Land Use Surrounding the Thing Valley WPA

The Thing Valley WPA is located within the Ewiiaapaayp Reservation. According to the San Diego County General Plan, the site is located within the Mountain Area Community Planning Area with a land use designation as Indian Reservation. The highlands of the watershed area are located within the Cleveland National Forest, and the San Diego County General Plan identifies this area as the Central Mountain Community Planning Area, with an open space forest designation.

There are no full-time residents or industries within the Reservation limits, though the Reservation includes several abandoned structures and structures that are used periodically, as well as a fire station and a structure that was to be used as a water bottling plant. Aside from these structures, the surrounding land is undeveloped mountain and valley terrain. The nearest residents are located approximately 3 miles south of the WPA at Thing Valley Ranch.

2.3.2 Land Use Surrounding the Rough Acres Ranch WPA

The Rough Acres Ranch WPA is located in a sparsely populated region of the county. According to the San Diego County General Plan, the site is located within the Mountain Area Community Planning Area and has a land use designation as general agricultural. Properties surrounding the site are designated as general rural, and one parcel to the east is designated as National Forest/State Parks.

Consistent with the designated land uses, the Rough Acres Ranch is used for livestock grazing, and this property is surrounded by large lot residences to the west and south, a low-security detention center and rural air field to the east, and high desert open space to the north and east.

2.4 Water Demand

Because there are no residents or uses for groundwater within the Thing Valley WPA, and the County has no jurisdiction over groundwater use on tribal lands, there is no requirement to evaluate water demands in this area.

For the Rough Acres Ranch WPA, a conservative approach was used to ensure that the proposed project would not affect adjacent groundwater users. It is assumed that all groundwater for this project will be derived from the Rough Acres Ranch WPA even though the project will also utilize water from the Thing Valley WPA.

As recommended by the County Groundwater Geologist, the water production area was restricted to a one-half mile radius surrounding the production wells (the estimated maximum area of interference from the pumping well). However, to evaluate other groundwater uses, the evaluation radius was extended in some instances to about three quarters of a mile. Within this evaluation area, seven single family residences were identified, including one residence that operates an apparent poultry farm. In addition to the residences, the Rough Acres Ranch property is utilized for free-range livestock grazing, with an estimated head count of 100 animals. Using residential water demand values provided by the County's Guidelines for Determining Significance and published values for livestock water usage, the groundwater demand for the project is estimated in the following table:

Water Use	Demand (Acre-Feet per Year)	Demand (Acre-Feet per Month)
Proposed Project Construction (9 month duration)	60	6.7
Post-Project Maintenance	2.8	0.23
Residential Water Use (7 residential properties; 0.5 acre-feet per year per residence)	3.5	0.29
Livestock Grazing (100 head; 19 gallons per day per animal)	2.13	0.18
Poultry Raising (500 birds; 770 liters per 1000 birds per day)	0.11	0.01
Totals:	**65.74**	**7.18**

2.5 Geology and Soils

The Thing Valley and Rough Acres Ranch WPAs are situated within batholithic rocks of the Peninsular Ranges Geomorphic Province. Batholithic rocks were generally emplaced in the late Mesozoic to early Cenozoic eras. Post-emplacement uplift, weathering, and erosion has resulted in formation of surficial soils and alluvial deposits that mantle the crystalline bedrock. Due to the remote locations and paucity of mineral resources, neither site has been studied in detail, and most of the available geologic information comes from regional geologic studies, including the "Preliminary Geologic Map of the 30' x 60' El Cajon Quadrangle" (Todd, 2004) and "Mineral Resources of the Sawtooth Mountains and Carrizo Gorge/Eastern McCain Valley Wilderness Study Areas (Todd, et al., 1987). Soils information is provided by the United Sates Department of Agriculture - Soil Conservation Service and Forest Service. Geologic and soils conditions specific to each WPA and its watershed are described below.

2.5.1 Geology and Soils of the Thing Valley WPA

The Thing Valley WPA is flanked by the Laguna Mountains to the west and the Sawtooth Mountains to the north and east. Based on the available geologic information, in the vicinity of the WPA, the two mountain ranges are geologically similar, and are composed of the early Cretaceous-age Las Bancas Tonalite, an assemblage of lightly foliated tonalite, granodiorite, and quartz diorite. In addition, at the northernmost portion of the watershed, the Sawtooth Mountains are also underlain by a variety of Triassic and Jurassic-age metasedimentary rock units.

Along the valley floor, the crystalline bedrock is overlain by recent alluvium. Based on the logs of the groundwater production wells, the thickness of alluvium is estimated to be approximately 30 to 50 feet.

Based on maps prepared by the Soil Conservation Service (now Natural Resources Conservation Service), and presented on Figure 4A the following table presents the soil types and their properties within the Thing Valley WPA watershed area:

Soil Type	Moisture Holding Capacity (in)	Runoff Potential	Maximum Runoff Percentage	Area (acres)
Acid Igneous Rock Land (AcG)	0.10	Rapid	100%	250
Bancas Stony Loam (BbG)	3-5.5	Rapid to Very Rapid	81%	1000
Crouch Coarse Sandy Loam (CtE)	4.5-7	Medium	71%	50
Crouch Coarse Sandy Loam (CtF)	4-6	Rapid	74%	40
Crouch Rocky Coarse Sandy Loam (CuE)	3.5-5	Medium	78%	30
Crouch Rocky Coarse Sandy Loam (CuG)	3.5-5	Rapid to Very Rapid	78%	100
Mottsville Loamy Coarse Sand (MvC)	4-5	Slow to medium	74%	40
Mottsville Loamy Coarse Sand (MvD)	4-5	Medium	74%	30
Sheephead Rocky Fine Sandy Loam (SpG2)	2-3	Rapid to Very Rapid	87%	750
Steep Gullied Land (StG)	Not Available	Rapid	100%	10

2.5.2 Geology and Soils of the Rough Acres Ranch WPA

The Rough Acres Ranch WPA is located at the eastern edge of the Peninsular Ranges. Available geologic information in the vicinity of the WPA indicates that the area is underlain by the early to late Cretaceous era La Posta Tonalite, an assemblage of horneblende-biotite trondhjemite and granodiorite that is exposed on the low-relief highlands surrounding and within McCain Valley. Along the valley floor, the crystalline bedrock is overlain by recent alluvium. Based on the logs of the groundwater production wells in the valley, the thickness of alluvium is estimated to be 30 and 70 feet.

Based on maps prepared by the Soil Conservation Service (now Natural Resources Conservation Service), presented on Figure 4B, the following table presents the soil types and their properties within the Rough Acres Ranch WPA watershed area:

Soil Type	Moisture Holding Capacity (in)	Runoff Potential	Maximum Runoff Percentage	Area (acres)
Acid Igneous Rock Land (AcG)	0.1	Rapid	100%	10
Calpine Coarse Sandy Loam (CaC)	4.5-6.5	Slow to medium	72%	5
La Posta Loamy Coarse Sand (LaE2)	2-3	Medium	87%	60
La Posta Rocky Loamy Coarse Sand (LcE2)	1-2	Medium	94%	150
Loamy Alluvial Land (Lu)	6-9	Slow	62%	120
Mottsville Loamy Coarse Sand (MvC)	4-5	Slow to medium	75%	110
Tollhouse Rocky Coarse Sandy Loam (ToE2)	1-2	Medium to rapid	94%	50

2.6 Hydrogeologic Units

This section of the water investigation report describes the water-bearing units at each site and their general hydraulic properties.

2.6.1 Hydrogeologic Units of the Thing Valley WPA

The hydrogeologic units of the Thing Valley WPA include the recent alluvial soils and the underlying fractured Las Bancas Tonalite. The alluvium is restricted to the lowest portion of the valley floor; based on available geologic maps and Soil Conservation Service surveys, it underlies less than 10 percent of the watershed. In contrast, the Las Bancas Tonalite underlies the entire watershed area, either directly or beneath the alluvium.

A California State Department of Water Resources well completion report (no. 058539) is available for the "south" well that was used as the observation well for the aquifer testing in this study. Drilling logs for the "north" aquifer pumping test well and far-field observation wells were not available. Based on the log for the south well, the alluvium at this location is approximately 12 feet thick. Relatively weathered "granitic" bedrock extends from 12 to 50 feet below ground surface, and relatively unweathered "granitic" rock was encountered from 50 feet to the bottom of the hole at 400 feet. The geologic conditions at the north and far-field wells would be expected to be generally similar based on inspection of the surface geology.

A static water level was measured at each of the three test wells prior to the start of the step-drawdown test (Section 2.7). The static water levels in each well were sufficiently deep, and is likely below the base of alluvium. This suggests that alluvium groundwater is ephemeral, and does not contribute significantly to the available groundwater resource at this site.

The fractured Las Bancas Tonalite appears to be the most significant aquifer within the Thing Valley WPA. Using the recommendations from the County Groundwater

Geologist, a specific yield of 0.1 percent has been established for this unit. Figure 6 presents a conceptual hydrogeologic cross section through the Thing Valley WPA.

2.6.2 Hydrogeologic Units of the Rough Acres Ranch WPA

The hydrogeologic units of the Rough Acres Ranch WPA include the recent alluvial soils and the underlying weathered and fractured La Posta Tonalite. As shown on Figure 7, the alluvium covers the broad valley floor, and based on available geologic maps and Soil Conservation Service surveys (Figure 4B), it underlies approximately 50 to 60 percent of the watershed. The alluvium is directly underlain by the Las Bancas Tonalite, which is also exposed as outcroppings throughout the watershed. Figure 8 depicts a conceptual hydrogeologic cross section through this WPA.

While seven wells were used for the aquifer test in this study area, only the pumping well and two observation wells are within the prescribed one-half mile radius watershed. A California State Department of Water Resources well completion report (no. 1089956) is available for the pumping well. Geologic information suggests that the alluvium in the center of the valley is approximately 70 to 80 feet thick. Weathered bedrock extends to a depth of about 230 feet, and below that depth to the total depth of boring (420 feet), the crystalline rock is relatively unweathered. Static water levels measured in the pumping and observation well suggest that the lower 45 to 50 feet of alluvium is saturated. Little alluvium is noted on the logs for other observation wells in the test area, and well depths typically range from 400 to 900 feet, indicating that the fractured La Posta Tonalite is the primary source of groundwater for production wells in the area.

The fractured La Posta Tonalite appears to be the most significant aquifer within the Rough Acres Ranch WPA, with the alluvium providing at least seasonal recharge to the subjacent bedrock aquifer. Using the recommendations from the County Groundwater Geologist, a specific yield of 0.1 percent has been established for this bedrock aquifer. Published specific yield values for mixed sand and gravel aquifers (Driscoll, 1986) indicate a range of 10 to 25 percent.

2.7 Hydrologic Inventory and Groundwater Levels

2.7.1 Thing Valley WPA Hydrologic Inventory

As described in Section 2.6.1, two groundwater production wells are located within the Thing Valley WPA watershed. The wells are owned by the Ewiiaapaayp Tribe. The "south" well is currently used for as-needed water supply and pumps water to a storage tank. The "north" well was constructed to supply water to a proposed water bottling facility, but it is not currently used. Outside of the project watershed area, approximately one mile south of the north and south wells, is the "Thing Valley" observation well that is located near the confluence of La Posta Creek and an unnamed tributary. No other wells are known to exist within the watershed area. Well construction information and static water levels are provided in the following table.

Well Name	Total Depth (ft)	Seal Depth (ft)	Production Rate (gpm)	Water Level – August 2010 (feet below top of casing)
"North" Well	400	22	Idle	54.81
"South" Well	Unknown	Unknown	Up to 30 gpm	49.34
"Thing Valley" Well	Unknown	Unknown	Idle – No Pump	77.62

Locations for these wells are shown on Figure 5. The locations and elevations of these wells are not surveyed; however, using approximate ground surface elevations to establish an approximate groundwater elevation, a hydraulic gradient of 0.05 feet per foot is estimated. The approximated groundwater elevations suggest a southeasterly flow direction down Thing Valley.

According to a report provided by the Ewiiaapaayp Tribe, the "South" well has the potential to produce water at a rate of about 30 gpm. It is used to provide water to a storage tank that supplies water to tribal members at the residences and the fire station. Since there are no permanent residents in the reservation, the south well only pumps occasionally to maintain the water level in the tank.

The North well is capable of producing groundwater at up to 90 gpm, and a pumping test conducted on the well following its construction indicates a specific yield of 55 gpm. The North well was constructed to provide water to a commercial water bottling facility constructed adjacent to the tribal fire station, though the bottling facility never opened and the North well remains idle.

The Thing Valley well is located approximately one mile south of the north and south wells and is not equipped with a pump or power. The well has no cap, and is open to the atmosphere and needs to be secured to be in compliance with California State Well Standards (Bulletin 74-90).

Surface water bodies within the Thing Valley WPA watershed include the ephemeral La Posta Creek and its unnamed, ephemeral tributaries. La Posta Creek passes within approximately 400 feet to the west of the south well. There are no reservoirs or ponds within the watershed, and no springs have been mapped in the area.

2.7.2 Rough Acres Ranch WPA Hydrologic Inventory

While only two wells (Wells 6 and 6a) are located within the prescribed 502-acre watershed area, seven wells surrounding the project area were evaluated during this project. Of these, four are equipped with pumps and are actively used for municipal water supply or to provide water to livestock. The remaining three well are either equipped with pumps and are not currently used, or have not been equipped with pumps. Well construction, current estimated production, and static water levels are provided on the following table.

Well Name	Total Depth (ft)	Seal Depth (ft)	Production Rate (gpm)	Water Level – August 2010 (feet below top of casing)
Well No. 6a "North" Well	385	75	1	28.0
Well No. 6 "South" Well	Unknown	Unknown	1	27.80
Walker Residence Well	Unknown	Unknown	<0.5	54.78
Well No. 9 Livestock Supply Well	Unknown	Unknown	<0.5	29.45
Well No. 2	185	24	No Power	23.92
Well No. 4	185	91	No Pump	10.98
Well No. 8	970	50	Pump	17.95

Locations for these wells are shown on Figure 7. The locations and elevations of these wells are not surveyed; however, using approximate ground surface elevations to establish an approximate groundwater elevation, a hydraulic gradient of 0.01 feet per foot is estimated. The approximated groundwater elevations suggest convergent flow toward McCain Valley, with a general southeasterly flow within the valley.

Based on aquifer testing conducted as part of this investigation and well testing conducted during construction, Well No. 6 and No. 6a are capable of producing groundwater at 50 to 60 gpm. The well test conducted on well No. 6a after construction indicates a specific yield of 60 gpm. Currently these wells are principally used to supply water to grazing livestock, and are estimated to provide water at a rate of about 1500 gallons per day, or 1.05 gpm on average.

Well logs were not available for the Walker residence well, which provides potable water for a single-family residence. Using recommendations provided by the County Groundwater Geologist for a typical residential well, it is estimated that this well produces about one-half acre-foot per year, or about 0.5 gpm on average.

Well logs were also not available for the "Livestock" Well No. 9 located between the Walker residential well and Wells No. 6 and No. 6a. This well provides water for grazing livestock in troughs located throughout the ranch. It is estimated that this well produces water at a rate of about 500 gallons per day, or about one third of a gpm on average.

Well No. 2 is located approximately one mile northeast of Wells No. 6 and No. 6a. First groundwater was encountered at a depth of 70 feet below ground surface in "black and white rock" interpreted to be the La Posta tonalite. Well tests conducted during construction indicate a specific yield of 10 gpm over a three hour test period. Currently, the well is idle.

Well No. 4 is located approximately one mile north of Wells No. 6 and No. 6a. First groundwater was encountered at a depth of 35 feet in "decomposed granite". Well tests conducted during construction indicate a specific yield of 15 gpm over a one hour test period. There is no pump in this well.

Well No. 8 is located about 3 miles east of Wells No. 6 and No. 6a, just east of McCain Valley Road. First groundwater was encountered at a depth of 30 feet in "weathered granitic rock". A specific yield was not achieved during the post-construction well test, which pumped the well at 50 gpm for 8 hours and recorded 800 feet of drawdown.

In addition to the wells within the prescribed watershed and those used as observation wells during the aquifer testing conducted as part of this study, there are seven residences within three-quarters of a mile of the project site, and each has its own water supply well. It is estimated that each of the seven additional residences utilizes about one-half acre-foot of water per year, and one of the residences has a small poultry farm with an estimated 500 birds that utilizes an additional 0.11 acre-foot of water per year. In total, the additional water use in the vicinity of the site is estimated to be about 3.61 acre-feet per year, or about 2.25 gpm on average.

Surface water bodies within the Rough Acres Ranch WPA watershed include the ephemeral Tule Creek. Although the USGS topographic map of the area identifies a small reservoir near the northwestern portion of the watershed, that feature was not observed within the study area. Rough Acres Ranch discharges water from Wells No. 6 and No. 6a to a small livestock watering reservoir about 2000 feet north of these wells. The reservoir is not lined, and as a result, water infiltrates rapidly into the ground. A groundwater spring was observed on the canyon wall adjacent to Well No. 4. The estimated flow rate from the spring is less than 1 gpm. No other surface water bodies are present within the watershed or surrounding study area.

2.8 Water Quality

Because this water development project is intended to provide water for construction rather than for potable use, no water quality evaluation has been conducted.

3.0 WATER QUANTITY IMPACT ANALYSIS

Water quantity impact analyses were performed in accordance with the County of San Diego *Groundwater Ordinance*, the County's *Guidelines for Determining Significance and Report Format and Content Requirements – Groundwater Resources* and the approved Groundwater Investigation Workplan and Well Test Plan developed for the Tule Wind Project. Based on the County guidelines for determining significance and correspondence with the County, the water quantity analysis section must address well interference, and 50 percent reduction of groundwater in storage associated with groundwater extraction for construction. In addition, in accordance with the County's Groundwater Ordinance, because it is anticipated that groundwater extraction will exceed 20,000 gpd, which is considered a water intensive use, a cumulative groundwater evaluation is required.

This section provides an analysis of the groundwater conditions and a determination of significant impacts to the groundwater resources, based on CEQA guidelines. It should be noted however that the County does not have jurisdiction over water use on tribal lands, including the wells in Thing Valley on the Ewiiaapaayp Reservation. Aquifer testing on

the Reservation was performed to assess available water for the project construction and a summary of these results is included herein.

Because the Thing Valley WPA is located within the Ewiiaapaayp Reservation, there is no regional authority governing the use of this water. As a result, the water quantity impact analysis has been limited to performance of a 72-hour aquifer pumping test from the North Well at a rate of 80 gpm followed by measurements of recovery back to static conditions. Over the test, the water level was drawn down approximately 80 feet in the pumping well, and about 17 feet in the nearest observation well, and less than one quarter of a foot in the Thing Valley observation well about one mile downgradient of the pumping well. Analysis of the test data as presented in Appendix A.

Thing Valley Water Quantity Impact Analysis. Thing Valley test data were recorded by Solinst Levelogger Gold pressure transducer data loggers placed in the pumping well and two observation wells. The aquifer transmissivity (the capacity of the well to transmit water) was calculated by a variety of methods using AquiferTest Pro, Version 3.5, numerical modeling software (Röhrich and Waterloo Hydrogeologic, 2002) and ranges from about 100 to 835 ft^2/day depending on the data (early, middle, late portions of the test) obtained during pumping and recovery; the average transmissivity was calculated to be 393 ft^2/day. A summary of the calculated transmissivity values and additional calculated values from the pumping test are provided in Appendix A.

A plot of time versus drawdown was developed from the aquifer pumping test data. Based on the data, a projected total drawdown in the pumping well of 190 feet is expected. A negative boundary condition occurs after 1700 minutes (about 28 hours) and pumping of 136,000 gallons of water. During the intial 1700 minutes of the pumping test, the drawdown cone around the pumping well was likely pulling water from the portion of the fractured rock within Thing Valley. As the cone developed further, the cone is interpreted to have intercepted less fractured bedrock (most likely along the canyon walls) resulting in diminished production (the negative boundary effect).

Considering that the pump has been inoperable for some time prior to the aquifer pumping test, it may be beneficial to remove the pump and conduct an inspection of the well casing and pump for corrosion damage and encrustation to ensure that the well(s) are optimally operable for the duration of the construction program.

3.1 Guidelines for Determination of Significance

For groundwater extraction projects in this fractured rock basin such as the Tule Wind Project, the County Guidelines state:

> "groundwater impacts will be considered significant if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50 percent or less as a result of groundwater extraction. Groundwater impacts are considered significant if a soil moisture balance or equivalent analysis conducted using a minimum of 30 years of precipitation data,

> including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50 percent or less as a result of the project groundwater demands."

The Guidelines also state:

> "As an initial screening tool, offsite well interference will be considered a significant impact if after a five year projection of drawdown, the results indicate a decrease in water level of 20 feet or more in the offsite wells. If site-specific data indicates water bearing fractures exist which substantiate an interval of more than 400 feet between the static water level in each offsite well and the deepest major water bearing fracture in the well(s), a decrease in saturated thickness of 5% or more in the offsite wells would be considered a significant impact."

In addition, based on conversations with the County Groundwater Geologist, a basin-wide cumulative analysis is not required because the project's groundwater extraction period is limited to approximately 9 months. For purposes of the cumulative analysis, with the approval of the County Groundwater Geologist, the Rough Acres Ranch Water Production Area boundary has been defined as an area with a one-half mile radius surrounding the projected ranch groundwater extraction well No. 6a.

3.2 Methodology

In accordance with the approved well test plan for the Tule Wind Project, a step test followed by a 72-hour constant rate aquifer pumping test was conducted at Well No. 6a at the Rough Acres Ranch to evaluate hydraulic characteristics in this proposed construction supply well. Prior to initiating the pumping test, area residents were contacted to request their participation in the test. In order to participate, the resident was asked to discontinue pumping and allow measurement of changes in water levels in their supply well over the testing period. The following residents listed with their Assessor's Parcel Number (APN) were contacted:

Resident	APN	Response
Dave and Linda Shannon	611-091-14	No domestic water storage on site
Dennis and Celeste Wilson	611-091-15	No domestic water storage on site
York Heimerdinger	611-091-02	Has storage but refused the test
Jeff and Peggy Garber	611-090-15	Has storage but refused the test
Lynn Wilson	611-050-24	No domestic water storage on site
Wayne and Frankie Thibodeau	611-091-07	No return call

As presented in this table, none of the surrounding residents agreed to participate in the test. However, because the well pumping test was being performed on the Rough Acres Ranch, most of the available wells on the ranch were made available for monitoring. In addition, the Ranch Manager, Mr. Walker, made his residential supply well available for the duration of the test. A Solinst Levelogger Gold data logger was placed in each of the

available ranch wells prior to the long-term constant rate pumping test. These well locations are presented on Figure 7.

The 72-hour aquifer pumping test was conducted between August 24, and 27, 2010, followed by measurement of well recovery to static conditions. Direct water level measurements could not be performed in 4-inch diameter cased pumping well No. 6a, because of limited access through the well head, with only sufficient room to place the levelogger pressure transducer into the well to a depth of 114 feet below the water level for measurements of the water level in this well. Because of limited access through the wellhead at Well No. 6, located approximately 36 feet from the pumping well, water levels in this observation well were measured manually with an electric water level meter. Flow from the pumping well (at about 50 gpm) was measured with an in-line flow meter and water was discharged to a stock pond location approximately 2000 feet northeast of the pumping well. In addition, barometric pressure was measured with the Solinst Barologger Gold transducer, placed in the pumping well pump house adjacent to the pumping well. The pumping well static water level at the start of the test was about 28 feet below ground surface (bgs) and the pump depth was reportedly positioned at an estimated depth of 350 feet, though the pump depth could not be verified. During the pumping test, the maximum drawdown in the pumping well was 77.5 feet. In the nearest observation Well No. 6, the water level was drawn down a maximum of 3.7 feet. An estimated 216,000 gallons of water was pumped to the stock pond.

Results of the pumping and recover tests were plotted on semilog plots to evaluate the data. County Guidelines were reviewed and incorporated into the analysis. In addition, the long-term aquifer test data were analyzed using AquiferTest Pro, Version 3.5, numerical modeling software (Röhrich and Waterloo Hydrogeologic, 2002) to calculate aquifer hydraulic properties.

3.3 Well Test Results

As required by the County Guidelines, a plot of the pumping test time versus drawdown curve in the pumping well was used to estimate the drawdown in the pumping well after five years (2,600,000 minutes) of pumping at an average of 50 gpm as performed during the pumping test. From the graphed pumping data, the projected draw down is 87 feet after five years (Figure 3; Appendix B). Recognizing the project water requirements are needed over an estimated 9-month construction period, 84 feet of drawdown is predicted. In the event that during the construction, a higher pumping rate is needed, using proportions, doubling the pumping rate to 100 gpm would produce a drawdown of 174 feet after five years.

Using the plot of the drawdown plotted against time presented logarithmically since pumping started (Figure 3; Appendix B), aquifer transmissivity can be calculated using the Cooper-Jacobs approximation to the Theis equation:

$$T = 2.3Q / 4\pi\Delta s$$

where,

T = transmissivity in square feet per day
Q = average pumping rate in ft^3 / day (e.g., 50 gpm multiplied by 193 = 9650 ft^3 / day)
π = 3.14
Δs = change in drawdown over one logarithm of time (3.13 ft. from Appendix B, Figure 3)

Based on this equation, a transmissivity of 563 square feet per day is calculated from the pumping data. Using Aquifer Test Pro numerical modeling software, curve matching methods were used on the time versus drawdown plots to calculate transmissivity, hydraulic conductivity, and storativity by different methods. The transmissivity values obtained from the pumping well ranged from between 26.9 and 630 square feet per day. The analytical results show higher transmissivity (and hydraulic conductivity values) for curves matched to the observation well No. 6 and range from 0.375 to 3750 square feet per day. It is believed that the relatively thick alluvial section in this area of McCain Valley acts as a reservoir recharging the underlying fractured bedrock system. If the fractures in the bedrock are limited, the actual volume of groundwater available may be controlled by these thicker sections of alluvium and the more highly fractured bedrock. A summary of the calculated hydraulic properties from the aquifer tests, are presented in Table 1 included in Appendix B.

The recovery data were evaluated to assess long-term affects on the groundwater aquifer. The plot of residual drawdown versus t/t' (the ratio of time to time since pumping stopped) plotted on a logarithmic scale was used to evaluate aquifer storage. At t/t' equal to 1, a residual drawdown would indicate permanent dewatering of the aquifer and greater than 2 feet of residual drawdown would indicate a failed pumping test. As shown on Figure 4 in Appendix B, when the resultant recovery curve is projected back to t/t' equals 1, a residual drawdown of 0.33 feet is obtained indicating a successful test.

Based on the lack of significant drawdown (3.7 feet) in the nearest observation well 36 feet away, and no evidence of an effect in more distal observation wells suggests that the there is significant water within this water production area. Interference with the nearest off-site wells approximately one half mile from the pumping well are not anticipated from the level of pumping proposed during project construction.

3.4 Cumulative Impacts Analysis

Because the project water needs exceed 20,000 gallons of water per day, a cumulative basin analysis is required. To address these cumulative requires, GLA worked directly with the County's Groundwater Geologist, Mr. Jim Bennett, to develop a reasonable approach. Because the McCain Valley is an extensive groundwater basin and pumping is proposed from a limited area of the basin, it was agreed that the cumulative analysis would be limited to a ½ mile radius about the pumping Well No. 6A. The cumulative analysis was performed using spreadsheets and calculations initially developed by Mr. Bennett.

Initially, project groundwater extraction at 50 gpm (72,000 gpd) and area residential and operational water demands were evaluated against monthly groundwater recharge during a drought condition to determine if project extraction will exceed 50 percent of the total storage capacity within an effective area of McCain Valley defined as approximately within one half mile of the proposed pumping Well No. 6a. A second analysis was performed with double the pumping (100 gpm) to further evaluate increased water utilization at this well. Using drought year precipitation data from the Boulevard gauging station (July 1998 through June 2005), when groundwater recharge is minimal and water is extracted from storage, a conservative assessment of possible groundwater impacts was developed.

3.4.1 Groundwater Recharge

In the spreadsheet, groundwater recharge was estimated from available precipitation data for the Boulevard gauging station over a seven year drought period from July 1998 through June 2005, provided by the County Groundwater Geologist. The recharge area was considered to be an area encompassing the ½-mile radius surrounding the pumping well, equivalent to 502 acres. The groundwater recharge also accounts for evapotranspiration based on an average of 62.5 inches per month as established by California Reference CIMIS ETo map, Zone 16.

3.4.2 Groundwater Demand

For the groundwater demand, the project water needs were incorporated with standard assumptions of water needs for other known potential groundwater users including residents, livestock, and other users identified within approximately ½ of the pumping well. To be conservative some land uses within ¾ mile of the pumping well were included into the overall area groundwater demand calculations. The groundwater demand calculation assumed that there were seven residents using 0.5 acre feet of water per year in accordance with County Guidelines. From literature (The Ohio State University Extension, 2002), an estimated 100 head of cattle graze on the Rough Acres Ranch, would require an estimated daily intake of 19 gallons per animal per day (the maximum estimated daily water intake required for a bull in 90 degree temperatures), equivalent to 2.13 acre feet of water. It should be noted that slightly lower water consumption values (up to 15 gallons per day) are estimated for various classes of horses that may also be grazing on the Ranch lands. A poultry farm, estimated to include 500 poultry, is located to the south of Rough Acres Ranch and based on available literature from Pennsylvania State University (2002), a conservative estimate of 100 gallons per day or 0.11 acre feet of water consumption each year is assumed to support these animals.

These water quantities in combination with the estimated 9-month construction schedule of water demand from the pumping well on Rough Acres Ranch of 50 gpm resulted in an overall groundwater demand of 7.18 acre-feet per month, or 65.74 acre-feet per year. The groundwater demand would increase to 13.88 acre-feet per month and 125.74 acre-feet per year with a corresponding doubling of the production from the pumping well to 100 gpm.

3.4.3 Groundwater in Storage

The groundwater storage capacity was calculated using conservative estimated of the saturated thickness of each of the hydrogeologic units underlying the water production area as observed in boring logs within the McCain Valley. For this analysis, it is assumed that the saturated thicknesses include 20 feet of alluvium, 10 feet of residuum, and 500 feet of fractured bedrock. Assuming that these materials are continuous over the 502 acre water production area, conservative estimates of the specific yield for each unit was obtained from the County. As summarized in Table 1 in Appendix C, the greatest specific yield is associated with the alluvium at 10%, the specific yield for the residuum is 5%, and because the fractured bedrock yields water only within the fractures, the specific yield for this unit is 0.10%.

By multiplying the 502 acres by the specific yield and by the saturated thickness for each hydrogeologic unit, the total groundwater in storage within the ½-mile water production area is 1002 acre feet of water.

3.4.4 Long-Term Groundwater Availability

Based on the proposed 9-month construction period and the project groundwater demand along with adjacent water users, subtracted from the existing groundwater in storage, in combination with the anticipated groundwater recharge generated over a seven year drought cycle, there will be no long-term groundwater requirements in support of the project. As shown on Table 2 in Appendix C, the maximum drawdown within the subject area is about 66 acre-feet, well above the 50% basin depletion level of 500 acre-feet. Even if project pumping were to be increased to 100 gpm, a maximum of 136 acre-feet of drawdown is calculated within the basin (Table 3; Appendix C). In fact, until pumping is increased by eight times to 54 acre-feet per month or nearly 486 acre-feet per year would the basin approach the 50% depletion level of 500 acre-feet (Table 4; Appendix C).

Based on these analyses, the long-term result of pumping at 50 gpm reduces the groundwater in storage to 94% and a maximum reduction to 92% of the total groundwater in storage during the 7-year drought period. Under an increased (100 gpm) pumping scenario, the groundwater in storage is reduced to 86% of the total with an average of 89%.

Following the project construction phase, the estimated water demand for the project site is estimated to be 2500 gallons per business day or about 2 acre-feet per year, associated with the operations and maintenance facility for the wind turbines. Based on the calculations of groundwater availability this level of use would have no significant impact on the groundwater in storage within McCain Valley.

3.5 Significance of Impacts Prior to Mitigation

Based on the results of the aquifer pumping test at the Rough Acres Ranch well No. 6a, the criteria for well interference and 50% depletion of groundwater in storage associated

with the proposed project will not be met. No significant impacts to groundwater are anticipated associated with the project.

3.6 Mitigation Measures and Design Considerations

Based on the lack of significant impacts to groundwater associated with the proposed project, no groundwater mitigation measures are proposed for the project.

3.7 Conclusions

Based upon the analyses performed, well interference is not anticipated to be a significant impact for the Tule Wind Farm construction project. During the pumping test, a maximum of 3.7 feet of drawdown was observed in the nearest observation well 36 feet away from the pumping well. No observed drawdown was identified in wells located within one third and one half mile of the pumping well.

The potential for depletion of groundwater in storage within the McCain Valley is not anticipated. Results of the groundwater demand during a drought period indicate that eight times the anticipated groundwater pumping would be required to drawn groundwater to the 50% depletion level.

4.0 SUMMARY OF PROJECT IMPACTS AND MITIGATION

Based on the results of pumping tests and analysis of the data, there is sufficient groundwater to meet the project demands. Review of cumulative analyses performed within a ½ mile radial area of McCain Valley about the aquifer pumping test well indicates based on the available groundwater storage within McCain Valley, it is possible to increase pumping at the Rough Acres Ranch aquifer test well significantly without well interference or significant groundwater depletion.

Although there are no requirements for analysis of groundwater use on tribal lands, the aquifer pumping test and analyses indicate that there is sufficient storage for use of groundwater within Thing Valley and no significant impacts to groundwater storage are anticipated. However, the pumping test data and the noted boundary condition identified during the test after 1700 minutes suggests that to support the project water needs, it may be necessary to pump at a lesser rate or lesser frequency at the aquifer pumping test well, and supplement the water from this well with water from another well within Thing Valley such as the observation well. In addition, because the well has been inoperable for some time, it is recommended that this well and pump be inspected and rehabilitated as necessary to ensure that the well operates optimally for the duration of the construction project.

5.0 CLOSURE

This report was prepared in general accordance with acceptable professional geotechnical and hydrogeologic principles and practices. This report makes no other warranties, either expressed or implied as to the professional advice or information included herein. Although the groundwater investigation performed included constant rate pumping over a 72-hour period, it is not possible to fully anticipate an aquifer's behavior over the proposed 9-month construction period. It is understood that the project intends to obtain will serve letters to purchase water from off-site vendors if it is needed. The use of off-site water suppliers is recommended in the event that groundwater supplies are not fully supportive of the project. Our firm should be notified of any pertinent change in the project, or if conditions are found to differ from those described herein, because this may require a reevaluation of the conclusions. This report has not been prepared for use by parties or projects other than those named or described herein. It may not contain sufficient information for other parties or purposes.

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7.0 LIST OF PREPARERS AND PERSONS AND ORGANIZATIONS CONTACTED

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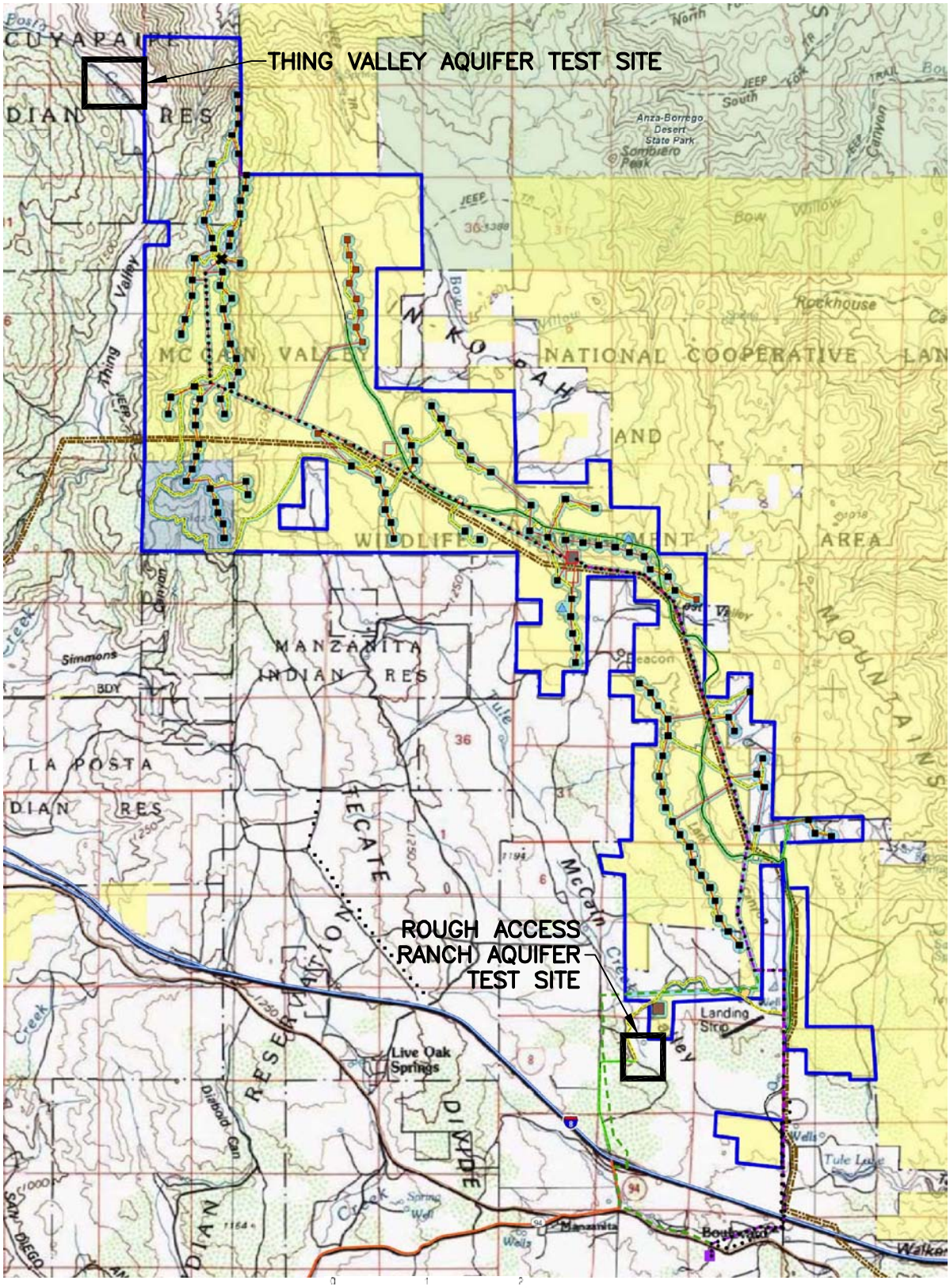
Mr. Robert Walker
Rough Acres Ranch Manager

Desi Vela
Field Technician, Ewiiaapaayp Band of Kumeyaay Indian

FIGURES



Legend

- Proposed Turbine
- Alternate Turbine
- Proposed Met Tower
- Proposed Junction Box
- Proposed Overhead Structure
- Preferred 138-kV Transmission Line
- Alternate 138-kV Transmission Line
- Proposed Underground 34.5-kV Line
- Proposed Overhead 34.5-kV Line
- Existing Road - Improvements Needed
- Proposed New Access Road
- Freeway
- Highway
- Major Road
- McCain Valley Road
- Proposed 10-acre Parking Area
- Proposed 2-acre Lay Down Area
- Proposed Batch Plant
- Preferred O&M and Substation
- Alternate O&M and Substation
- Existing Substation
- Proposed Sunrise Powerlink Transmission ROW
- Development Corridor
- Project Area
- CA State Lands Commission
- BLM Land

REFERENCE:
IBERDROLA RENEWABLES, 2009

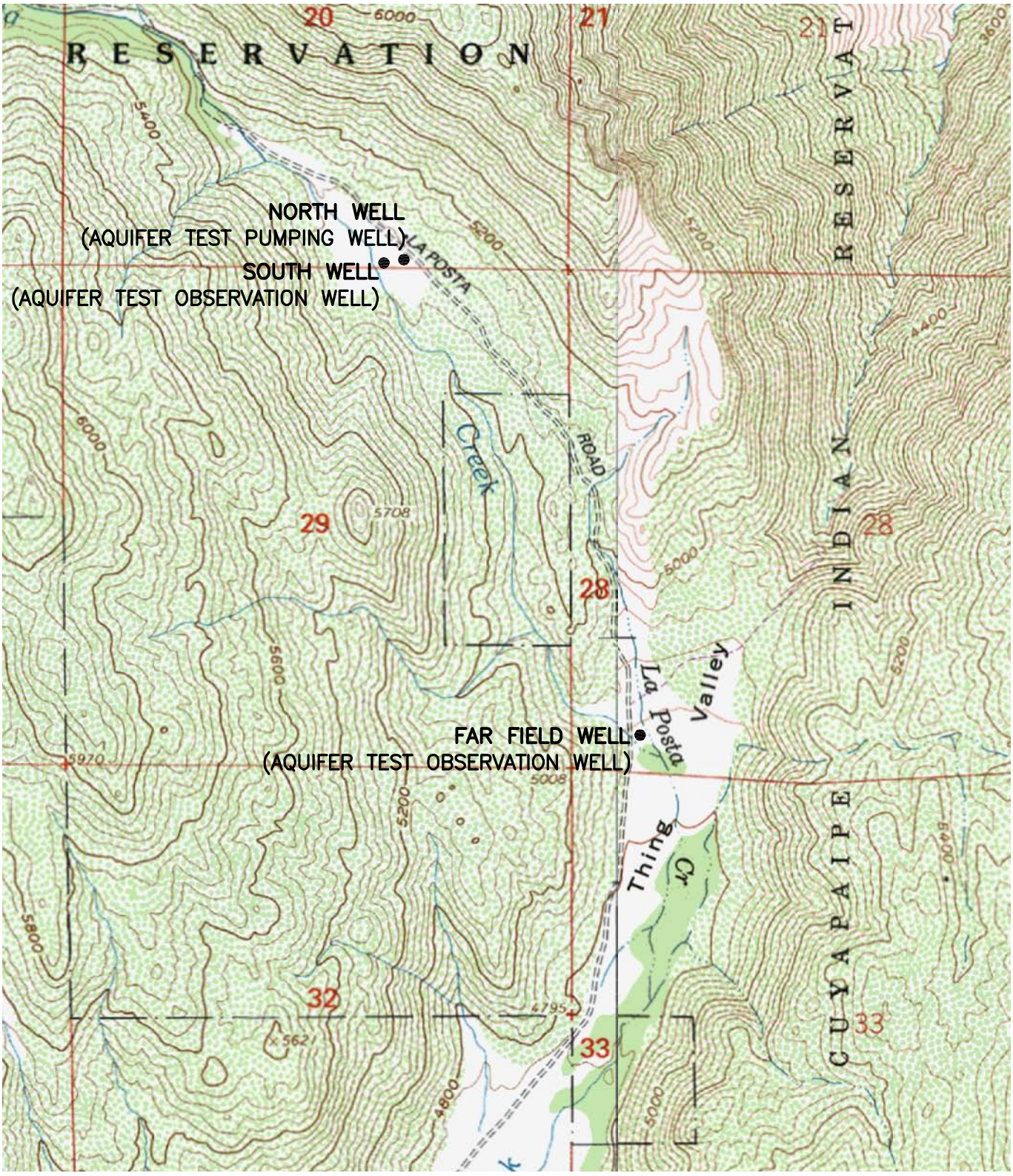
FIGURE 1

PROJECT LOCATION MAP

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005



GRAPHIC SCALE
750 0 375 750 1500
(in feet)
1 inch = 1500 ft.

N

REFERENCE: 7.5 MINUTE SERIES (TOPOGRAPHIC) MOUNT LAGUNA (1997) AND SOMBRERO PEAK (1975) CALIFORNIA QUADRANGLES

FIGURE 2A

WELL LOCATION MAP
THING VALLEY AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005

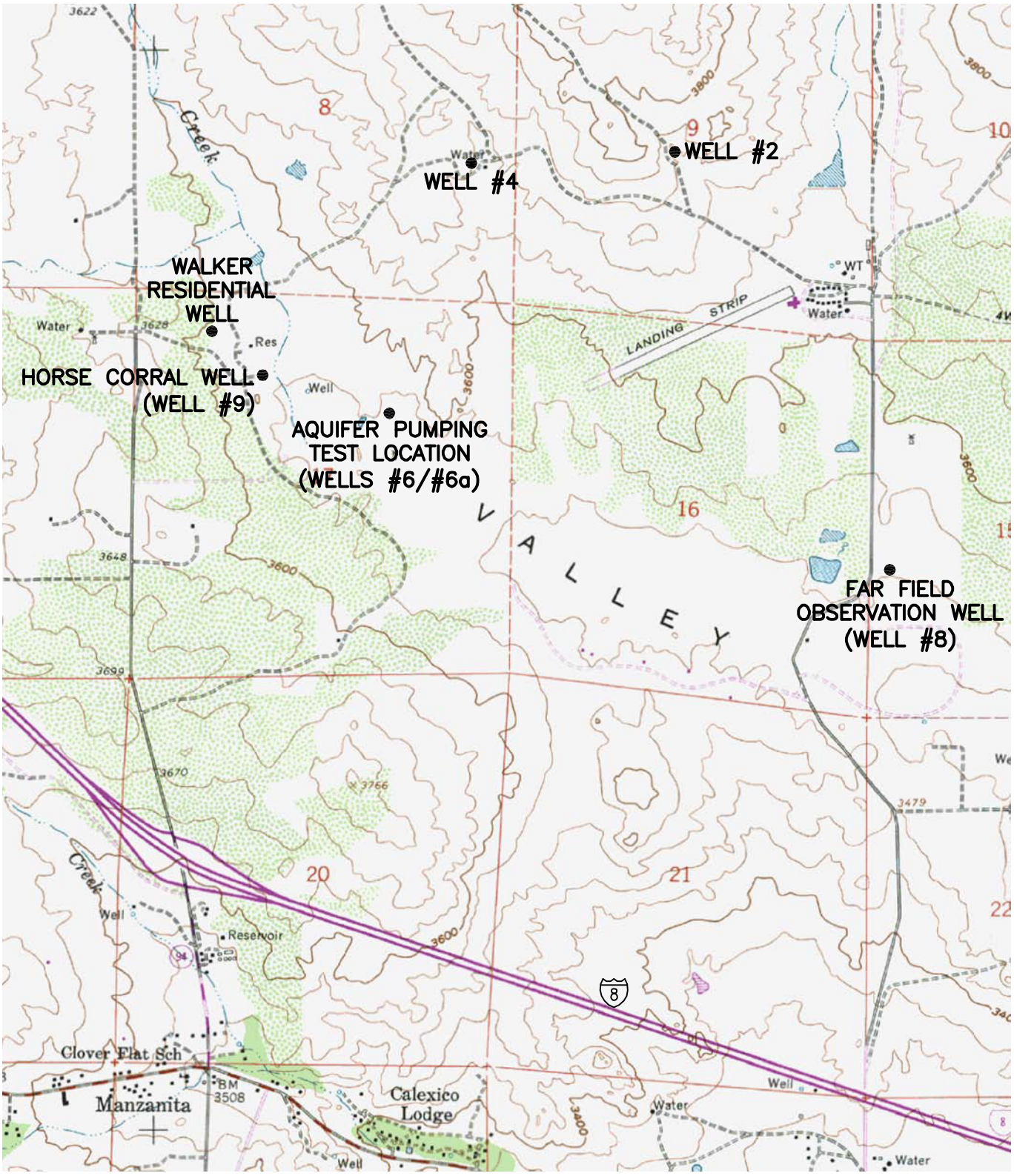


FIGURE 2B

GRAPHIC SCALE
1000 0 500 1000 2000
(in feet)
1 inch = 2000 ft.

N

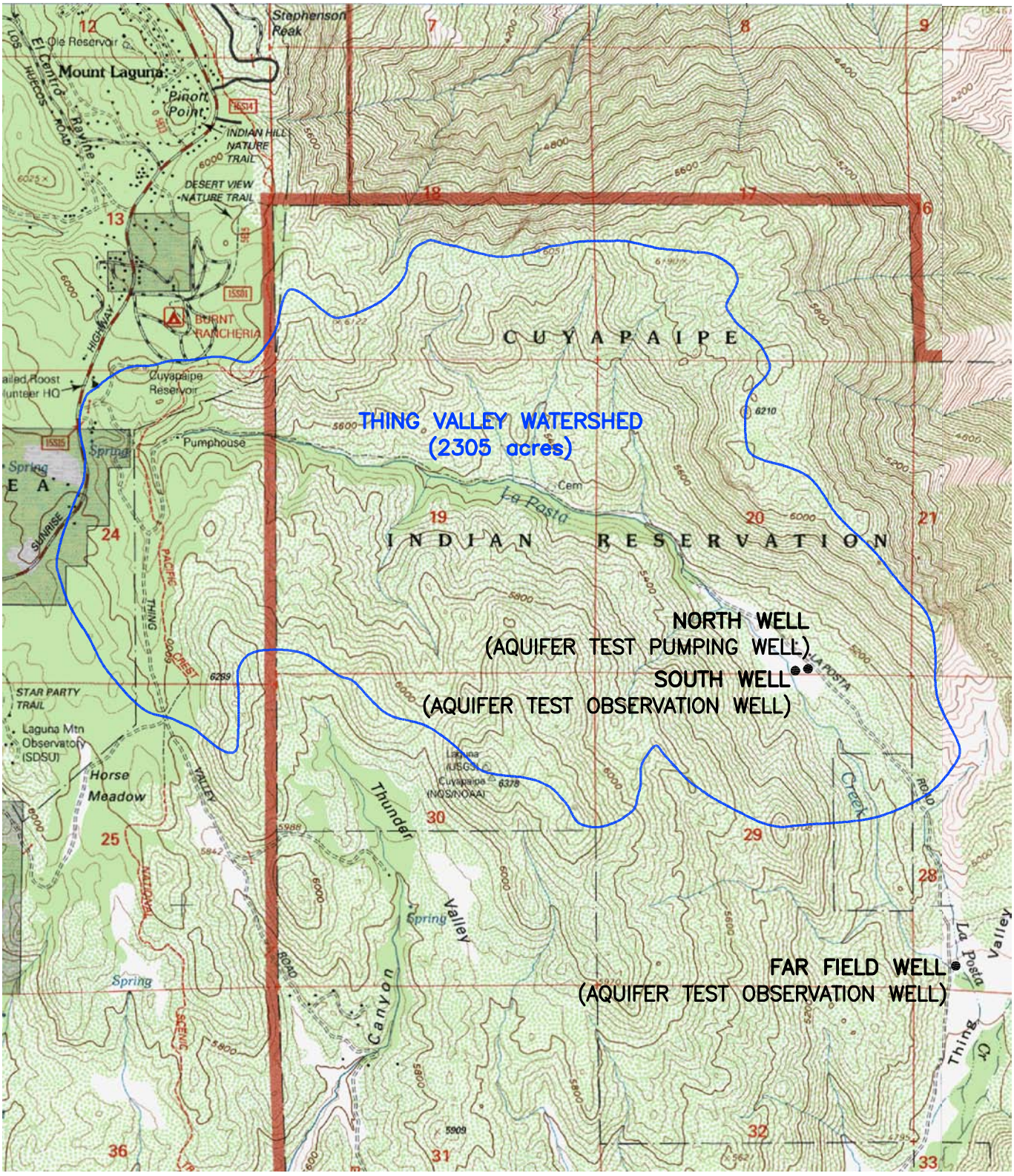
REFERENCE: 7.5 MINUTE SERIES (TOPOGRAPHIC) LIVE OAK SPRINGS (1975) CALIFORNIA QUADRANGLE

WELL LOCATION MAP
ROUGH ACRES RANCH AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005



GRAPHIC SCALE
1200 0 600 1200 2400
(in feet)
1 inch = 2400 ft.

N

REFERENCE: 7.5 MINUTE SERIES (TOPOGRAPHIC) MOUNT LAGUNA (1997) AND SOMBRERO PEAK (1975) CALIFORNIA QUADRANGLES

FIGURE 3A

WATERSHED MAP
THING VALLEY AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005

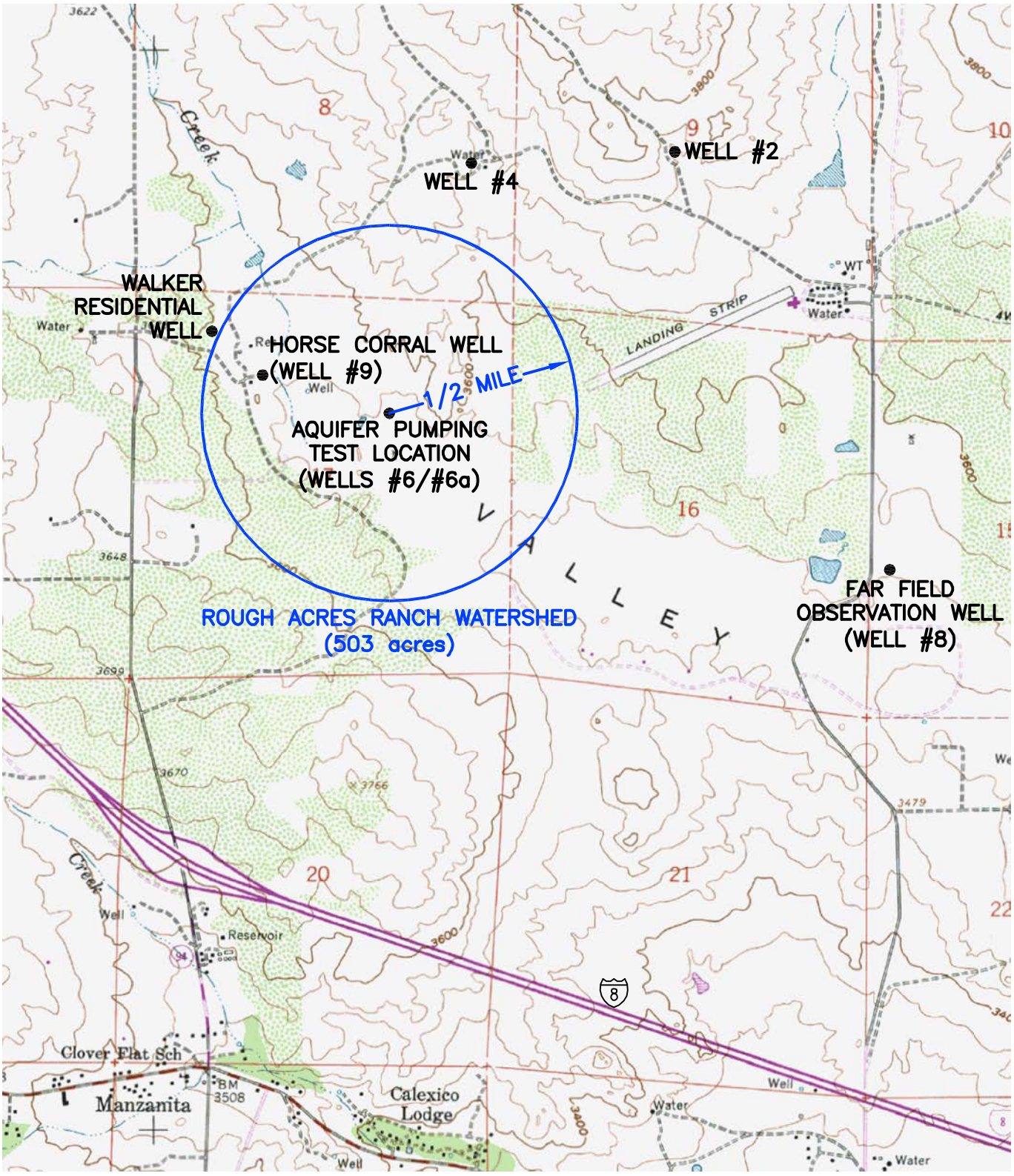


FIGURE 3B

GRAPHIC SCALE
1000 0 500 1000 2000
(in feet)
1 inch = 2000 ft.

N

REFERENCE: 7.5 MINUTE SERIES (TOPOGRAPHIC) LIVE OAK SPRINGS (1975) CALIFORNIA QUADRANGLE

WATERSHED MAP
ROUGH ACRES RANCH AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005

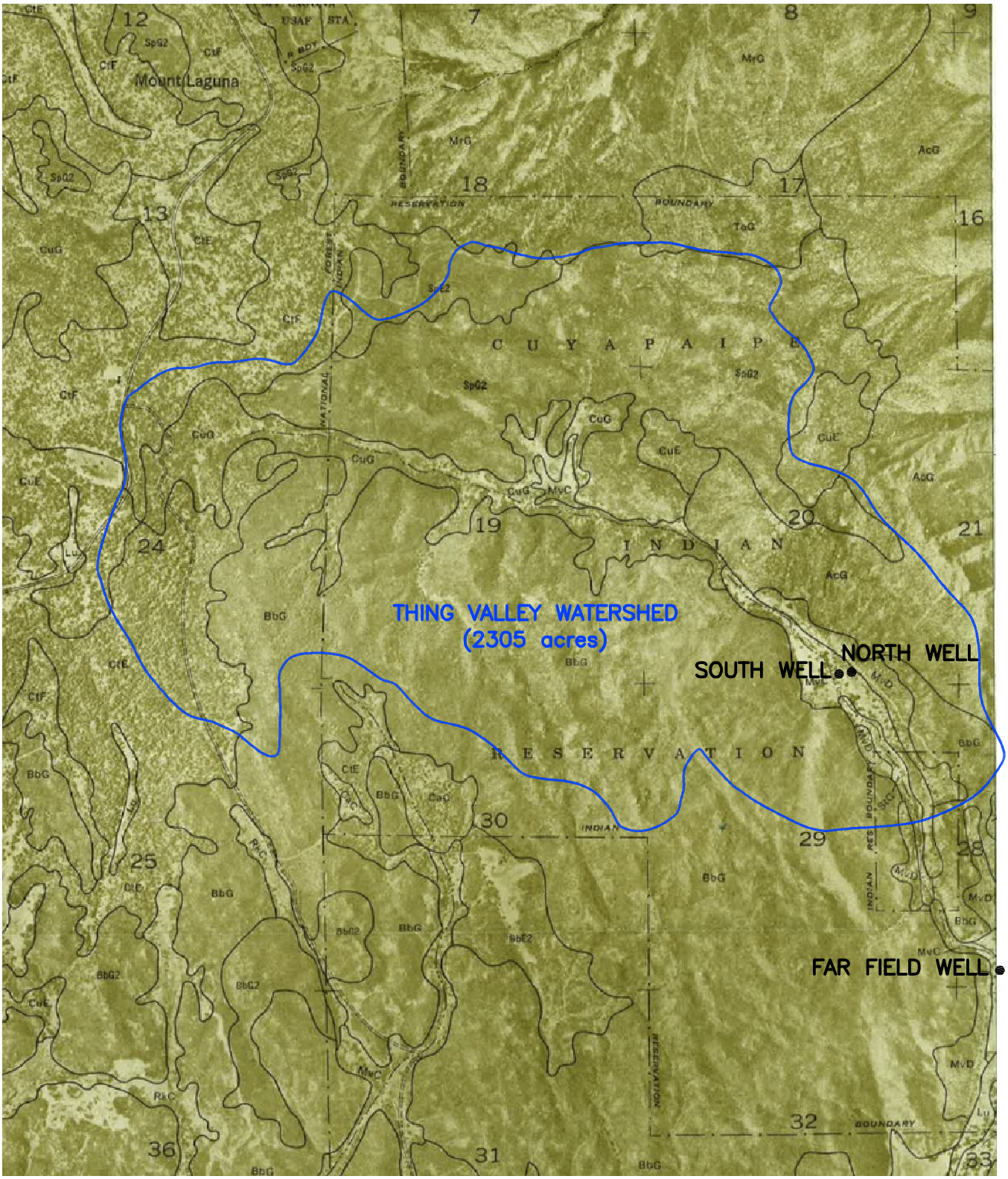


FIGURE 4A

GRAPHIC SCALE
1200 0 600 1200 2400
(in feet)
1 inch = 2400 ft.

N

REFERENCE: SOIL SURVEY, SAN DIEGO AREA SOIL CONSERVATION SERVICE, 1973 (SEE TEXT SECTION 2.5 FOR EXPLANATION)

SOILS MAP
THING VALLEY AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005

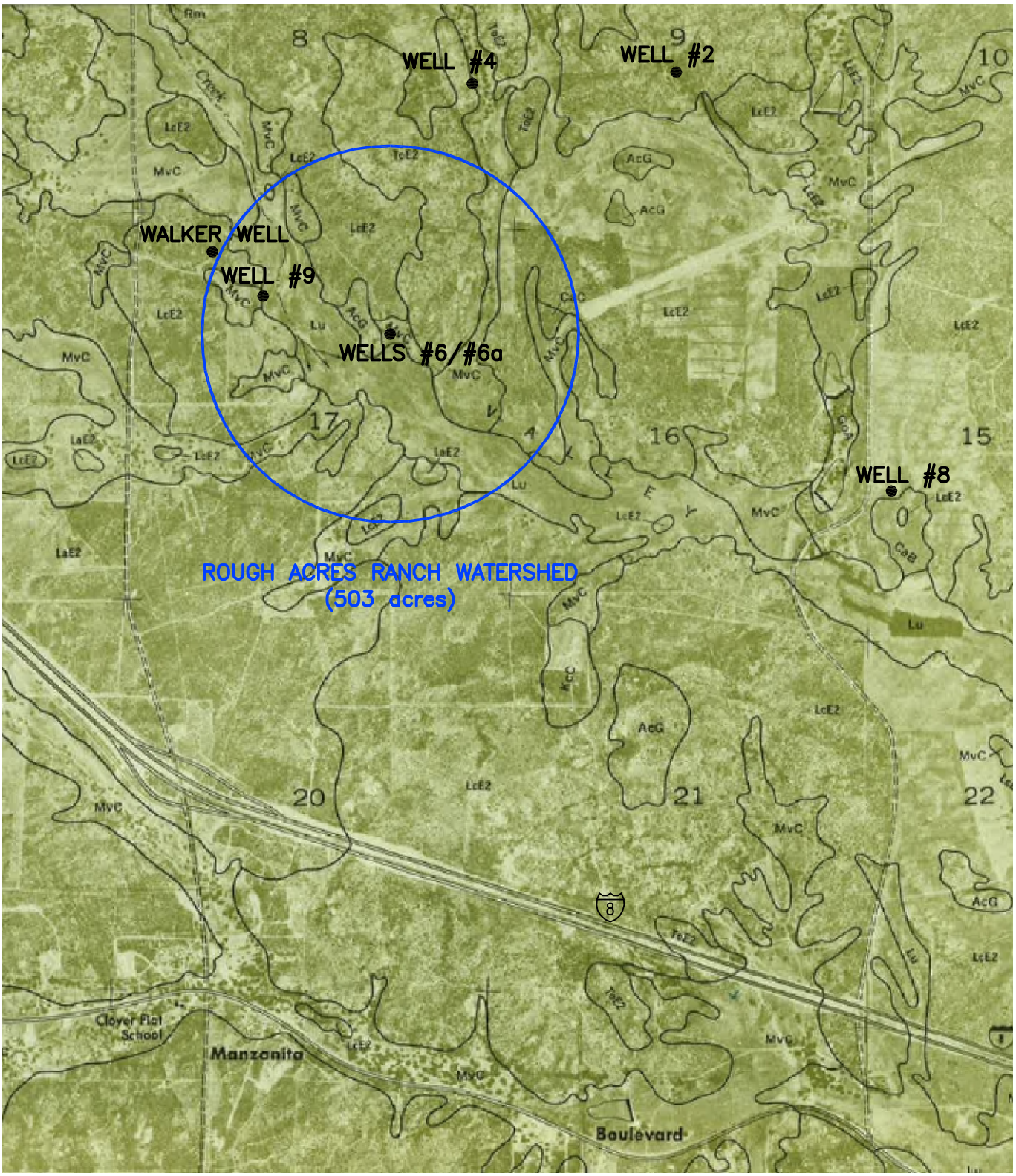


FIGURE 4B

GRAPHIC SCALE
1000 0 500 1000 2000
(in feet)
1 inch = 2000 ft.

N

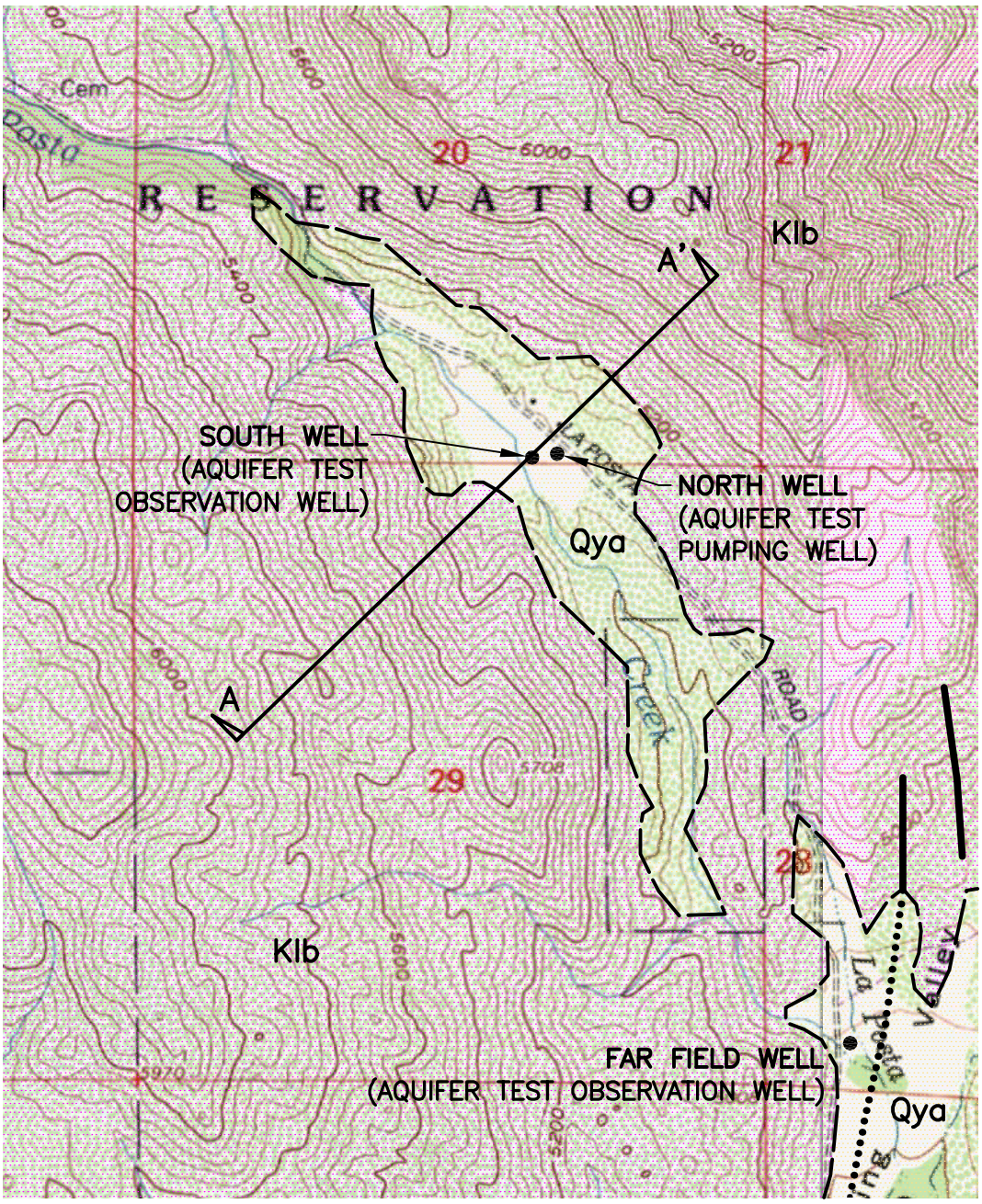
REFERENCE: SOIL SURVEY, SAN DIEGO AREA SOIL CONSERVATION SERVICE, 1973 (SEE TEXT SECTION 2.5 FOR EXPLANATION)

SOILS MAP
ROUGH ACRES RANCH AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005



EXPLANATION:

Qya	YOUNG ALLUVIUM (HOLOCENE)
Klb	TONALITE OF LAS BANCAS (EARLY CRETACEOUS)
— — — —	APPROXIMATE GEOLOGIC CONTACT
——•••••—	FAULT, DOTTED WHERE CONCEALED
A A'	CROSS-SECTION LOCATION

GRAPHIC SCALE

750 0 375 750 1500

(in feet)

1 inch = 1500 ft.

FIGURE 5

GEOLOGIC MAP
THING VALLEY AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

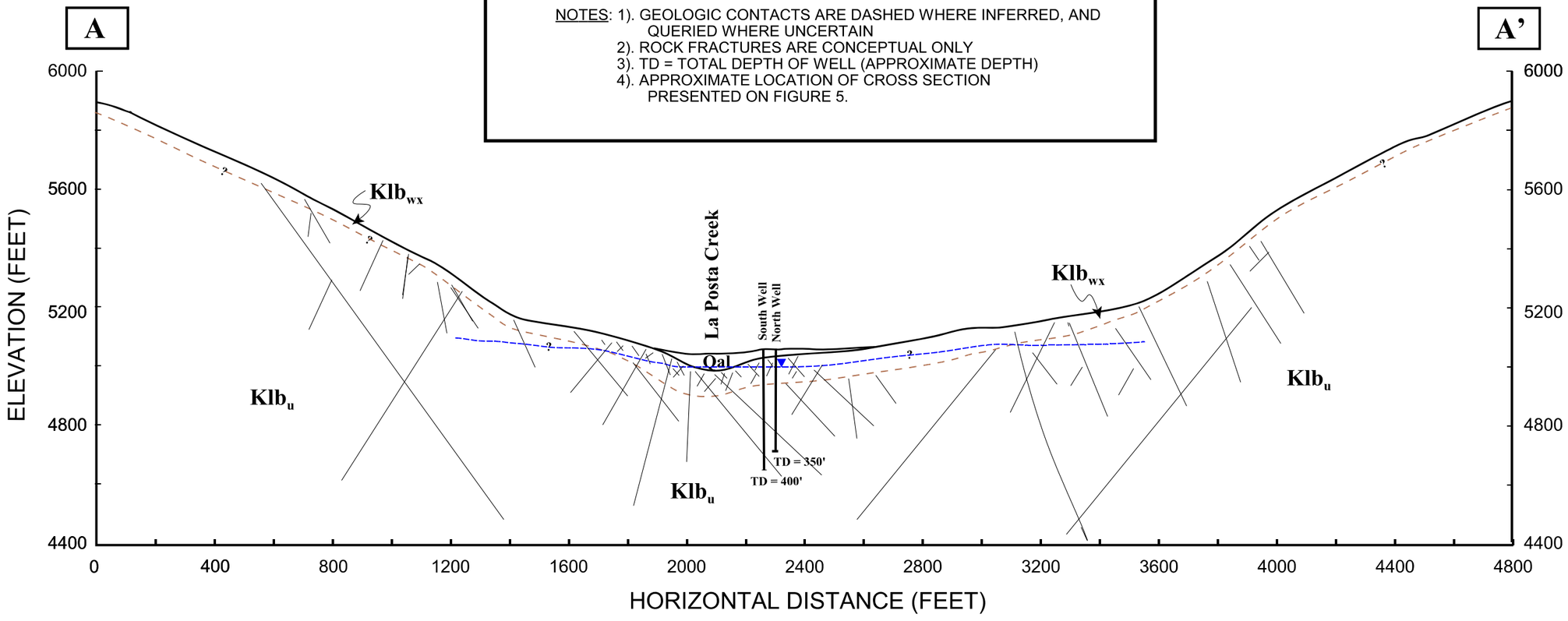
DRAWN BY:	DATE:	JOB NO.
VL	NOVEMBER 2010	2010-005

REFERENCE: PRELIMINARY GEOLOGIC MAP OF EL CAJON 30' x 60' QUADRANGLE, SOUTHERN CALIFORNIA, V. R. TODD, 2004

LEGEND

Qal	RECENT ALLUVIUM
Klb_{wx}	LOS BANCOS TONALITE, WEATHERED
Klb_{u}	LOS BANCOS TONALITE, UNWEATHERED
	APPROXIMATE GROUNDWATER TABLE
	ROCK FRACTURES

NOTES: 1). GEOLOGIC CONTACTS ARE DASHED WHERE INFERRED, AND QUERIED WHERE UNCERTAIN
2). ROCK FRACTURES ARE CONCEPTUAL ONLY
3). TD = TOTAL DEPTH OF WELL (APPROXIMATE DEPTH)
4). APPROXIMATE LOCATION OF CROSS SECTION PRESENTED ON FIGURE 5.



NORTH 45° EAST

HORIZONTAL SCALE: 1 INCH = 400 FEET
VERTICAL SCALE: 1 INCH = 400 FEET
(11 X 17 INCH FORMAT ONLY)

FIGURE 6

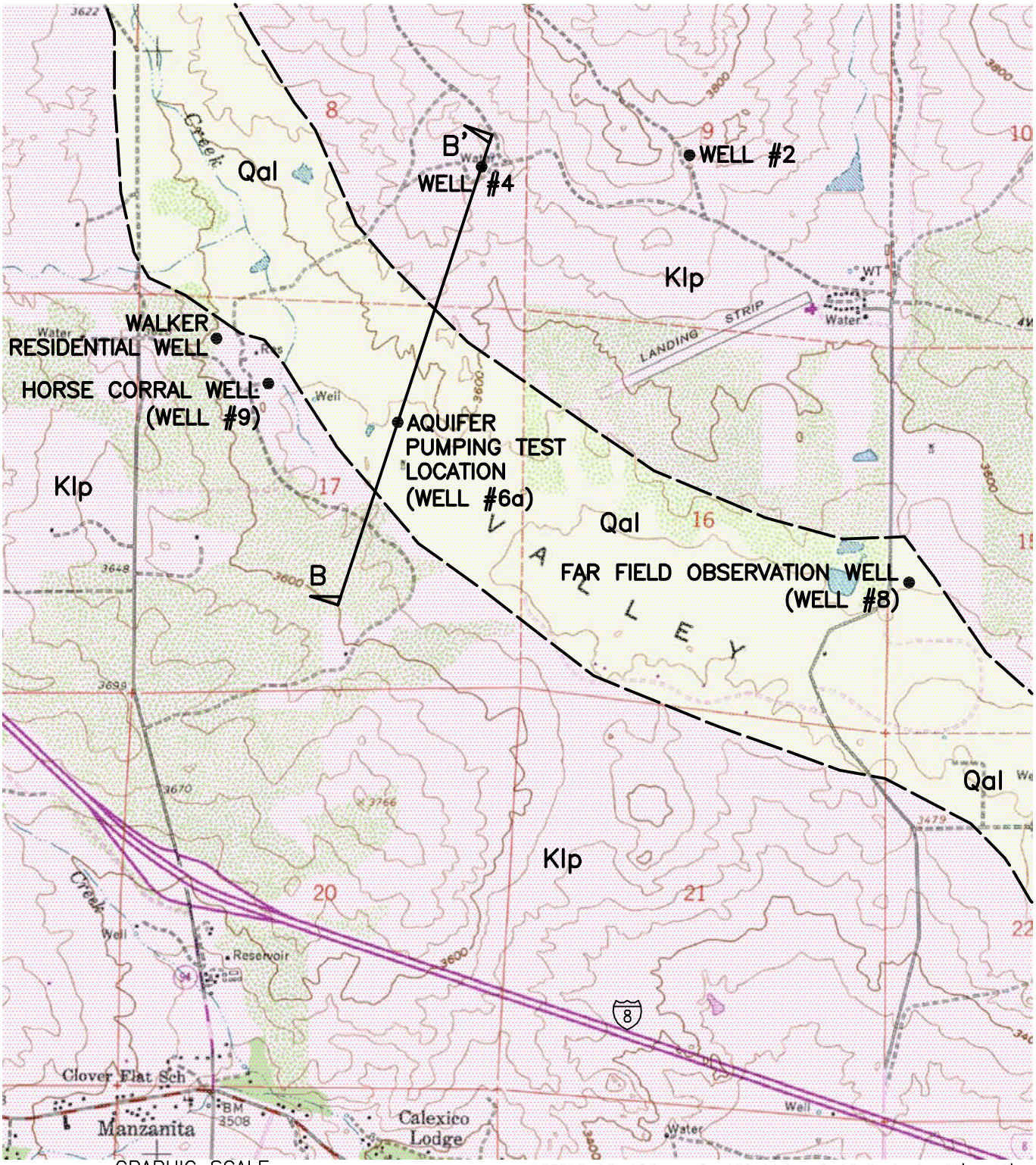
CONCEPTUAL HYDROGEOLOGIC CROSS SECTION

THING VALLEY STUDY AREA
SAN DIEGO COUNTY, CALIFORNIA

Geo-Logic ASSOCIATES

Draft	Date	Project No.
JGF	OCT 2010	2010-0005

References: USGS, 1997, 7.5' Mount Laguna and USGS, 1975, 7.5' Sombrero Peak, CA Quadrangles.



GRAPHIC SCALE

1000 0 500 1000 2000

(in feet)

1 inch = 2000 ft.

N

REFERENCE: PRELIMINARY GEOLOGIC MAP OF EL CAJON 30' x 60' QUADRANGLE, SOUTHERN CALIFORNIA, V. R. TODD, 2004

FIGURE 7

EXPLANATION:

Qal	ALLUVIUM
Klp	TONALITE OF LA POSTA (EARLY AND LATE CRETACEOUS)
	APPROXIMATE GEOLOGIC CONTACT
B B'	CROSS-SECTION LOCATION

GEOLOGIC MAP
ROUGH ACRES RANCH AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

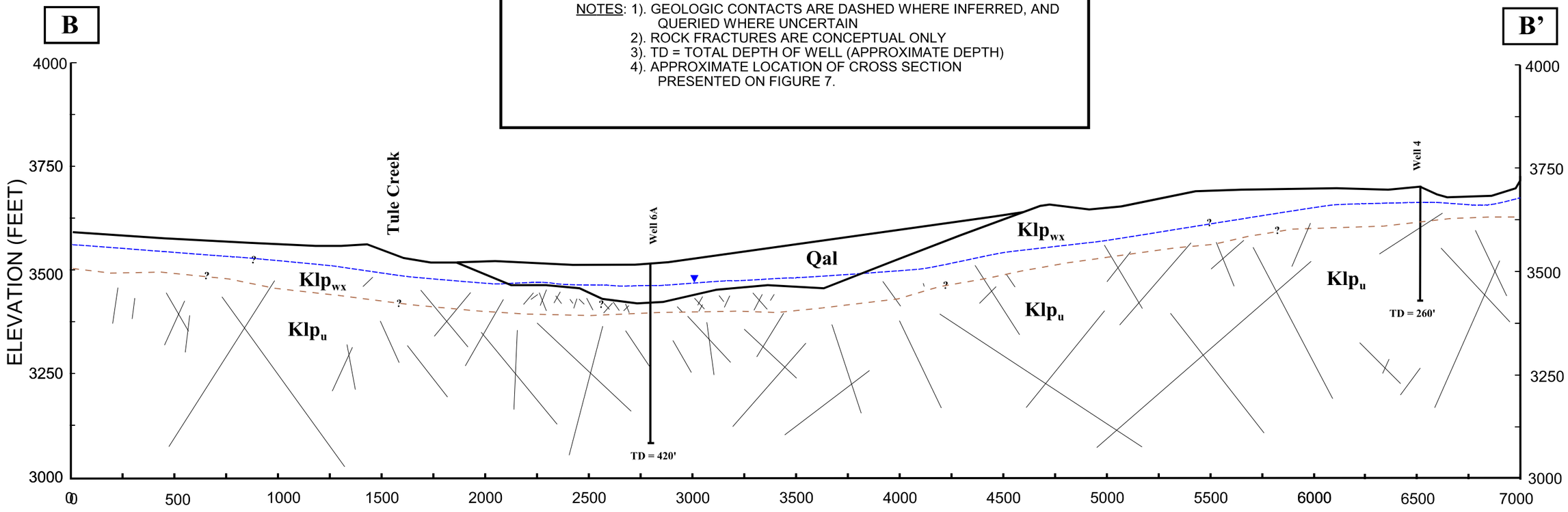
Geo-Logic ASSOCIATES

DRAWN BY:	DATE:	JOB NO.
VL	NOVEMBER 2010	2010-005

LEGEND

Qal	RECENT ALLUVIUM
Klp_{wx}	LA POSTA TONALITE, WEATHERED
Klb_{u}	LA POSTA TONALITE, UNWEATHERED
	APPROXIMATE GROUNDWATER TABLE
	ROCK FRACTURES (SCHEMATIC ONLY)

NOTES: 1). GEOLOGIC CONTACTS ARE DASHED WHERE INFERRED, AND QUERIED WHERE UNCERTAIN
2). ROCK FRACTURES ARE CONCEPTUAL ONLY
3). TD = TOTAL DEPTH OF WELL (APPROXIMATE DEPTH)
4). APPROXIMATE LOCATION OF CROSS SECTION PRESENTED ON FIGURE 7.



NORTH 18° EAST

HORIZONTAL SCALE: 1 INCH = 500 FEET
VERTICAL SCALE: 1 INCH = 250 FEET
2x VERTICAL EXAGGERATION
(11 X 17 INCH FORMAT ONLY)

References: USGS, 1975, 7.5' Live Oak Springs, CA Quadrangle.

FIGURE 8

CONCEPTUAL HYDROGEOLOGIC CROSS SECTION

ROUGH ACRES STUDY AREA
SAN DIEGO COUNTY, CALIFORNIA

Geo-Logic ASSOCIATES

Draft	Date	Project No.
JGF	OCT 2010	2010-0005

APPENDIX A

OBSERVATIONS AND ANALYSIS OF AQUIFER CHARACERISTICS

EWIIAAPAAYP RESERVATION

THING VALLEY, EAST SAN DIEGO COUNTY, CALIFORNIA

Geo-Logic
ASSOCIATES
Geologists, Hydrogeologists and Engineers

Date: November 8, 2010
Project No.: 2010-0005

To: John Hower, CEG
Sarah Battelle, CHG

From: Mark Vincent, CHG

Regarding: **Observations and Analyses of Aquifer Characteristics**
Thing Valley, San Diego County, California

INTRODUCTION

This memo presents a summary of observations and analyses made following a stepped and a constant rate aquifer pumping and recovery test in wells located in Thing Valley located approximately 10 miles north of I-8 off La Posta Truck Trail/Thing Valley Road in the Ewiiaapaayp Reservation, in eastern San Diego County, California. The tests were performed to determine whether sufficient volumes of water are available for the Tule Wind Farm construction projects. Analyses performed included calculation of transmissivity, hydraulic conductivity, and storativity for a pumping well and observation wells.

WELL AND AQUIFER CONDITIONS

A well labeled as South Well was used as the pumping well for this test. Another well labeled as North Well is located 61.5 feet to the west of the pumping well and was monitored and analyzed as an observation well. A third well identified as Thing Valley Well is located approximately 5,517 feet south-southeast of the pumping well and was also used as an observation well (Figure 1).

Records for drilling and construction of the wells used for these pumping tests are incomplete or nonexistent. A well identified on Department of Water Resources (DWR) records as the "Cuyapaipe Community Well" (identified as Form No. 058539) is believed to be the log for South Well. No records are available for North Well or Thing Valley Well.

Although DWR records indicate that slotted well casing was installed to a depth of 122 feet, they do not indicate whether or not casing exists below that depth or if the casing was installed prior to drilling the well to a total depth of 400 feet. The North and South Wells used in this pumping test have existing electric submersible pumps installed in them. Based on the production rates achieved during the tests performed, the wells are likely to be outfitted with four-inch diameter electric submersible pumps. Based on the depth and pressure head on the transducers installed in the wells for the test, it was assumed that all of the boreholes are 400 feet deep and are 10-inches in diameter. It was

further assumed that the wells were constructed with 6-inch diameter well casing and that they are perforated or screened over the entire saturated thickness. Details of well construction could not be verified in the field because of the presence of pumps, discharge pipes, electrical wires, and surface sanitary seals.

The area immediately around North Well and South Well is underlain by alluvium comprised of poorly sorted sand, gravel, and silt derived from the crystalline basement rock exposed on the adjacent canyon sidewalls. The crystalline basement rocks are classified as tonalite and yield groundwater from fractures. The well log reportedly recorded for South Well indicates that there are about 12 to 15 feet of alluvium overlying the tonalite. An alternative interpretation of the log is that some of the materials described in the log to a depth of 50 feet could also be coarse-grained alluvium locally derived from the surrounding tonalite. Groundwater was measured at a depth of 54.81 feet below the top of sanitary seal on North Well (approximately 8-inches above ground surface) and was measured at a depth of 49.34 feet below the sanitary seal in South Well (also about 8-inches above ground surface). Groundwater was measure at a depth of 77.62 feet below the top of the conductor casing on Thing Valley Well (the conductor casing extends approximately 6-inches above ground surface).

TEST METHODS

Observations of groundwater elevation were recorded in a pumping well and two observation wells in Thing Valley. Data was collected using pressure transducers connected to data loggers. Barometric pressure changes were recorded during the test and corrections were made to the pressure head data collected during the tests.

A stepped aquifer pumping test was performed using North Well to determine the optimum pumping rate for a longer duration test. The pressure transducers were deployed and began recording data on August 12, 2010 to perform the stepped pumping test. The stepped pumping test was performed at pumping rates of 72 gallons per minute (gpm), 88 gpm, and 90 gpm. The pump could not be throttled down below 72 gpm without water exiting a by-pass / check valve and had a maximum yield of 90 gpm. A semi-logarithmic plot of elapsed time versus drawdown for the stepped pumping test is shown on Figure 2.

The constant rate pumping and recovery test was performed from August 16 through 19, 2010. The pump was powered-down on August 19, 2010 and allowed to recover until August 23, 2010 when the pressure transducers were removed from the wells. South Well was initially pumped at an average rate of 88 gpm and was corrected to 80 gpm during a period from about 1 to 2 hours into the test. Recovery tests were performed by turning off the pumps and recording the increasing head levels over time.

DATA ANALYSIS

Changes in groundwater level data recorded during this test were corrected for barometric pressure changes and used to generate a file containing tabulated time and changes in pressure head. The data was used to generate time-drawdown graphs for the pumping

and observation wells and imported into computer software used to calculate the transmissivity and storativity of the fractured tonalite.

The stepped pump test analysis consists of plotting the drawdown versus time for each pumping rate on a time versus drawdown plot with time plotted on a logarithmic scale. Forward projections of each segment representing a different pumping rate can be used to predict the likely drawdown for the pumping well during for the selected duration of the test. A pumping rate of 80 gpm was selected as the target pumping rate because it would allow for ample drawdown without the well running dry during the test.

The method of Schafer (1978) was employed to determine how much of the data set for North Well was impacted by casing storage effects. The method is a simplification of the method first developed by Papadopulos and Cooper (1967) but does not require prior knowledge of the transmissivity or well efficiency. The point at which casing storage effects are overcome was calculated to occur approximately 12 to 14 minutes into the test based on the assumptions about well construction practices, pumping rates, and drawdown. Very early pumping data was ignored in the analyses described below due to casing storage effects and the non-uniform drawdown curve caused by the change in the pumping rate from 88 to 80 gpm.

Time versus drawdown plots were prepared for the pumping and observation wells for the pumping and recovery portions of the test. The plots are shown with the time axis plotted on a logarithmic scale and drawdown on a linear scale.

Figure 3 shows the time-drawdown plot for North Well during pumping. The first 12 to 14 minutes of the test show the effects of attempting to establish a constant pumping rate and casing storage effects. A slight recovery in the drawdown is noted from around 14 minutes to approximately 33 minutes due to a reduction in the pumping rate from 88 to 80 gpm. The North Well drawdown plots as a straight line on the time-drawdown chart representing constant aquifer properties during that portion of the drawdown cone development. A sudden change in the drawdown curve starts at approximately 1,700 minutes and changes again at approximately 3,000 minutes. The steepening of the time drawdown curve noted at approximately 1,700 and 3,000 minutes likely indicates a negative boundary effect.

A residual drawdown plot for the North Well is shown on Figure 4. The plot shows the change in drawdown versus the ratio of the time since the pump test started divided by the time since the recovery portion of the test started (t/t`). An inflection point is noted at approximately t/t`=100 possibly due to some type of boundary effect. The residual drawdown at a t/t` ratio of 1 extends through the origin and there is no discernable change in storage noted in the pumping well over the course of the pumping and recovery portions of the aquifer stress test.

A time-drawdown plot of South Well located 61.5 feet away from the pumping well shows a sharp decrease in drawdown from approximately 51 minutes to approximately 65 minutes which is considered to be the result of the decrease in pumping rate from 88 to 80 gpm (Figure 5). The South Well plot shows a slight increasing slope to the semi-logarithmic plot but shows a very strong inflection point at approximately 1,700 minutes

into the test. This is interpreted to be the result of a negative boundary effect similar to that observed on the time-drawdown plot from North Well (compare Figures 3 and 5).

The South Well recovery portion of the test is plotted as the residual drawdown versus t/t` shows a concave upwards curvature to the semi-logarithmic plot (Figure 6) indicative of changing aquifer conditions from a t/t` ratio of about 10 to 200 into the recovery test period. The line segment from a t/t` ratio of 200 the end of the test is a straight line plot indicative of constant aquifer conditions. The residual drawdown value measured for a t/t' ratio of 1 is about -3.5 feet. Though this value is not within about one half of a foot as would be expected from a successful test, it may not be especially significant for an observation well when the pumping well shows no changes in storage effect.

The Thing Valley Well located approximately 5,517 feet south of the pumping well was monitored for changes in head. A possible cumulative drawdown of approximately 0.25 feet was observed from approximately 400 minutes until the end of the test (Figure 7). The recovery portion of the well is shown on Figure 8 and is shows a large sudden change in measured head near the end of the monitoring period. This is interpreted as a slippage of the transducer cable and is probably not a valid recovery curve.

Water level drawdown data were evaluated using the computer software program AquiferTest version 3.5 (Waterloo Hydrogeologic, 2002). The program performs curve matching of the time drawdown data to calculate transmissivity, hydraulic conductivity, and storativity using different methods. The methods employed included Cooper-Jacob (1946), Moench (1993), Neuman (1975), and Theis (1935).

DISCUSSION

As shown on Table 1, the calculated hydraulic conductivity values for all of the analytical methods employed ranged from a low of 0.285 feet/day for data collected from North Well using Neuman's method for the data collected from the end of the data set to a high of 2.39 feet/day for the early time recovery phase of South Well using the Theis Recovery method. An average conductivity of 1.122 feet/day was calculated from all methods from both South Well and North Well. The Storativity values range from a low of 3.33E-09 for North Well middle to late time data and a high of 4.19E+01 for a match to the very late time data recorded in South Well.

All of the analytical results show a higher transmissivity and hydraulic conductivity value for matches to the early time drawdown data and show lower values for matches to late time drawdown data. This is most likely the result of a higher degree of fracturing in the rock around the wells. North Well and South Well are located in a portion of Thing Valley which is entirely covered in up to 50 feet of alluvium (Figure 9). Inspection of aerial photographs from Google Earth show the local canyons and drainages are controlled by large scale joint sets. Areas of maximum fracturing will have higher transmissivity and hydraulic conductivity associated with them and also will be more prone to erosion.

During the pumping test, a cone of depression developed radially around the well until the cone intercepted lower transmissivity/less fractured rock at the canyon side walls (the

negative boundary effect observed approximately 1,700 minutes into the test). After that time, the majority of the water entering the wells is coming from directly up and down canyon. A later stage negative boundary effect near the 3,000 minute mark observed in North Well may be a secondary negative boundary effect associated with translation of the cone of depression outside the portions of the canyon overlain by alluvium. Although the alluvium was not thought to be saturated during the test it is likely to act like a sponge slowing the downgradient flow of groundwater.

Because the fractures in the bedrock appear to be of aerially limited extent, the actual volume of groundwater available may be limited with larger volumes of groundwater available within the canyon areas where fracturing may be most prevalent.

CLOSURE

This summary of observations and analyses has been prepared in general accordance with accepted professional geotechnical and hydrogeologic principles and practices. This report makes no other warranties, either expressed or implied as to the professional advice or information included in it. Our firm should be notified of any pertinent change in the project, or if conditions are found to differ from those described herein, because this may require a reevaluation of the conclusions. This report has not been prepared for use by parties or projects other than those named or described herein. It may not contain sufficient information for other parties or purposes.

Geo-**L**ogic **A**ssociates

Mark W. Vincent, PG 5767, CEG 1873, CHg 865
Senior Geologist

Attachments: Table 1 - Aquifer Stress Test Results
Figure 1 - Well Location Plan
Figure 2 - Step Test Time Drawdown Plot
Figure 3 - North Well Time Drawdown Plot Pumping
Figure 4 - North Well Time Drawdown Plot Recovery
Figure 5 - South Well Time Drawdown Plot Pumping
Figure 6 - South Well Time Drawdown Plot Recovery
Figure 7 - Thing Valley Well Time Drawdown Pumping
Figure 8 - Thing Valley Well Time Drawdown Recovery
Figure 9 - Geologic Map
Appendix A - Analytical Results from Aquifer Test Program

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Cooper, H.H., Jr. and Jacob, C.E., 1946, A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well Field History, *Transactions, American Geophysical Union*, Vol. 27, No. 4.

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Moench, S.P., 1993, Combining the Neuman and Boulton Models for Flow to a Well in an Unconfined Aquifer, *Ground Water*, Vol. 33, No. 3.

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Papadopulos, I.S. and Cooper, H.H., Jr., 1967, Drawdown in a well of large diameter, *Water Resources Research*, vol. 3, pp 241-244.

Schafer, D.C., 1978, Casing Storage Can Affect Pumping Test Data, *Johnson Drillers' Journal*, Jan/Feb, Johnson Division, UOP Inc., St. Paul, Minnesota.

Theis, C.V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Groundwater Storage, *American Geophysical Union Transactions*, Vol. 16, pp. 519-524.

Waterloo Hydrogeologic (co-developed with Thomas Roerich), 2002, AquiferTest version 3.5, Advanced Pumping Test and Slug Test Analytical Software.

Table 1
Aquifer Stress Test Results
Thing Valley

Well Designation	Condition	Distance From Pumping Well (feet)	Groundwater Depth from TOC (feet)	Groundwater Depth from Ground Surface (feet)	Assumed Aquifer Thickness (feet)	Average Pumping Rate (gpm)	Analytical Method	Transmissivity (feet^2/day)	Conductivity (feet/day)	Storativity	Comments
North Well	Pumping	1	54.81	54.14	350	81	Cooper-Jacob	488	1.390	3.33E-09	Match to mid-late data.
North Well	Pumping	1	54.81	54.14	350	81	Cooper-Jacob	176	0.502	3.05E-02	Match to late data.
North Well	Pumping	1	54.81	54.14	350	81	Moench	261	0.741	4.45E-04	Match to late data.
North Well	Pumping	1	54.81	54.14	350	81	Neuman	**99.8 Minimum**	**0.285 Minimum**	3.82E-04	Match to late data.
North Well	Pumping	1	54.81	54.14	350	81	Theis	256	0.733	3.57E-04	Match to late data.
North Well	Pumping	1	54.81	54.14	350	81	Walton	115	0.327	2.41E-02	Match to late data.
North Well	Recovery	1	54.81	54.14	350	81	Theis Recovery	669	1.910	NA	Match to early data.
North Well	Recovery	1	54.81	54.14	350	81	Theis Recovery	473	1.350	NA	Match to middle data.
North Well	Recovery	1	54.81	54.14	350	81	Theis Recovery	337	0.963	NA	Match to late data.
South Well	Pumping	61.5	49.34	48.67	350	81	Cooper-Jacob	513	1.470	8.29E+00	Match to late data.
South Well	Pumping	61.5	49.34	48.67	350	81	Cooper-Jacob	294	0.841	4.19E+01	Match to very late data.
South Well	Pumping	61.5	49.34	48.67	350	81	Moench	467	1.330	1.35E-05	Match to late data.
South Well	Pumping	61.5	49.34	48.67	350	81	Neuman	469	1.340	9.12E-04	Match to late data.
South Well	Pumping	61.5	49.34	48.67	350	81	Theis	477	1.360	2.10E-03	Match to late data.
South Well	Pumping	61.5	49.34	48.67	350	81	Walton	477	1.360	8.76E+00	Match to late data.
South Well	Recovery	61.5	49.34	48.67	350	81	Theis Recovery	**835 Maximum**	**2.39 Maximum**	NA	Match to early data.
South Well	Recovery	61.5	49.34	48.67	350	81	Theis Recovery	508	1.450	NA	Match to middle data.
South Well	Recovery	61.5	49.34	48.67	350	81	Theis Recovery	311	0.888	NA	Match to late data.
							Average Values	**393**	**1.122**	**3.88E-03**	

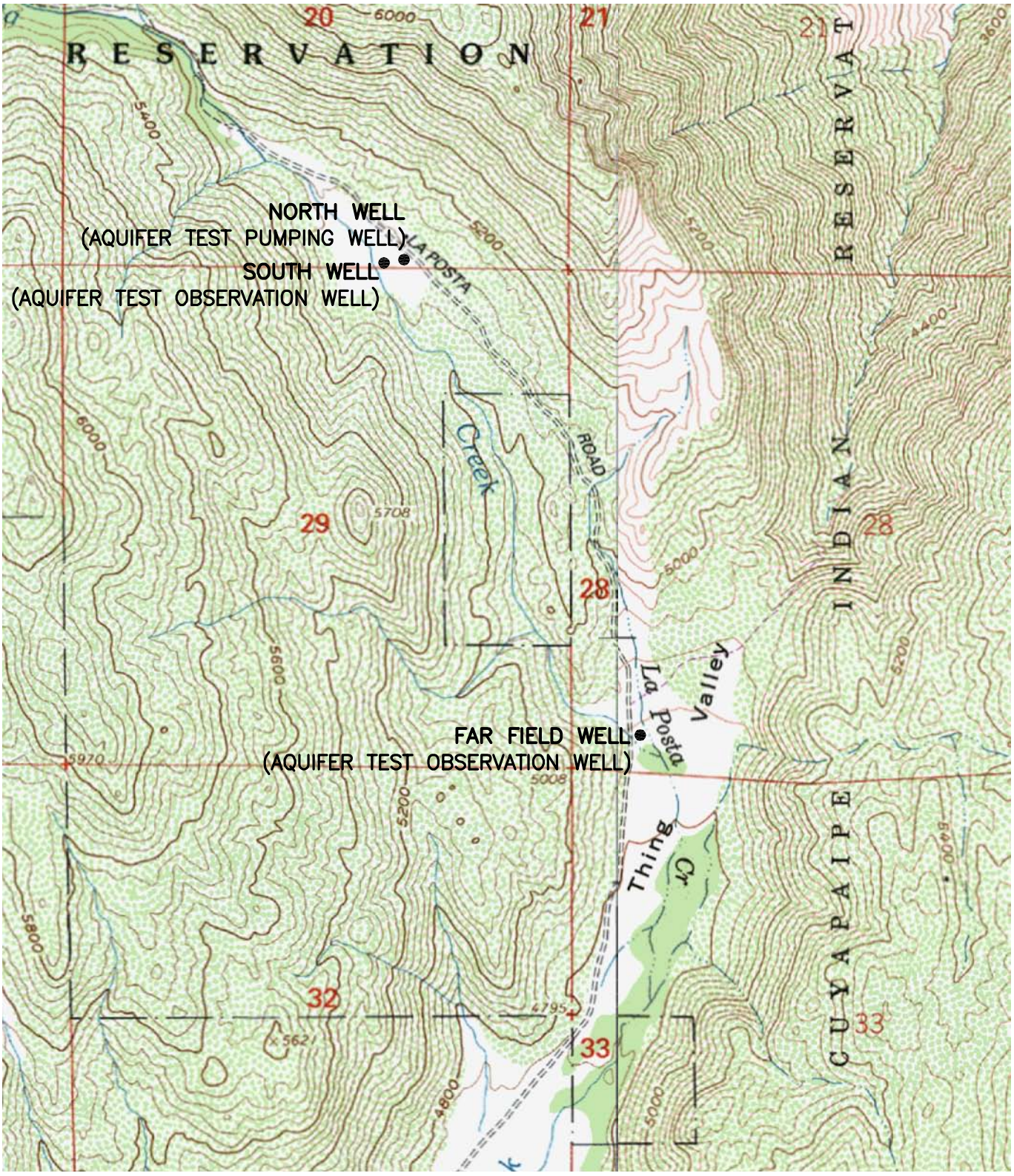


FIGURE 1

GRAPHIC SCALE
750 0 375 750 1500
(in feet)
1 inch = 1500 ft.

N

REFERENCE: 7.5 MINUTE SERIES (TOPOGRAPHIC) MOUNT LAGUNA (1997) AND SOMBRERO PEAK (1975) CALIFORNIA QUADRANGLES

WELL LOCATION MAP
THING VALLEY AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	NOVEMBER 2010	2010-005

Figure 2
North Well
(Pumping Well)
Time Drawdown Plot for Stepped Pump Test

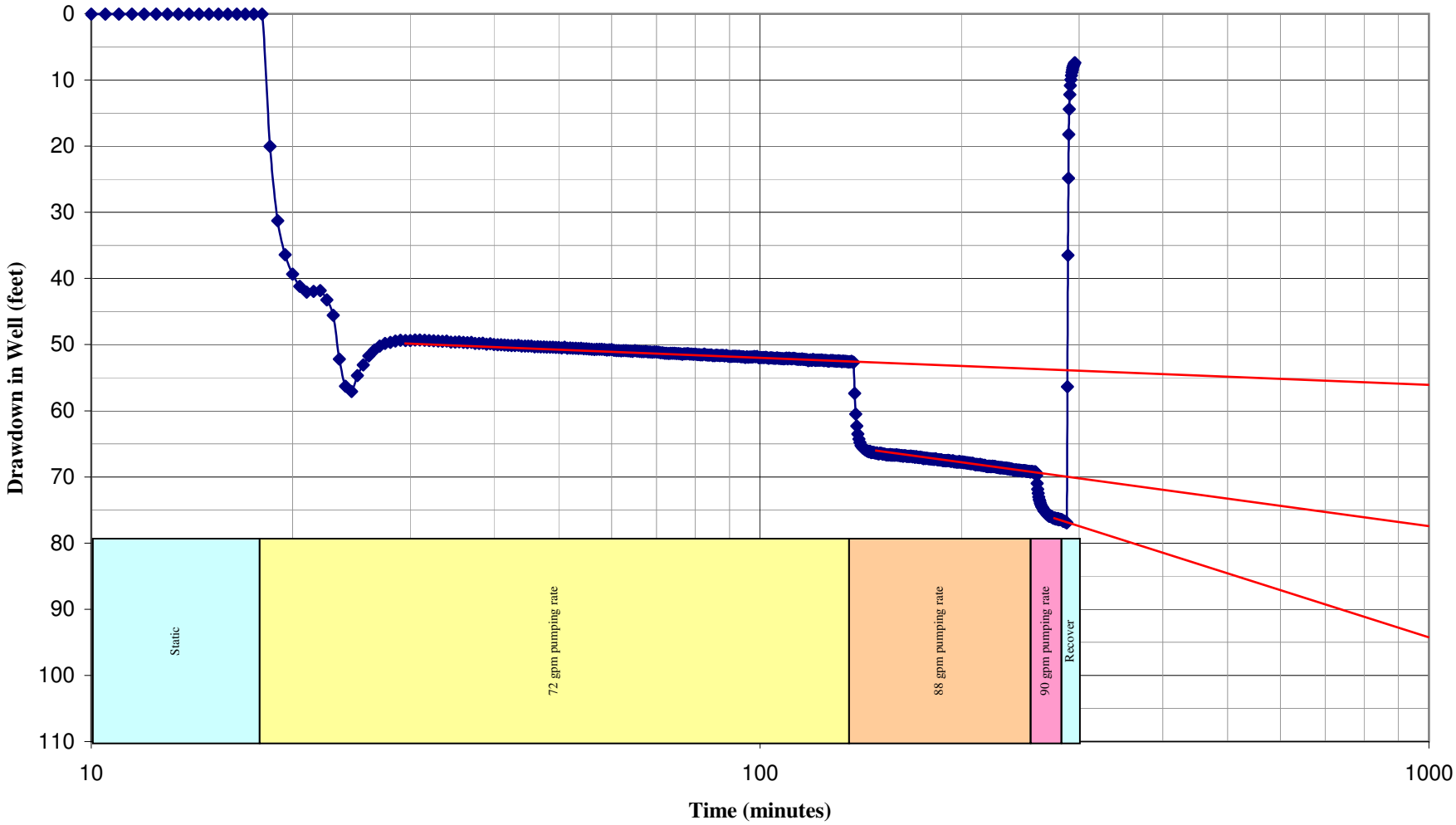


Figure 3
North Well
(Pumping Well)
Time-Drawdown Plot

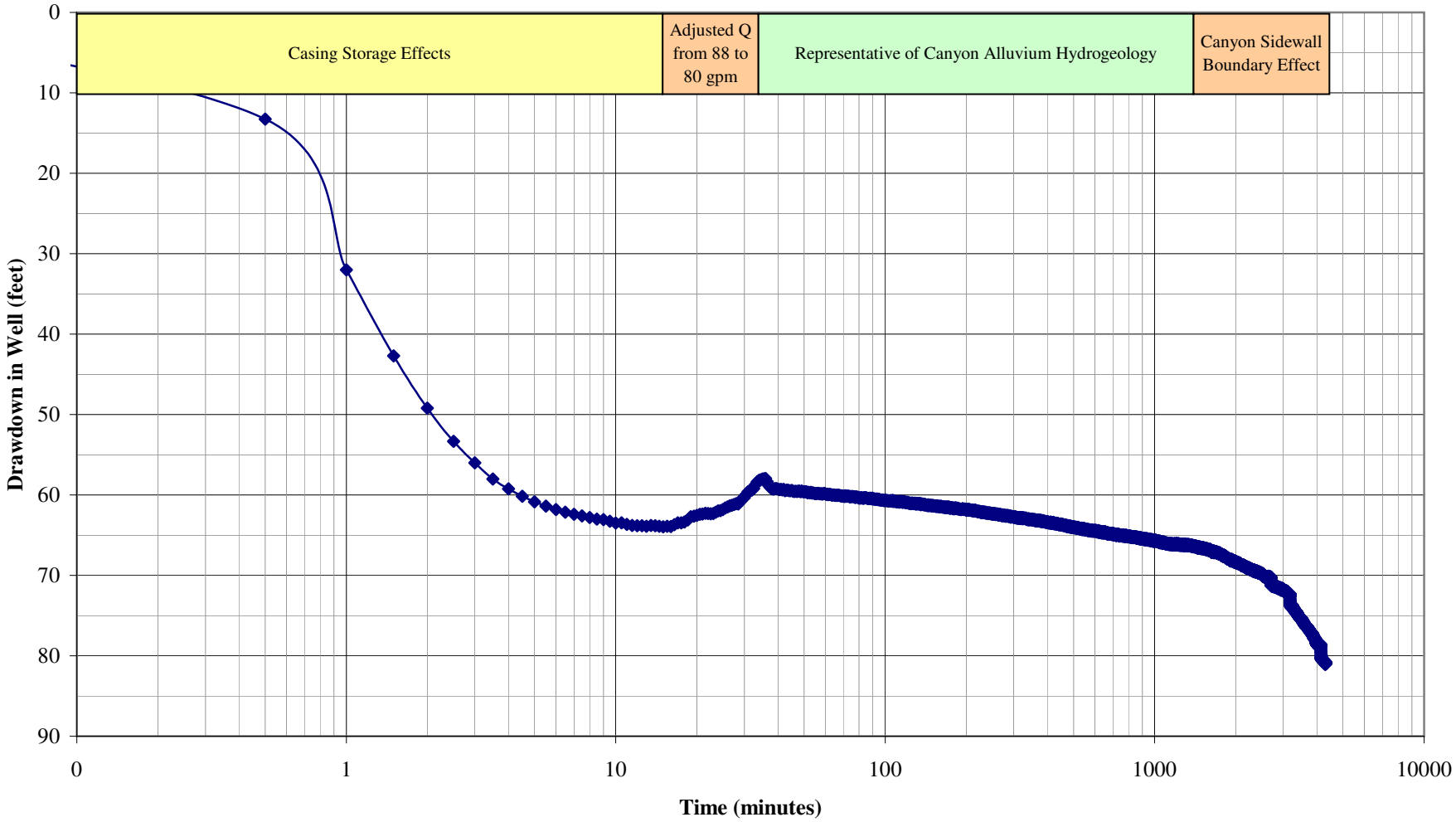


Figure 4
North Well
Recovery
Time-Drawdown Plot

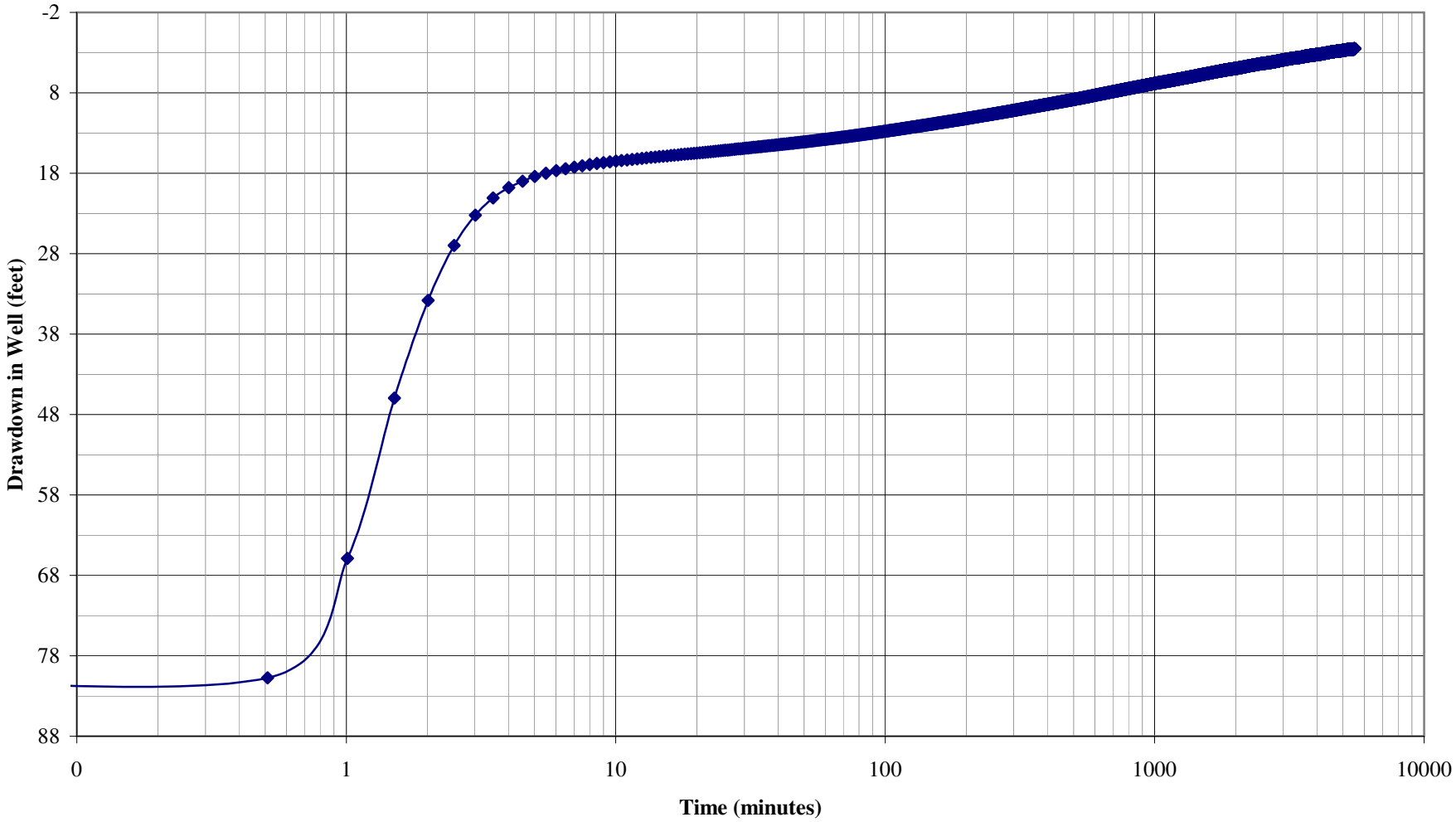


Figure 5
South Well
(Observation Well)
Time-Drawdown Plot

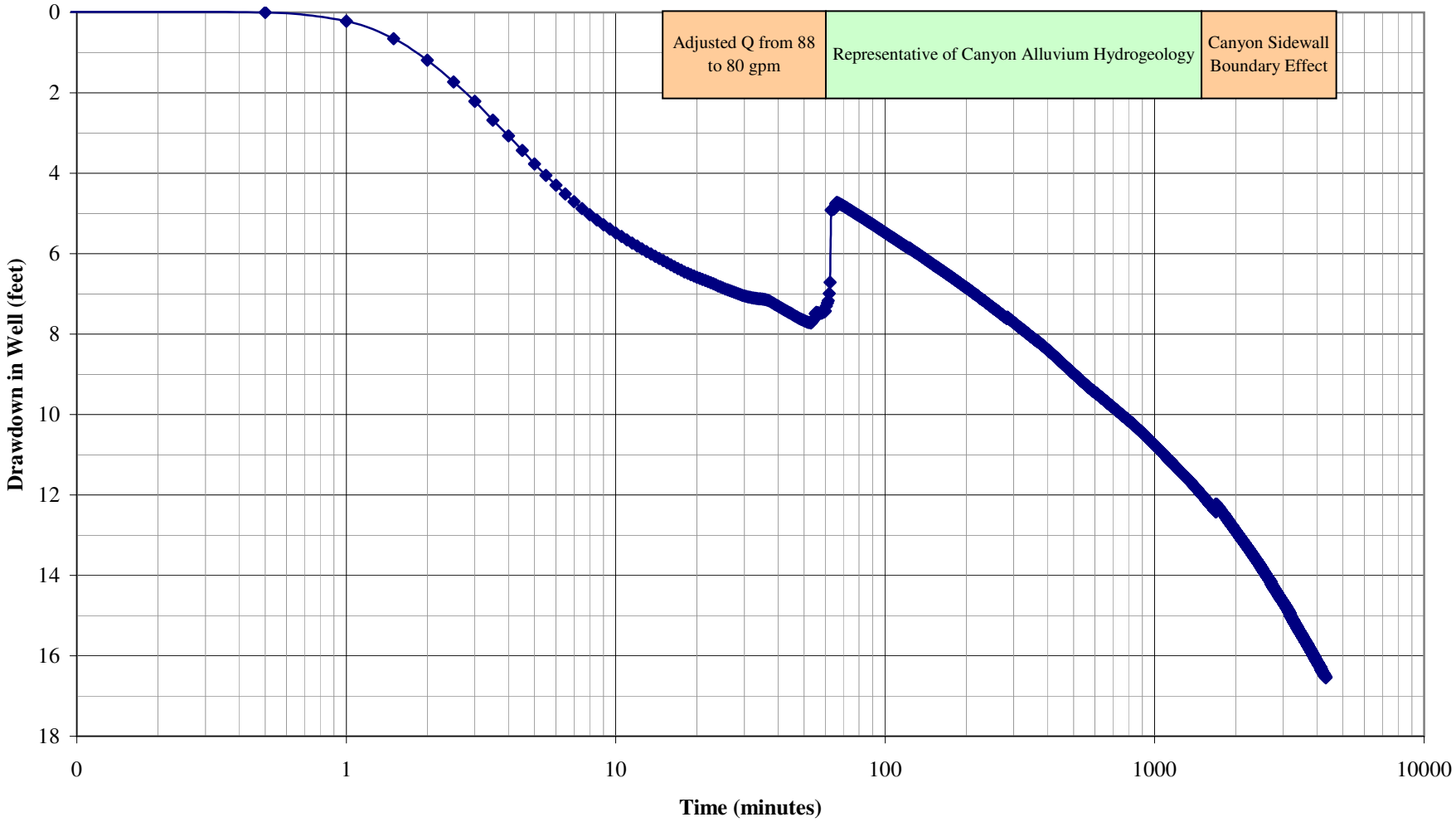


Figure 6
South Well
(Observation Well)
Recovery Time-Drawdown Plot

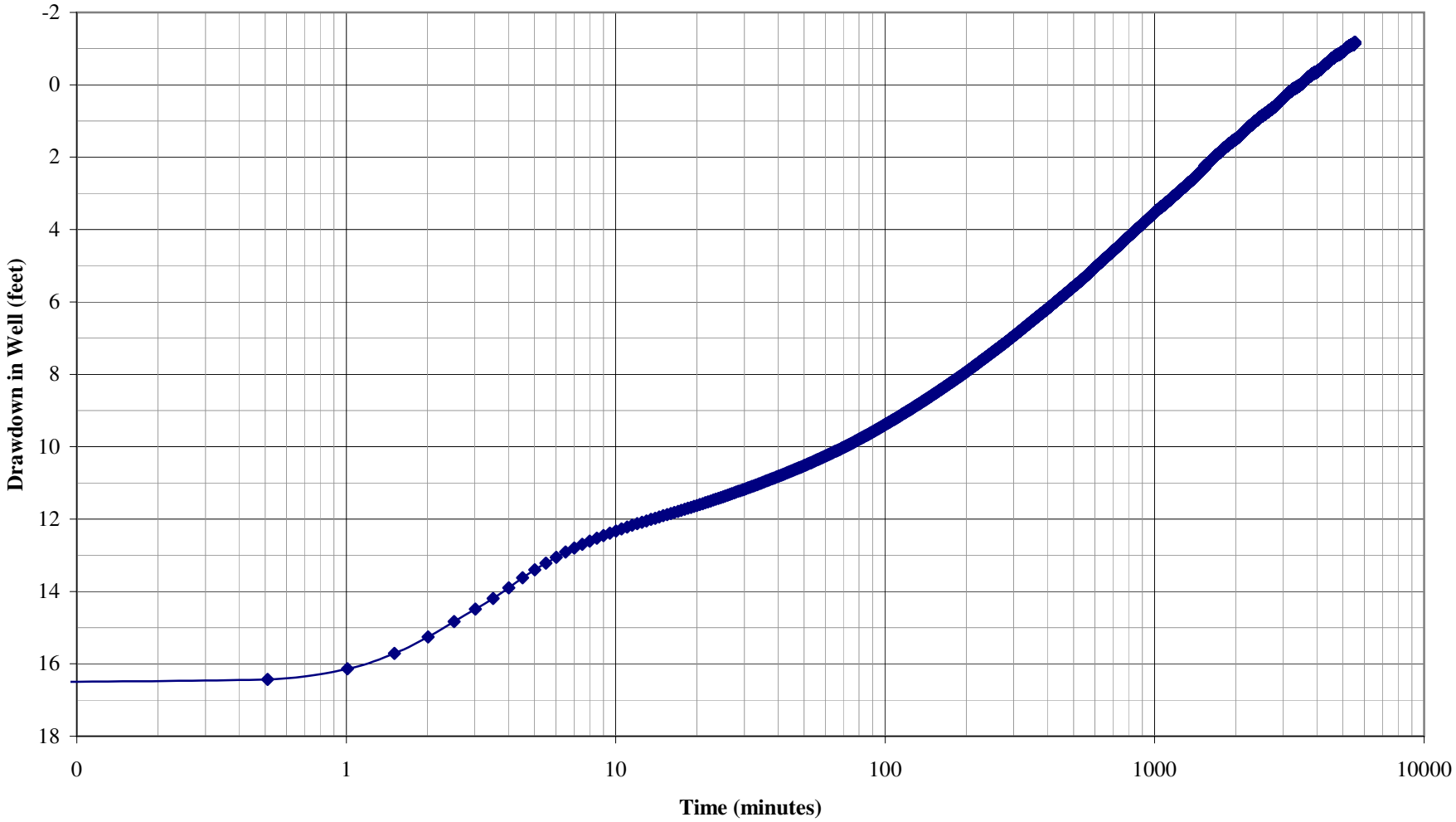


Figure 7
Thing Valley Well
(Observation Well)
Time-Drawdown Plot

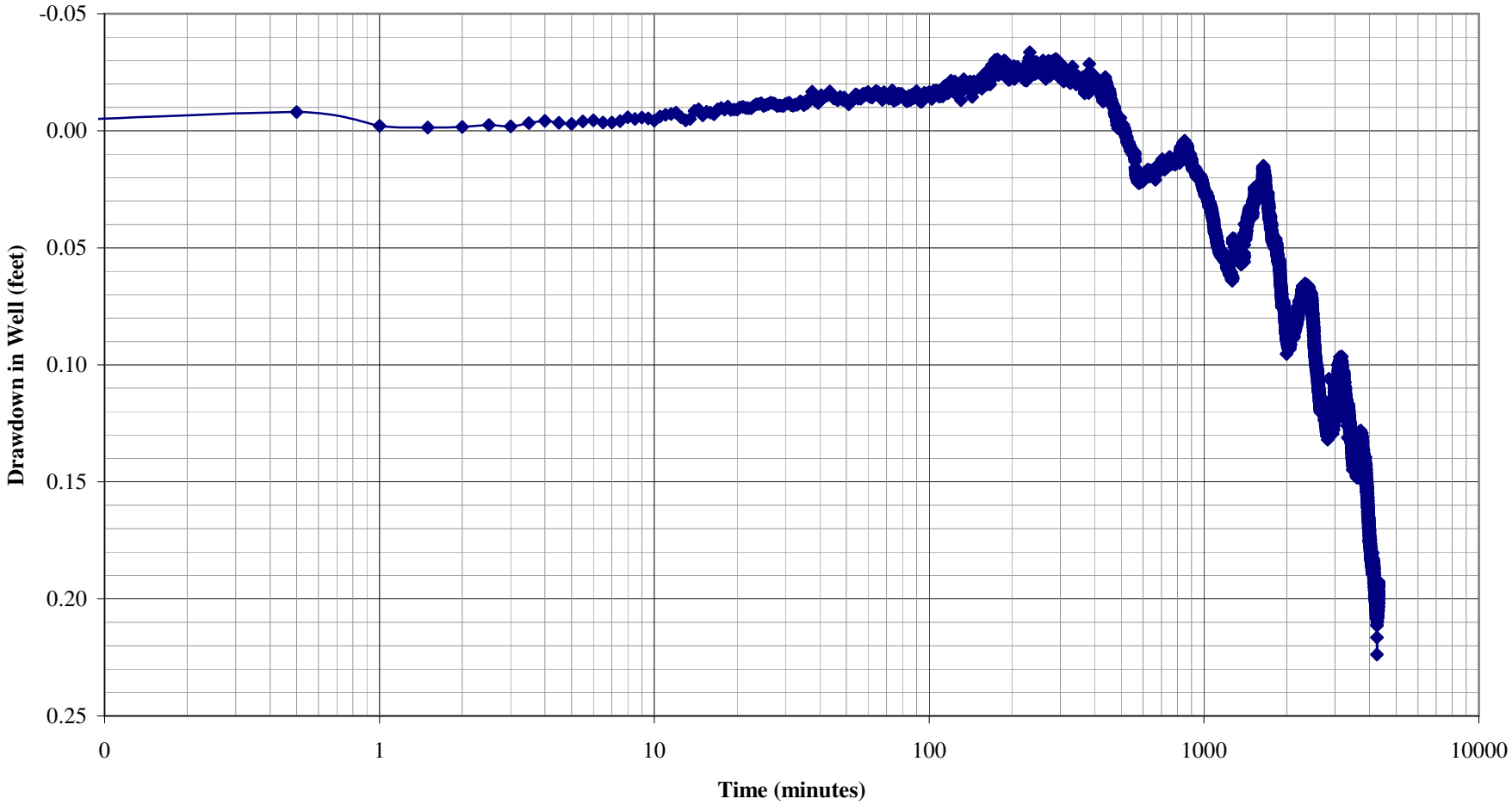
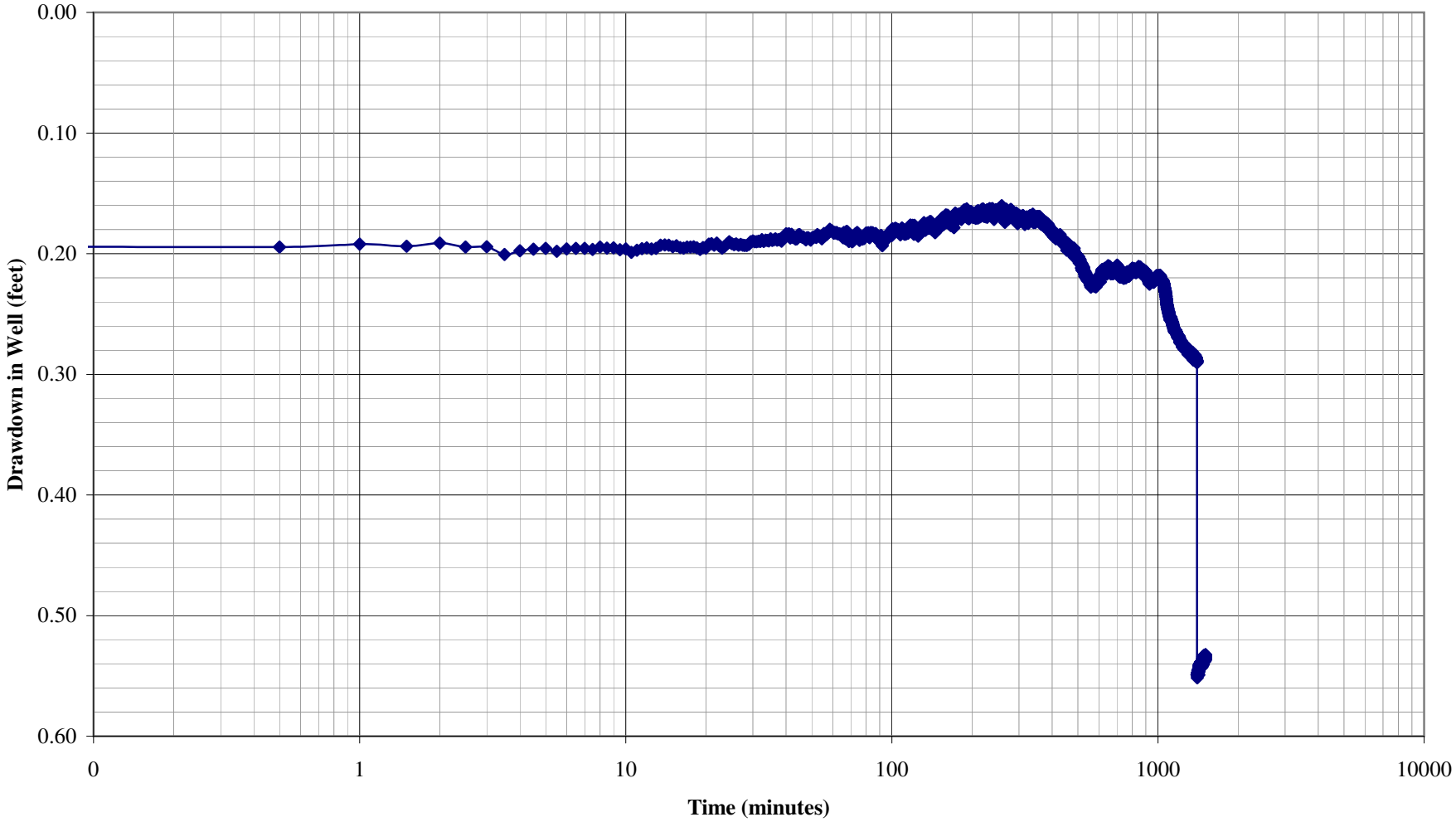
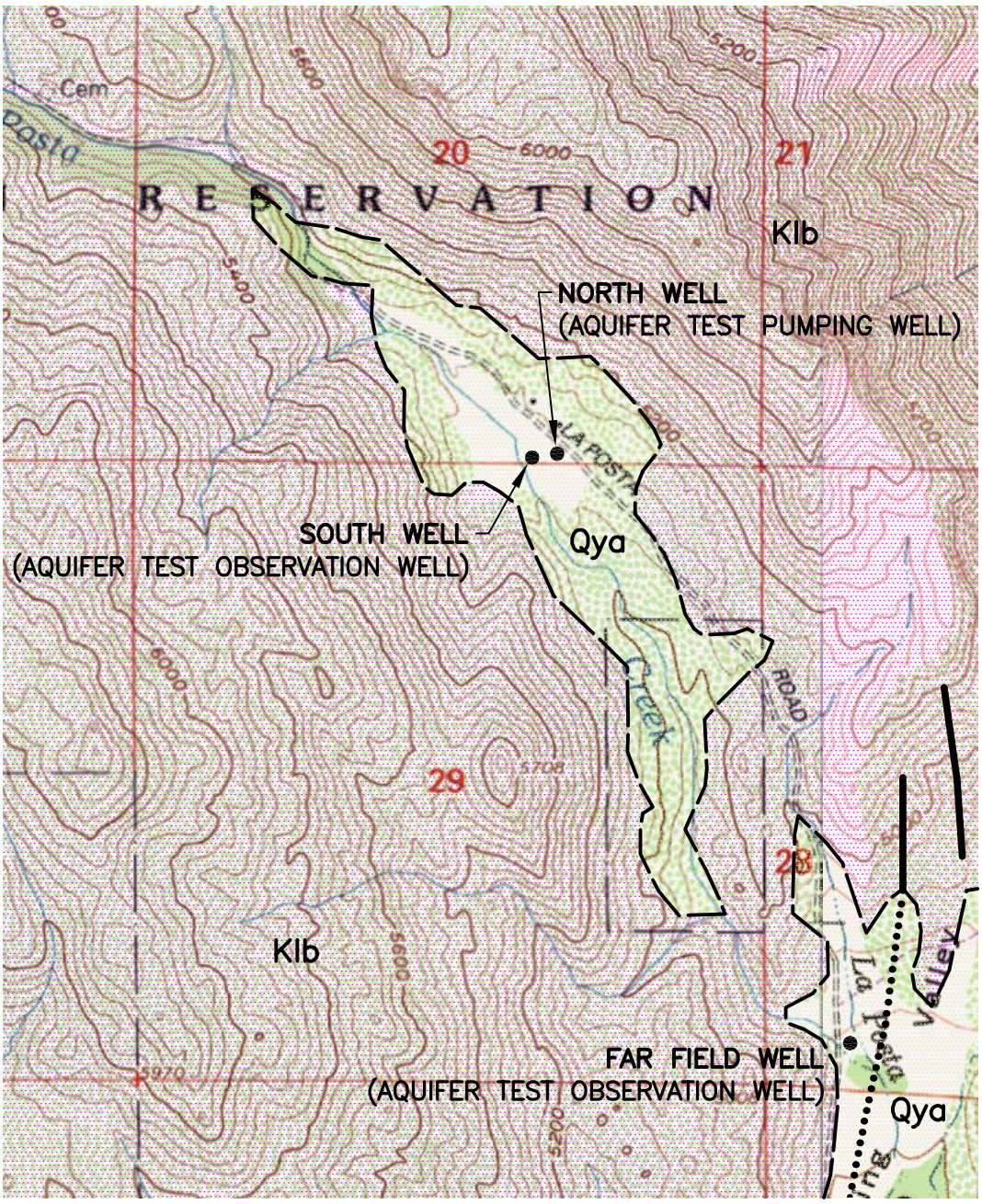


Figure 8
Thing Valley Well
Recovery
Time-Drawdown Plot





EXPLANATION:

Qya	YOUNG ALLUVIUM (HOLOCENE)
Klb	TONALITE OF LAS BANCAS (EARLY CRETACEOUS)
— — — —	APPROXIMATE GEOLOGIC CONTACT
——•••••	FAULT, DOTTED WHERE CONCEALED

GRAPHIC SCALE

750 0 375 750 1500

(in feet)

1 inch = 1500 ft.

FIGURE 9

GEOLOGIC MAP
THING VALLEY AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	NOVEMBER 2010	2010-005

REFERENCE: PRELIMINARY GEOLOGIC MAP OF EL CAJON 30' x 60' QUADRANGLE, SOUTHERN CALIFORNIA, V. R. TODD, 2004

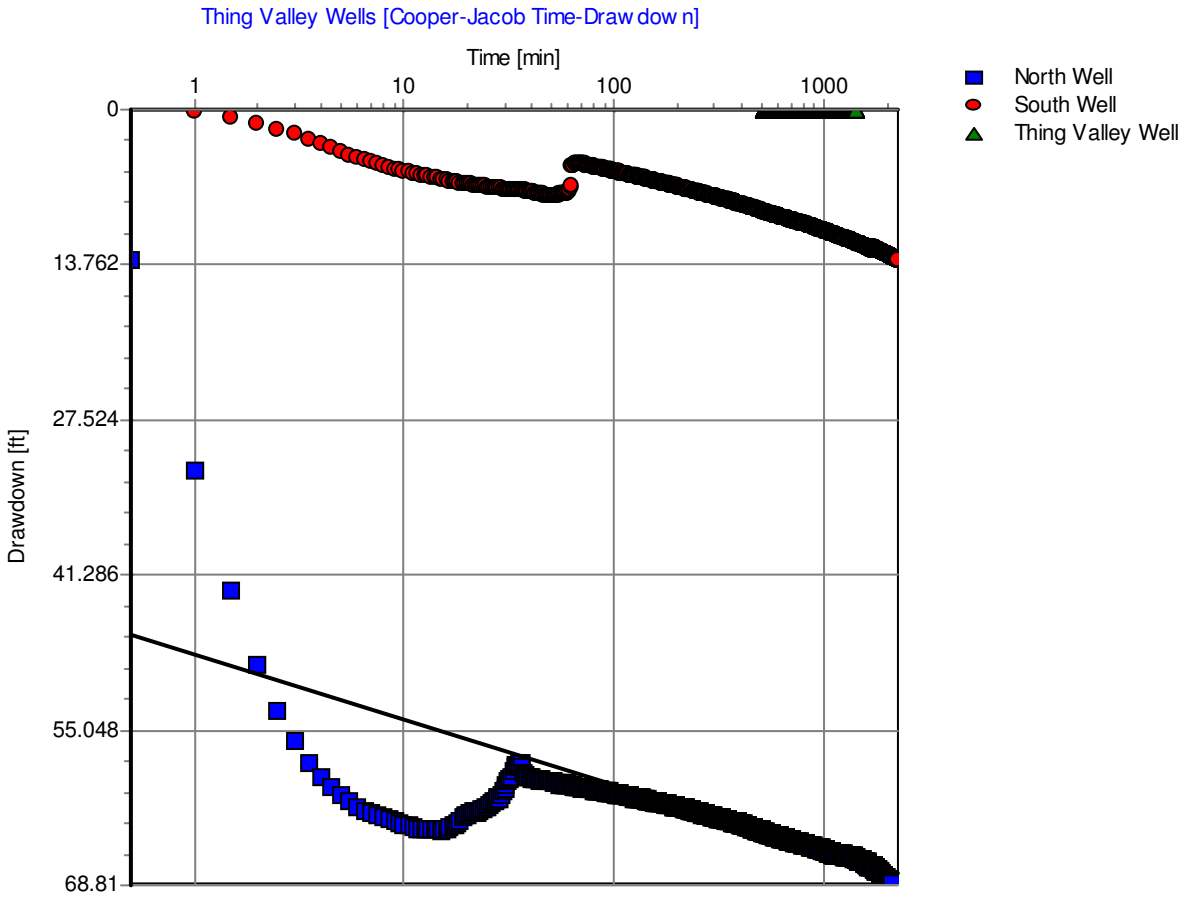
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	4.88E+2 [ft²/d]	Conductivity:	1.39E+0 [ft/d]
	Storativity:	3.33E-9		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		

Comments: North Well Match to mid-late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

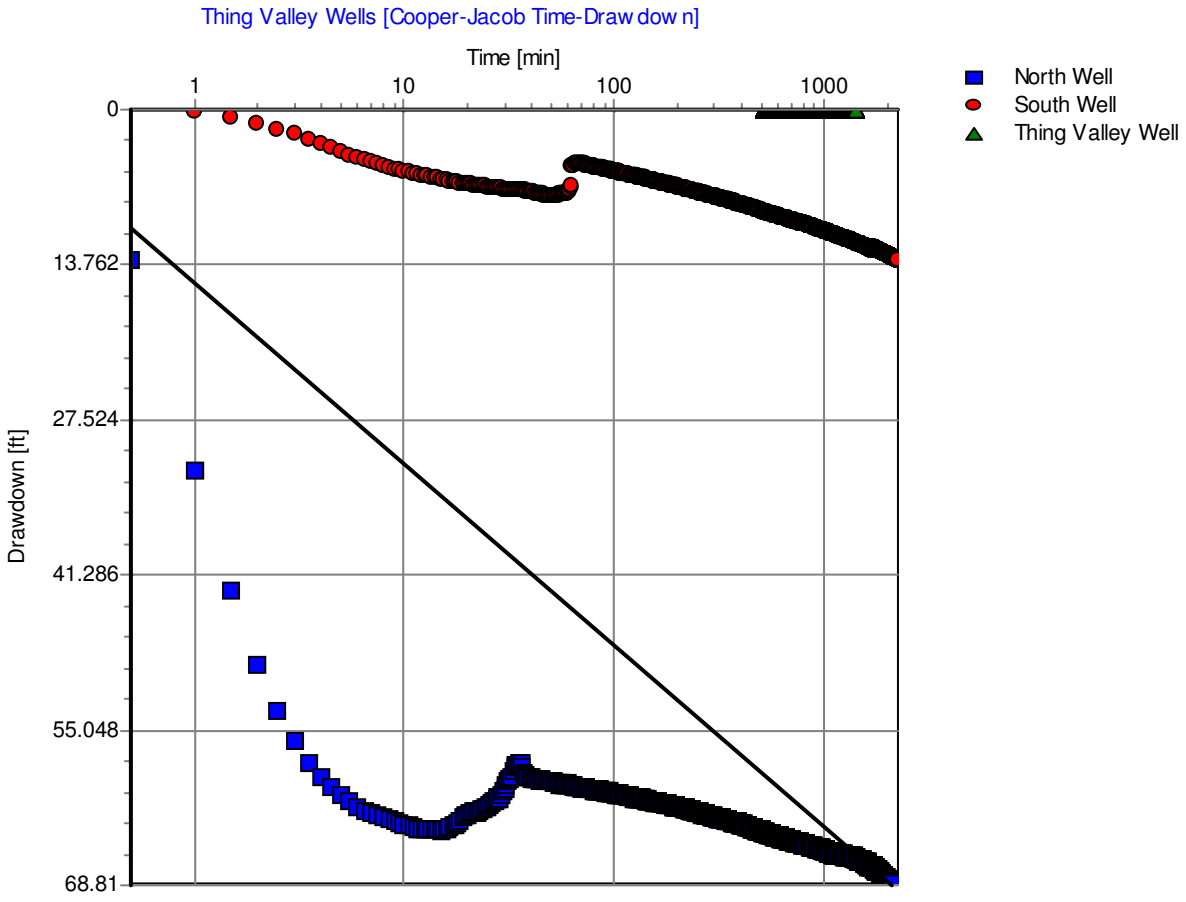
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	1.76E+2 [ft²/d]	Conductivity:	5.02E-1 [ft/d]
	Storativity:	3.05E-2		

Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		

Comments: North Well match to late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

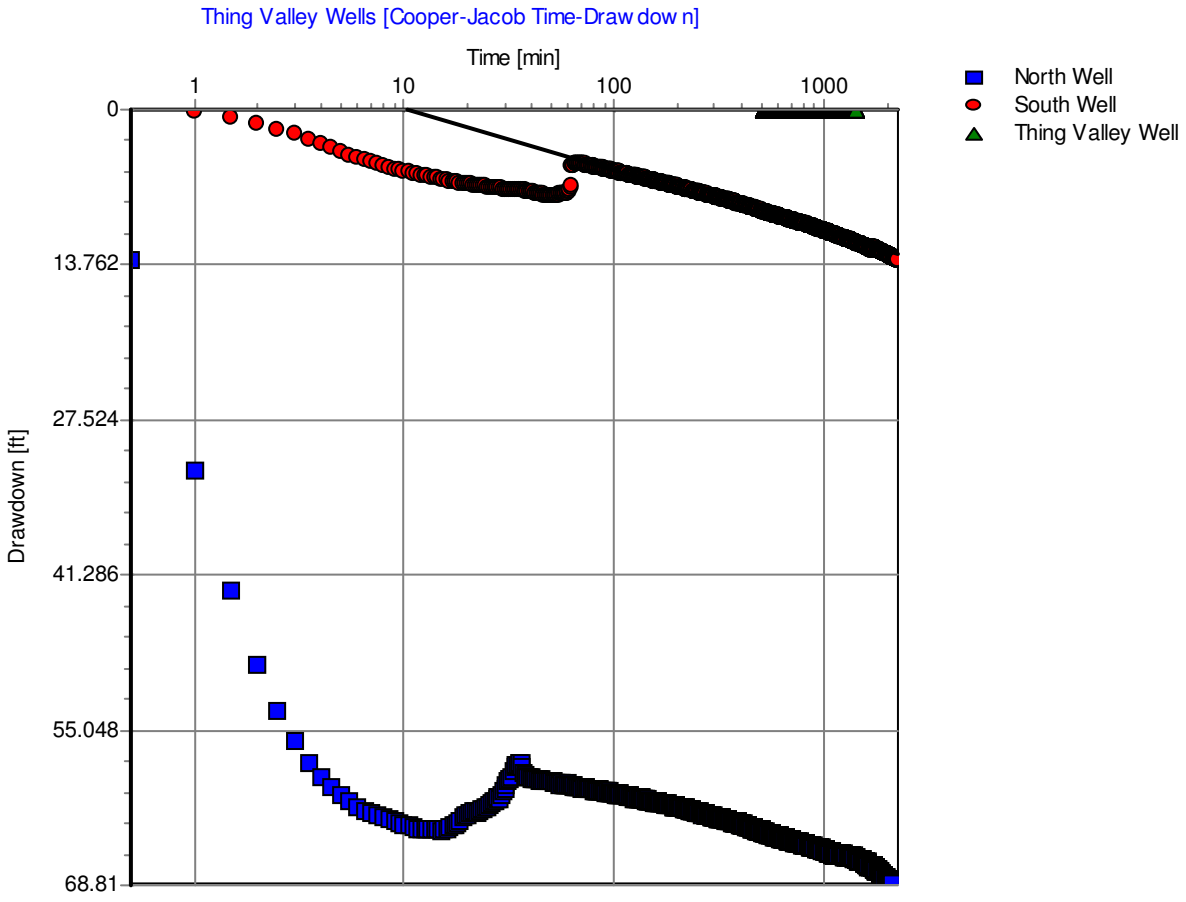
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	5.13E+2 [ft²/d]	Conductivity:	1.47E+0 [ft/d]
	Storativity:	8.29E+0		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		

Comments: South Well match to late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

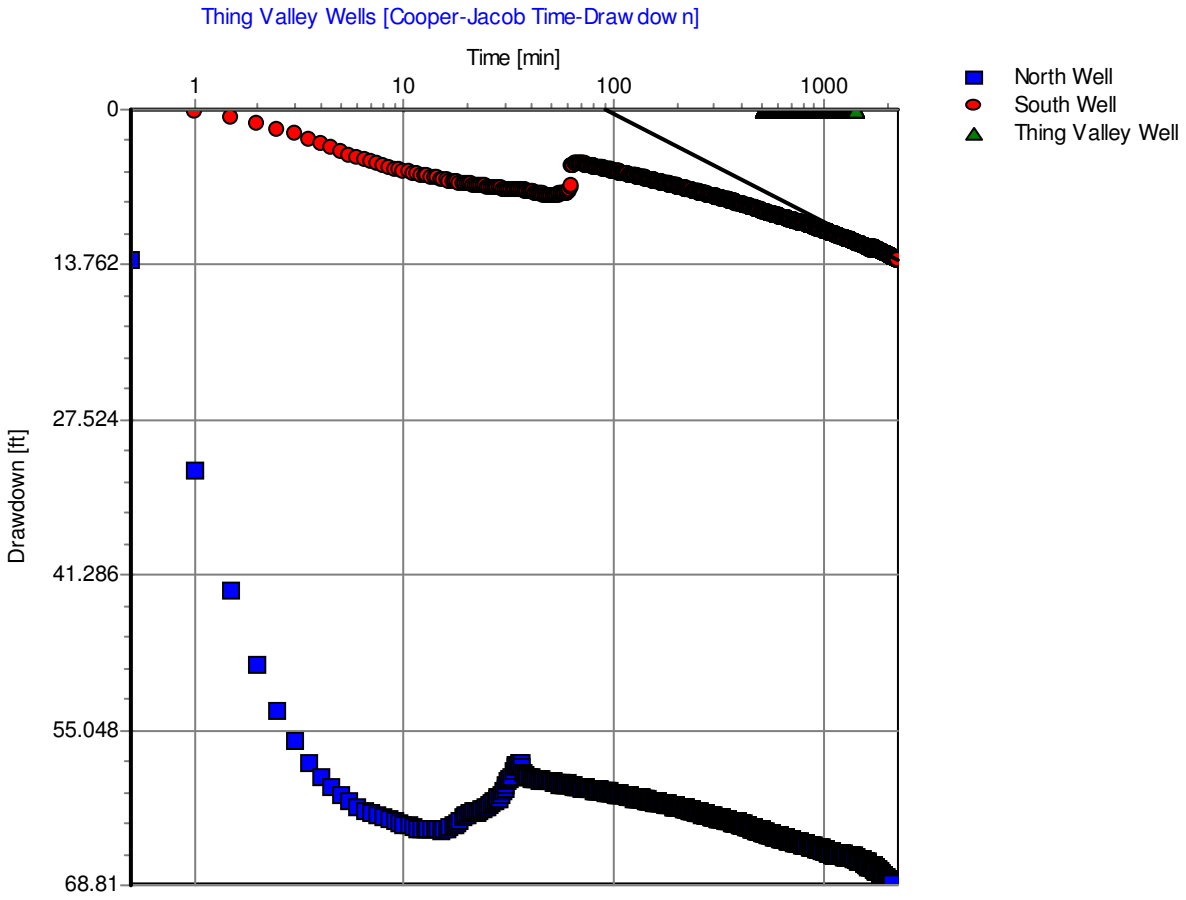
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	2.94E+2 [ft²/d]	Conductivity:	8.41E-1 [ft/d]
	Storativity:	4.19E+1		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		

Comments: South Well match to very late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

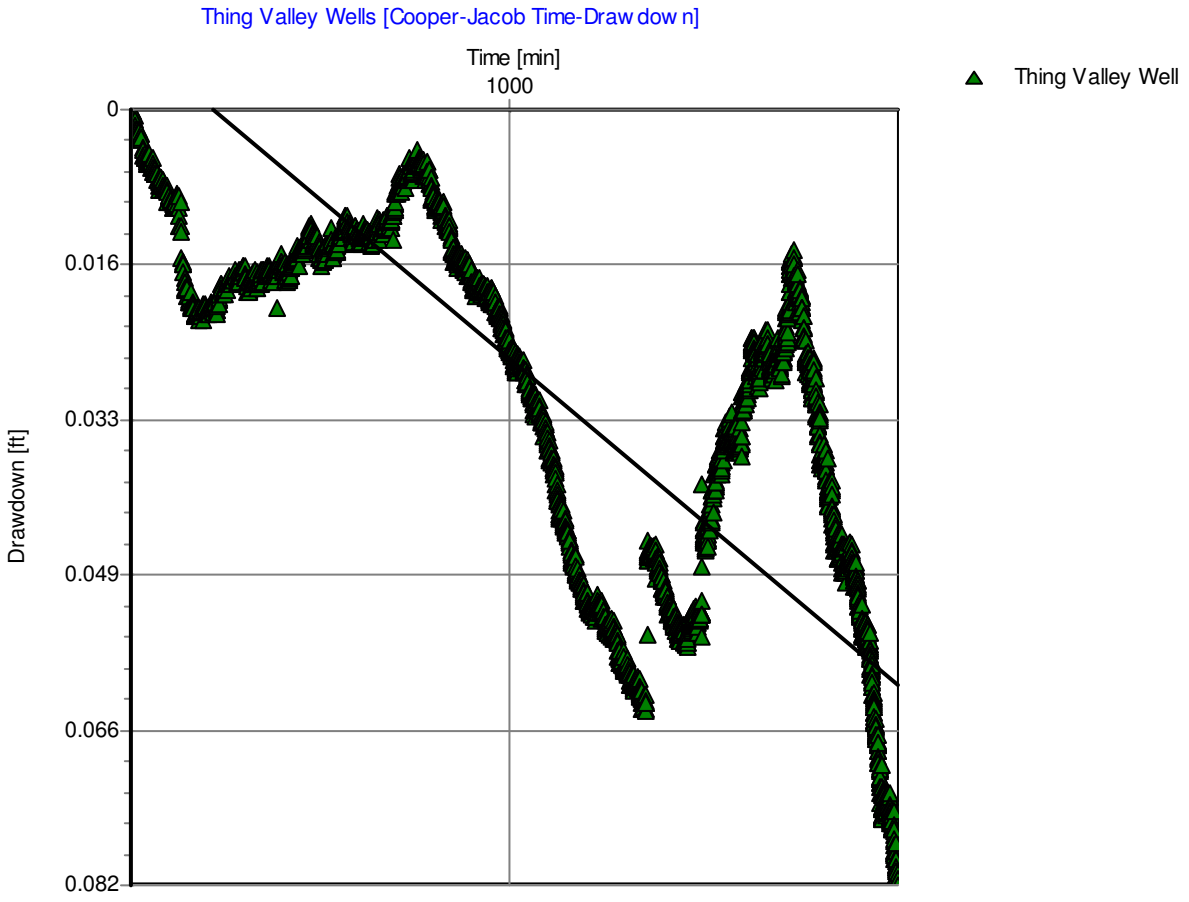
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	2.41E+4 [ft²/d]	Conductivity:	6.88E+1 [ft/d]
	Storativity:	7.34E-4		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		

Comments: Thing Valley program best fit match.

Evaluated by: MWV

Evaluation Date: 11/4/2010

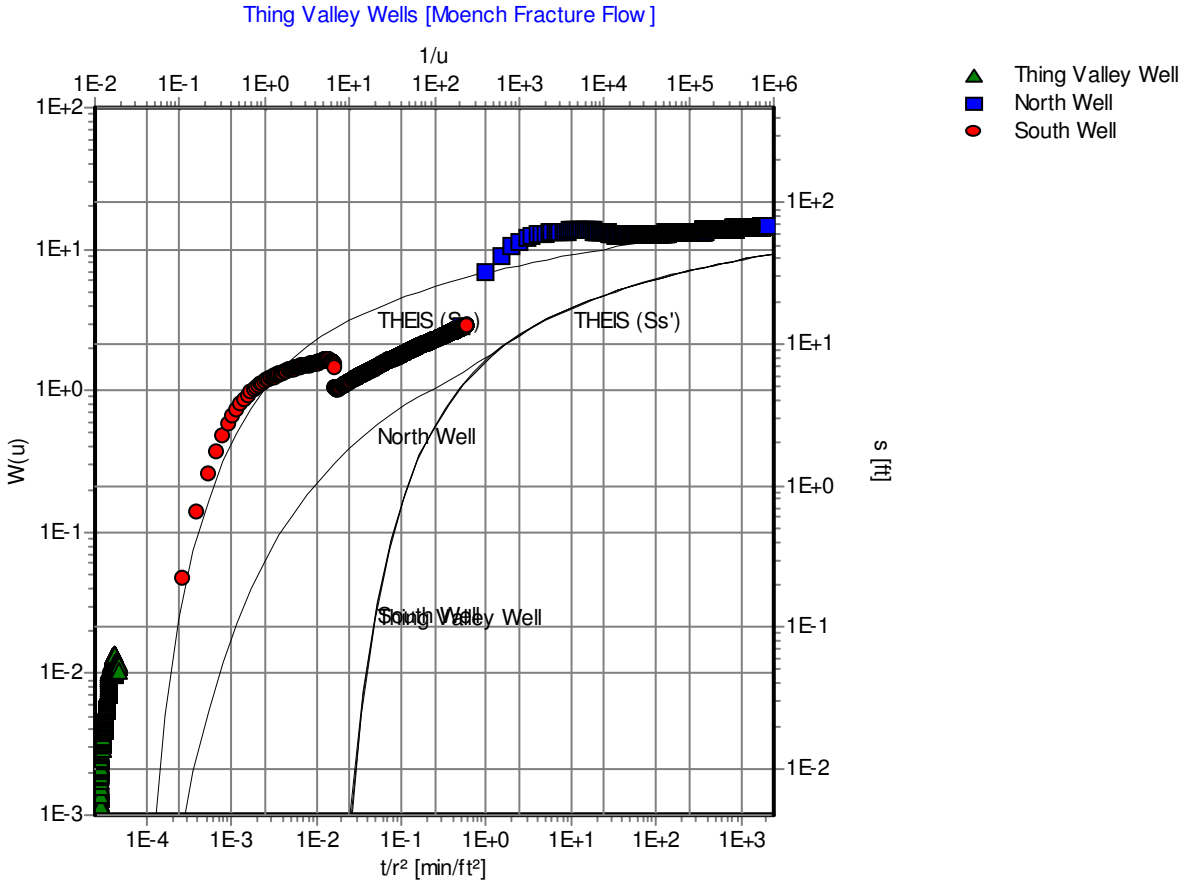
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Moench Fracture Flow**

Analysis Results:	Transmissivity:	2.61E+2 [ft²/d]	Conductivity:	7.47E-1 [ft/d]
	Storativity:	4.45E-4		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	b:	350 [ft]
	Screen length:	350 [ft]	Kv/Kh:	0.1
	Boring radius:	0.42 [ft]	C:	0.554
	Discharge Rate:	80.111574 [U.S. gal/mi	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments: North Well match to late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

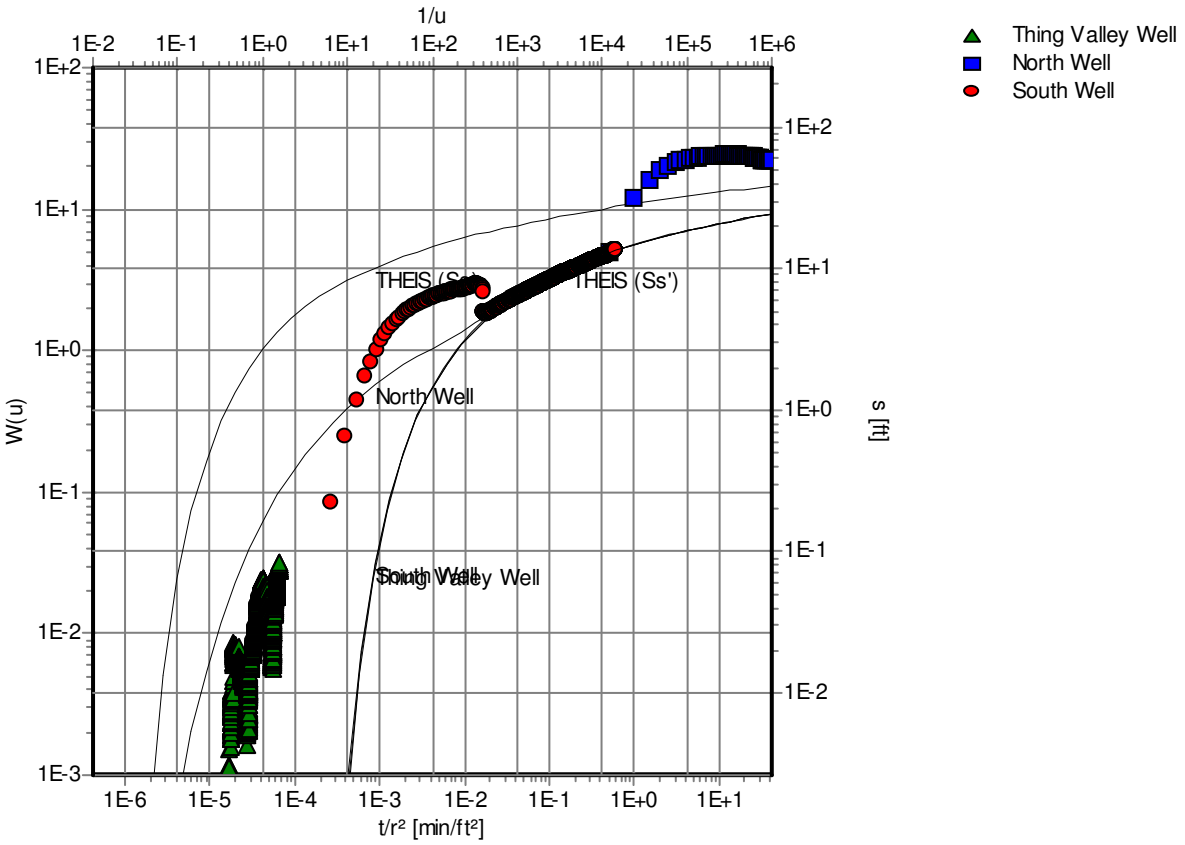
Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:

Thing Valley Wells [Moench Fracture Flow]



Thing Valley Well
North Well
South Well

Pumping Test: **Thing Valley Wells**

Analysis Method: **Moench Fracture Flow**

Analysis Results:				
	Transmissivity:	4.67E+2 [ft²/d]	Conductivity:	1.33E+0 [ft/d]
	Storativity:	1.35E-5		

Test parameters:				
	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	b:	350 [ft]
	Screen length:	350 [ft]	Kv/Kh:	0.1
	Boring radius:	0.42 [ft]	C:	0.554
	Discharge Rate:	80.111574 [U.S. gal/mi	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments: South Well match to late data.

Evaluated by: MWV

Evaluation Date: 11/1/2010

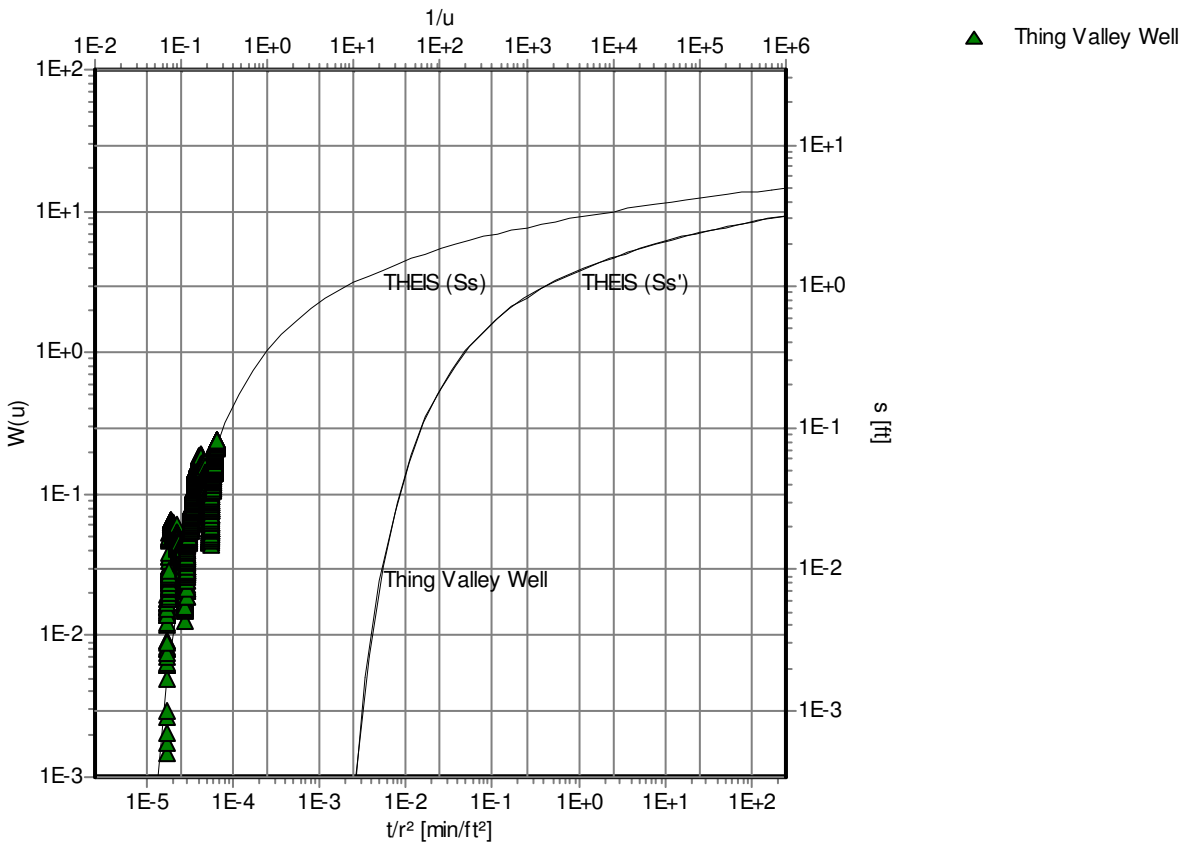
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Moench Fracture Flow**

Analysis Results:	Transmissivity:	3.61E+3 [ft²/d]	Conductivity:	1.03E+1 [ft/d]
	Storativity:	6.28E-4		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	b:	350 [ft]
	Screen length:	350 [ft]	Kv/Kh:	0.1
	Boring radius:	0.42 [ft]	C:	0.554
	Discharge Rate:	80.111574 [U.S. gal/mi	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments: Moench match to Thing Valley Well data.

Evaluated by: MWV

Evaluation Date: 11/4/2010

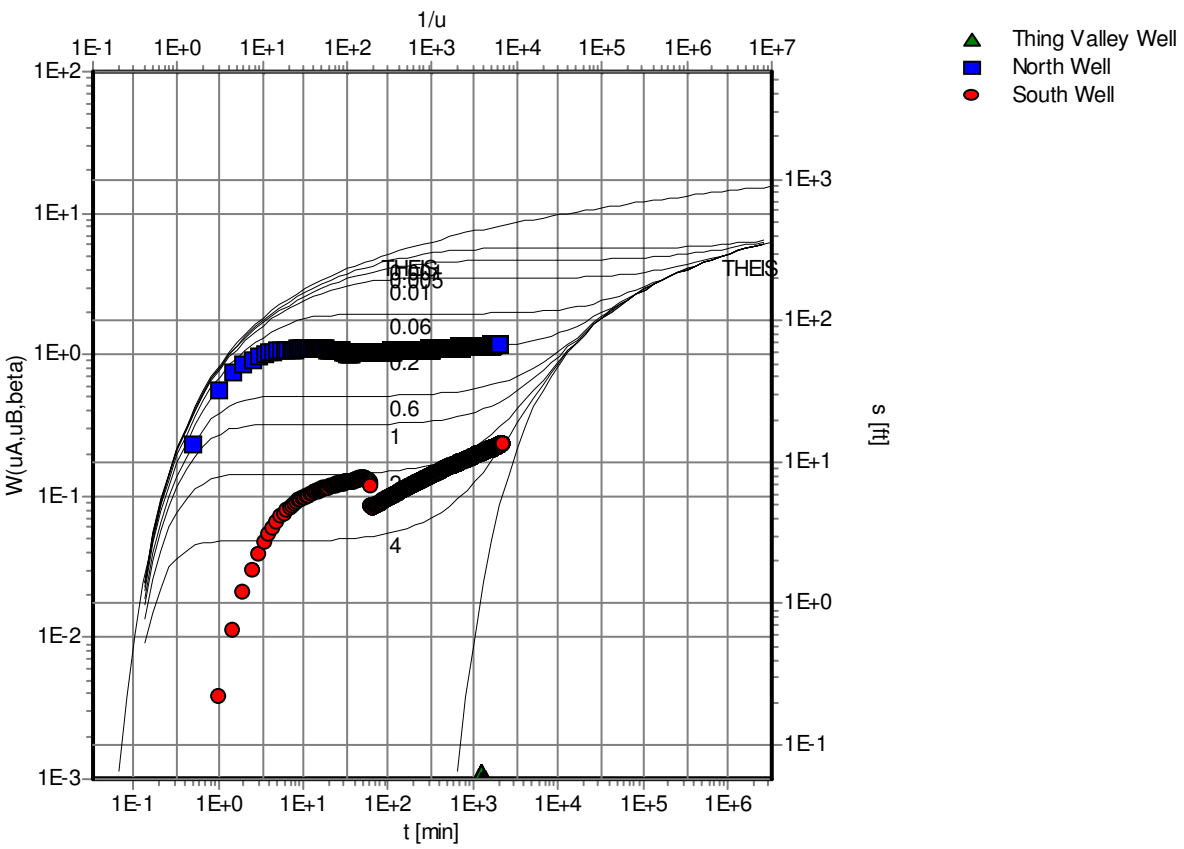
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Neuman**

Analysis Results:	Transmissivity:	2.13E+1 [ft²/d]	Conductivity:	6.09E-2 [ft/d]
	Storativity:	1.96E-2	Specific Yield:	1.96E+2
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Beta:	0.005
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		
	LOG(Sy/S):	4		

Comments: North Well match to all data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

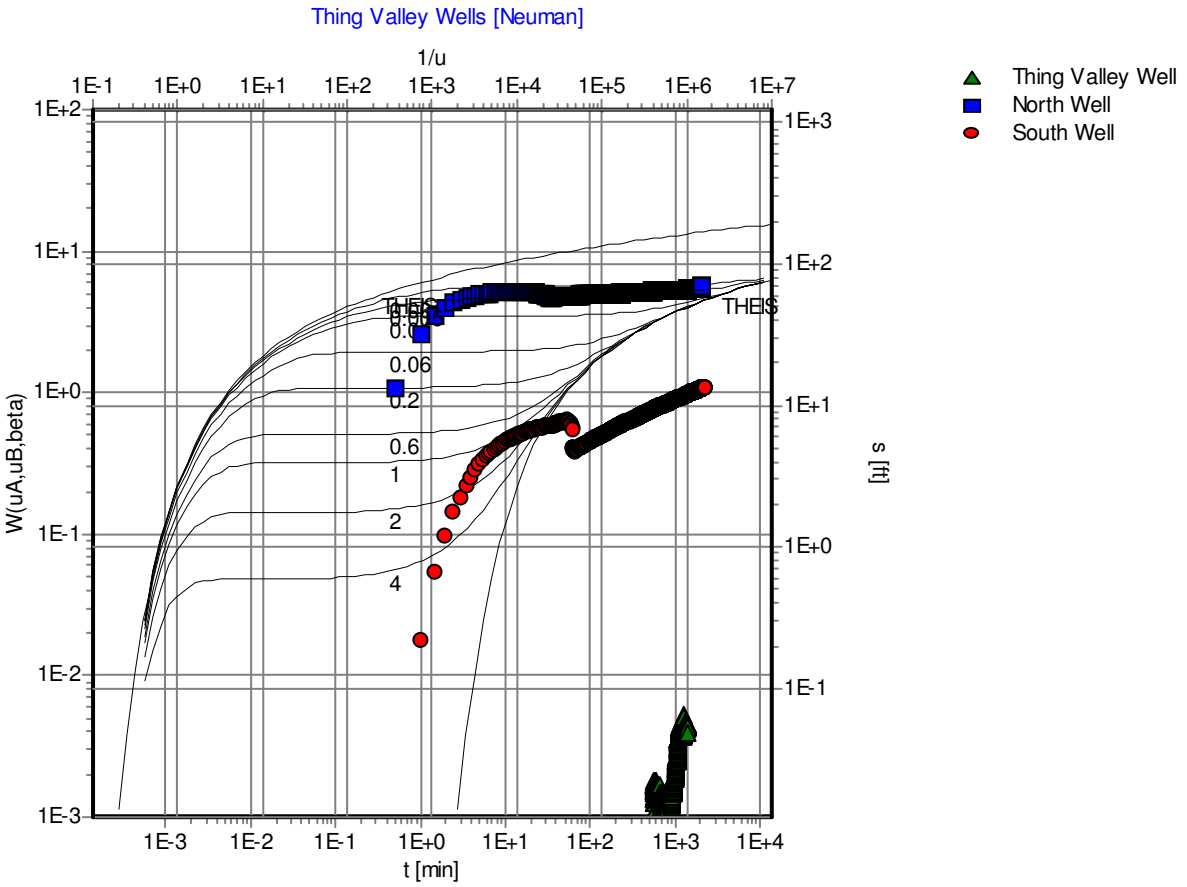
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Neuman**

Analysis Results:	Transmissivity:	9.98E+1 [ft²/d]	Conductivity:	2.85E-1 [ft/d]
	Storativity:	3.82E-4	Specific Yield:	3.82E+0

Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Beta:	0.005
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		
	LOG(Sy/S):	4		

Comments: North Well match to late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

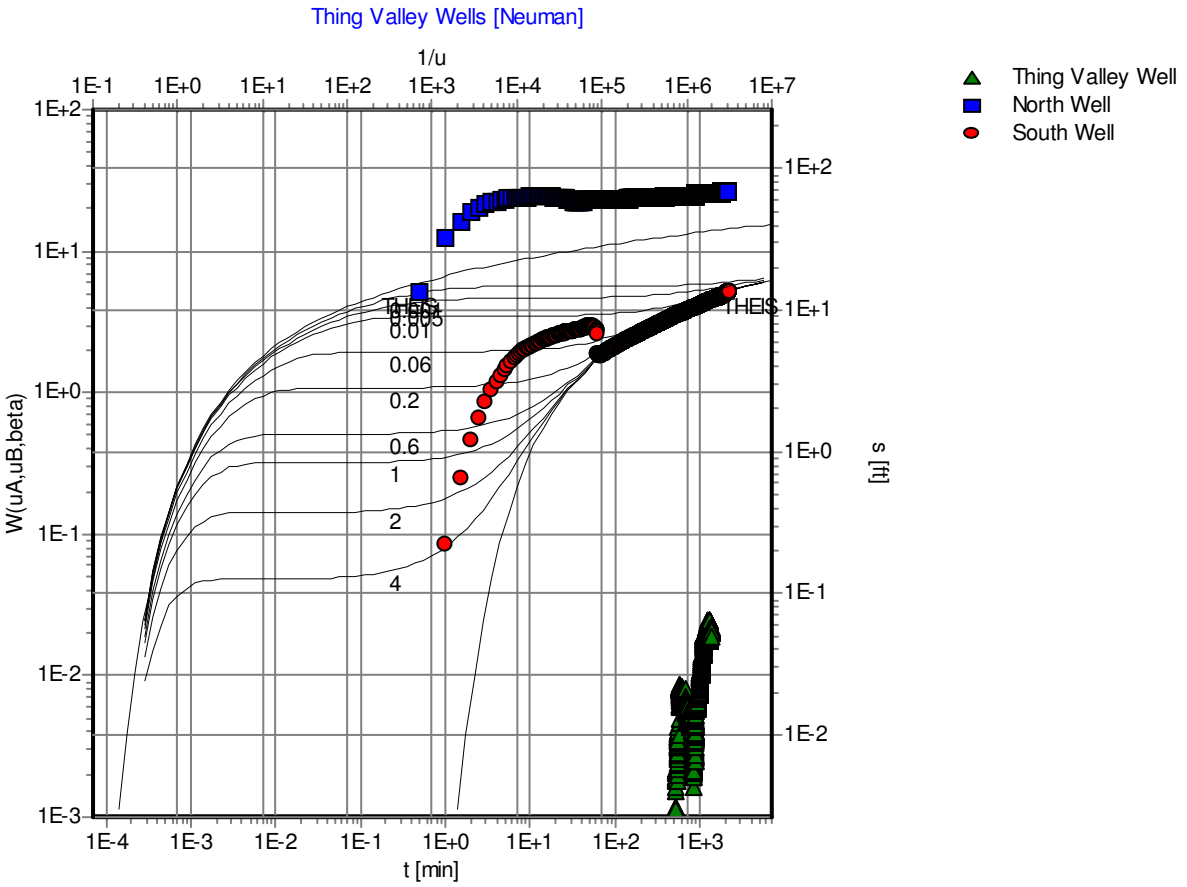
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Neuman**

Analysis Results:	Transmissivity:	4.69E+2 [ft²/d]	Conductivity:	1.34E+0 [ft/d]
	Storativity:	9.12E-4	Specific Yield:	9.12E+0
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Beta:	0.005
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		
	LOG(Sy/S):	4		

Comments: South Well match to late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

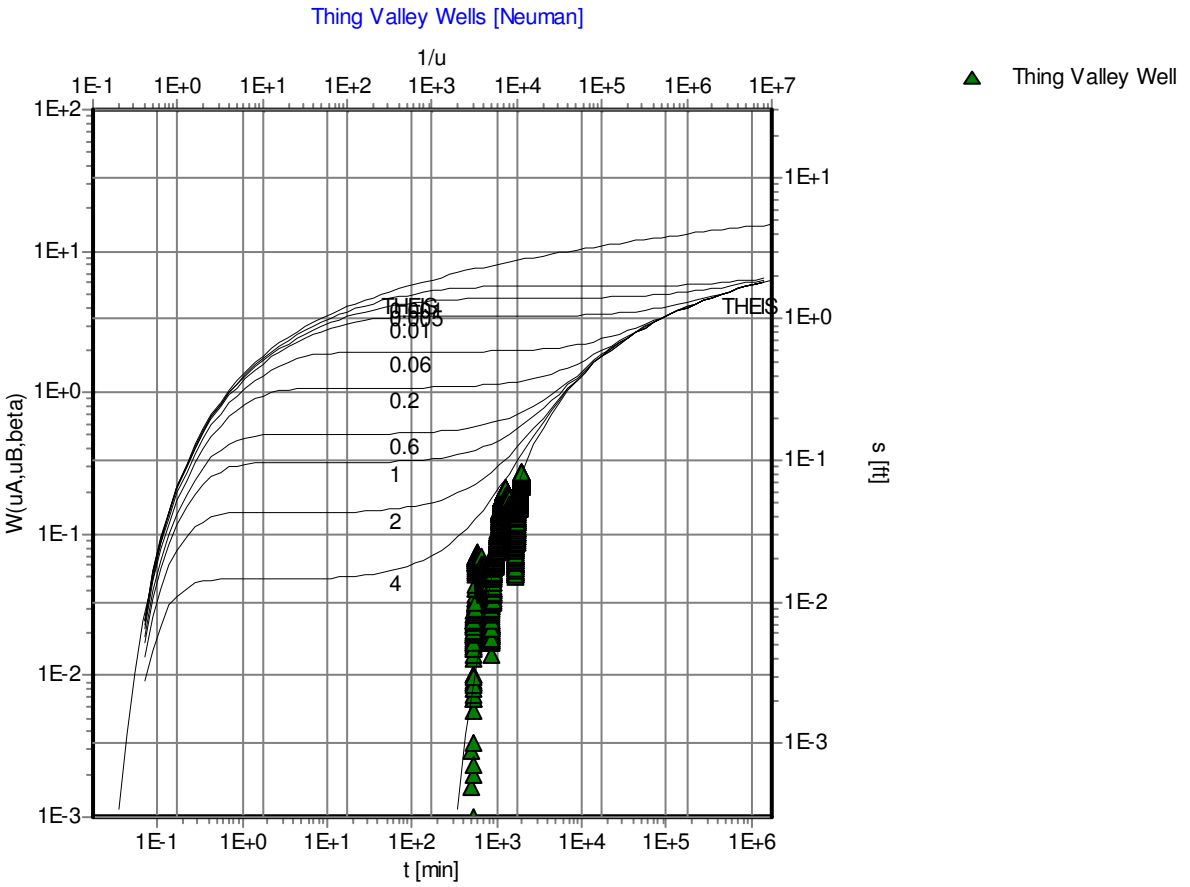
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Neuman**

Analysis Results:				
	Transmissivity:	4.06E+3 [ft²/d]	Conductivity:	1.16E+1 [ft/d]

Test parameters:				
	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Beta:	0.005
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		
	LOG(Sy/S):	4		

Comments: Thing Valley data

Evaluated by: MWV

Evaluation Date: 11/4/2010

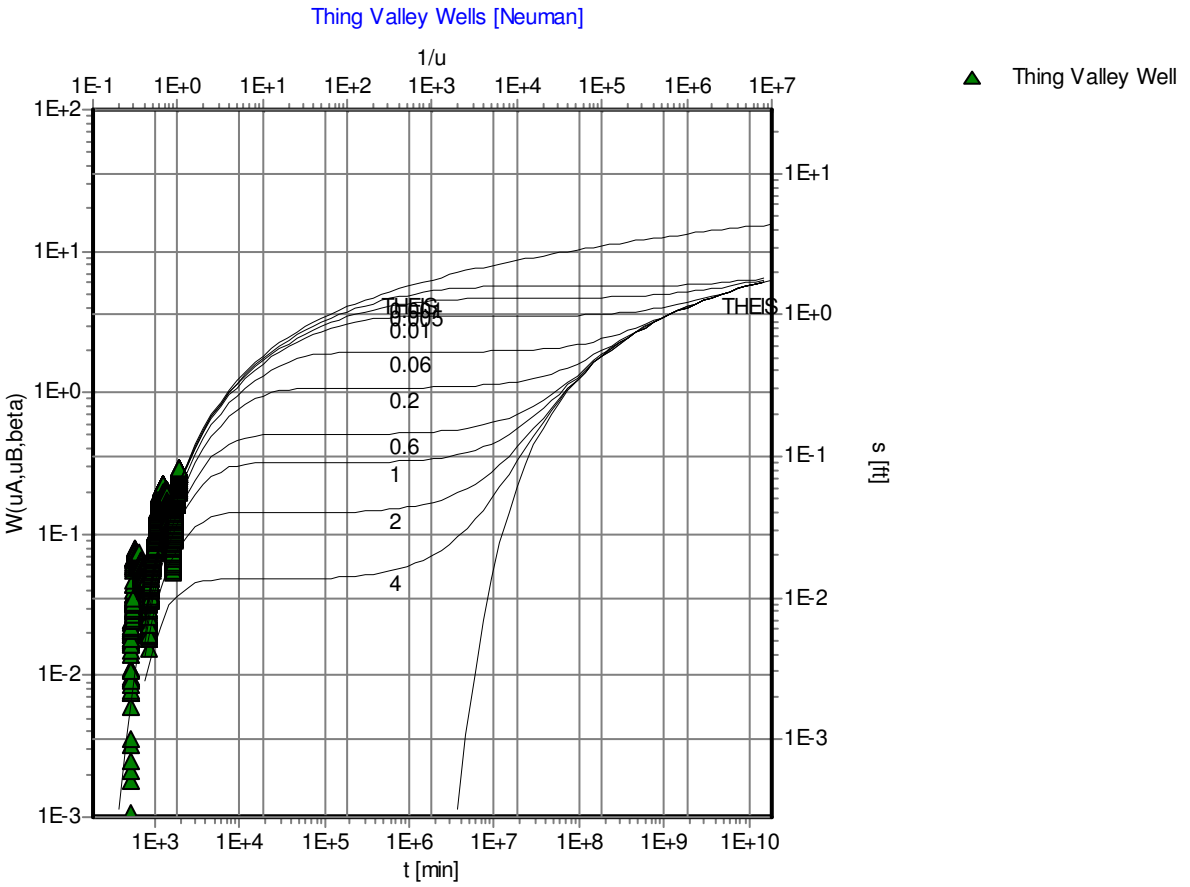
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Neuman**

Analysis Results:				
	Transmissivity:	4.35E+3 [ft²/d]	Conductivity:	1.24E+1 [ft/d]

Test parameters:				
	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Beta:	0.005
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		
	LOG(Sy/S):	4		

Comments: Thing Valley data

Evaluated by: MWV

Evaluation Date: 11/4/2010

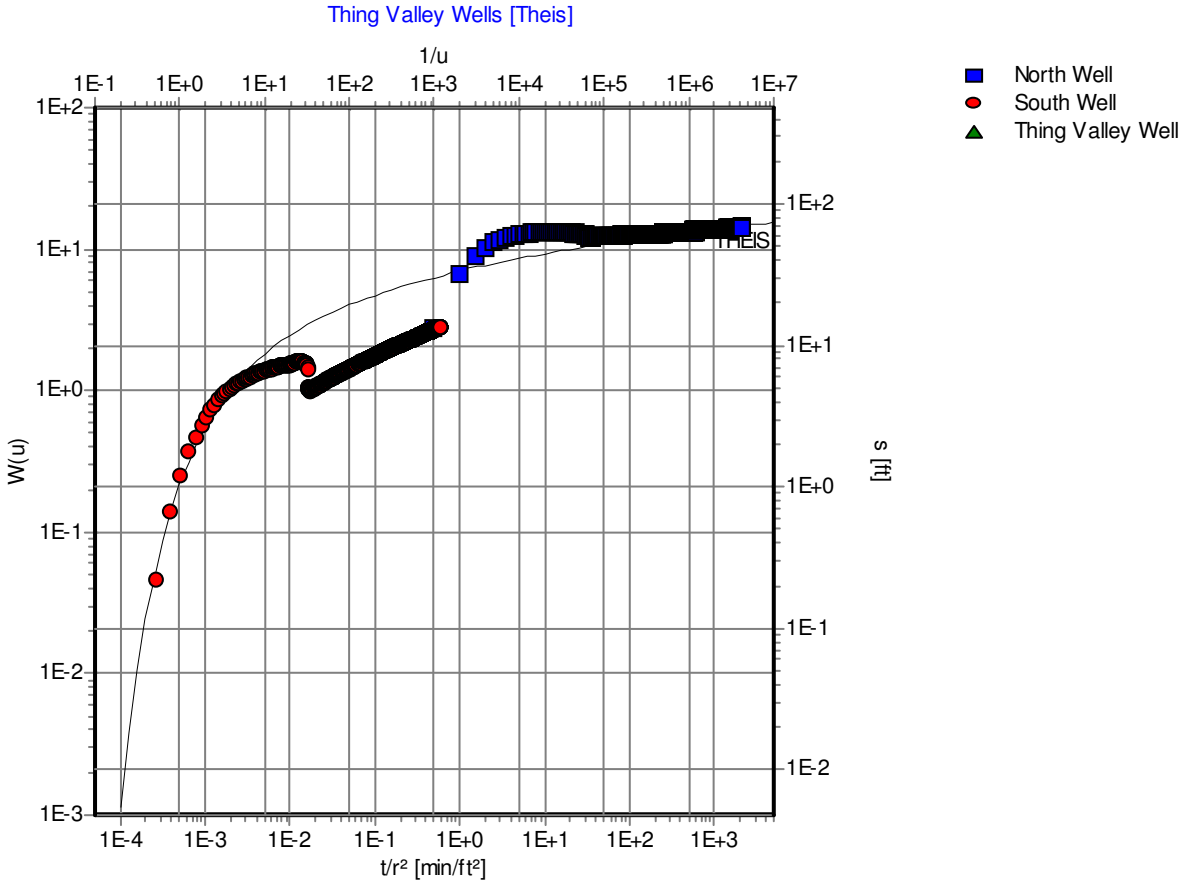
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	2.56E+2 [ft²/d]	Conductivity:	7.33E-1 [ft/d]
	Storativity:	3.57E-4		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		

Comments: North Well match to late data.
South Well match to early data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

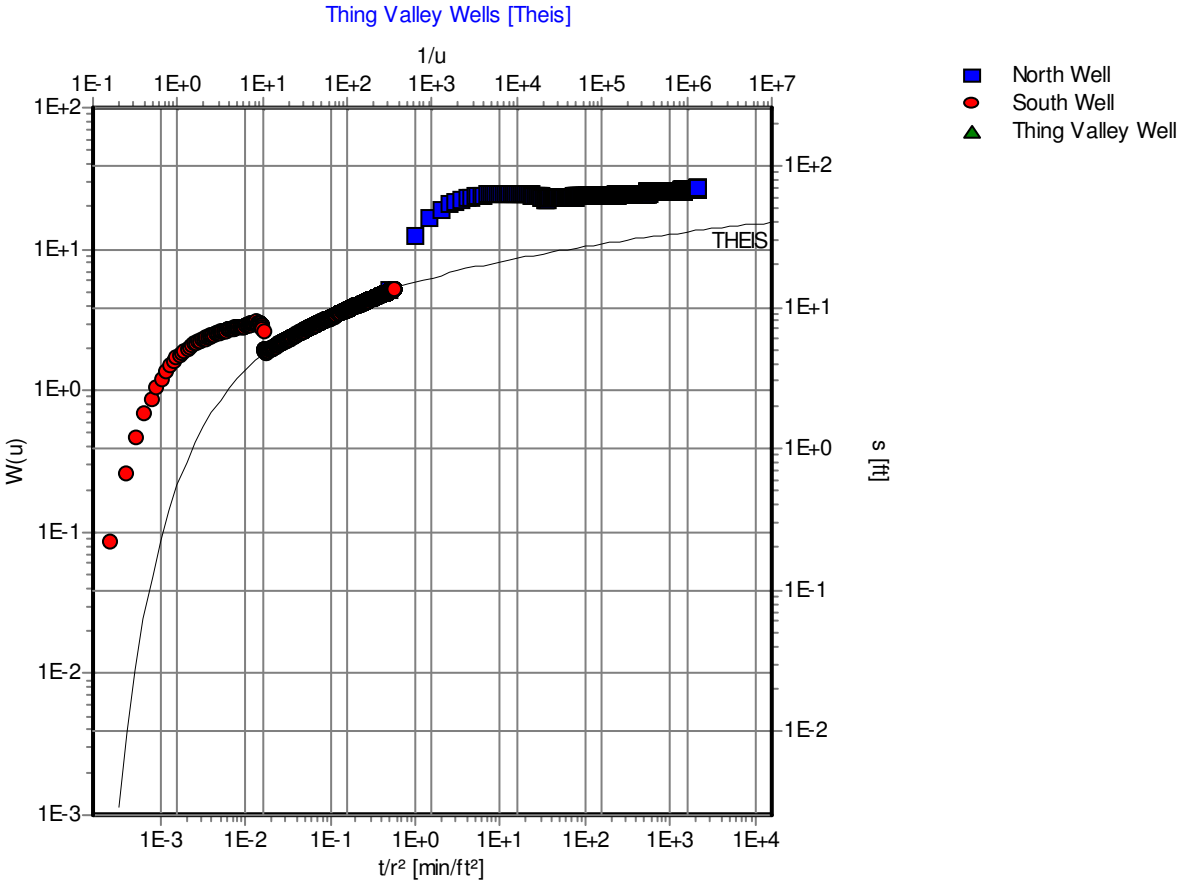
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Thing Valley Wells**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	4.77E+2 [ft²/d]	Conductivity:	1.36E+0 [ft/d]
	Storativity:	2.10E-3		
Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	80.111574 [U.S. gal/min]		

Comments: Match to South Well late data.

Evaluated by: MWV

Evaluation Date: 10/29/2010

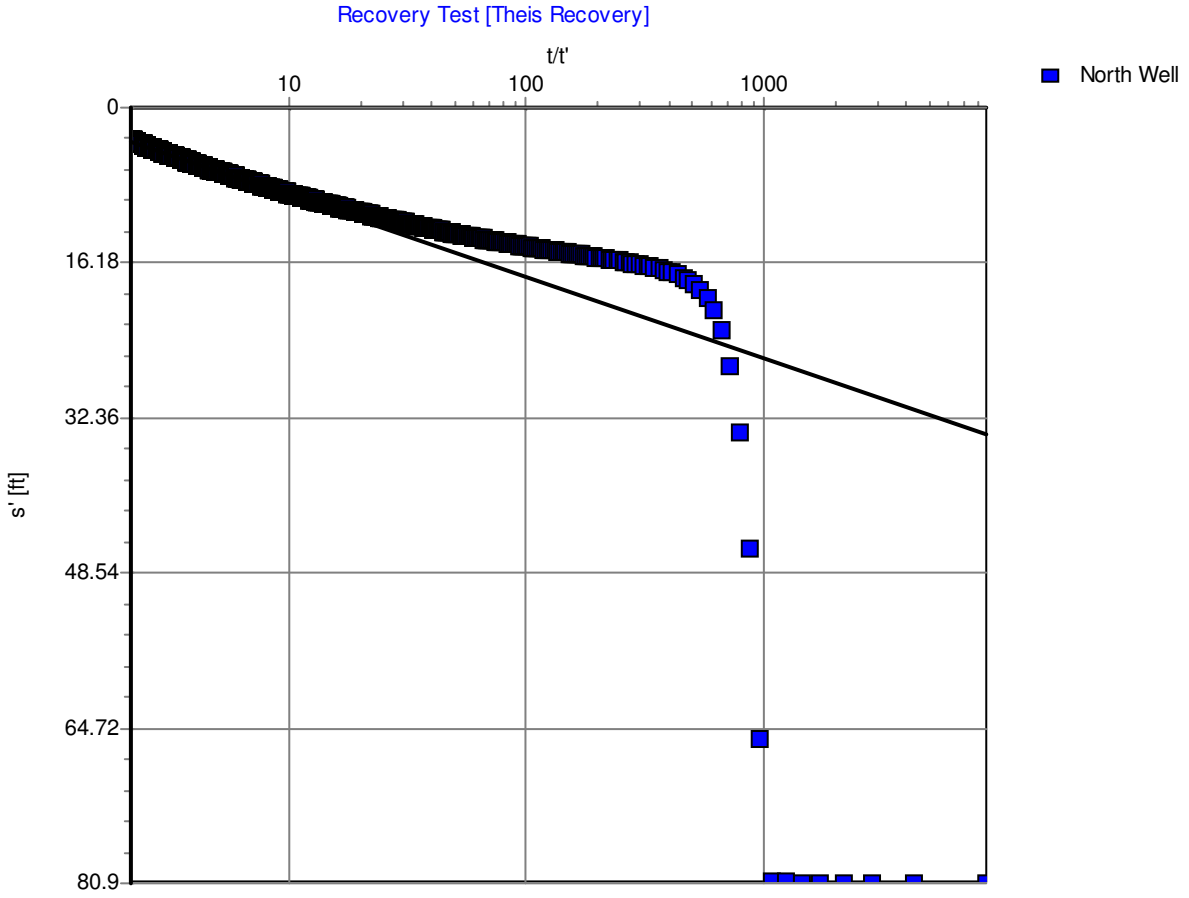
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Recovery Test**

Analysis Method: **Theis Recovery**

Analysis Results:	Transmissivity:	3.37E+2 [ft²/d]	Conductivity:	9.63E-1 [ft/d]

Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	81 [U.S. gal/min]		
	Pumping Time	4320 [min]		

Comments: North Well recovery match to late data.

Evaluated by: MWV

Evaluation Date: 11/2/2010

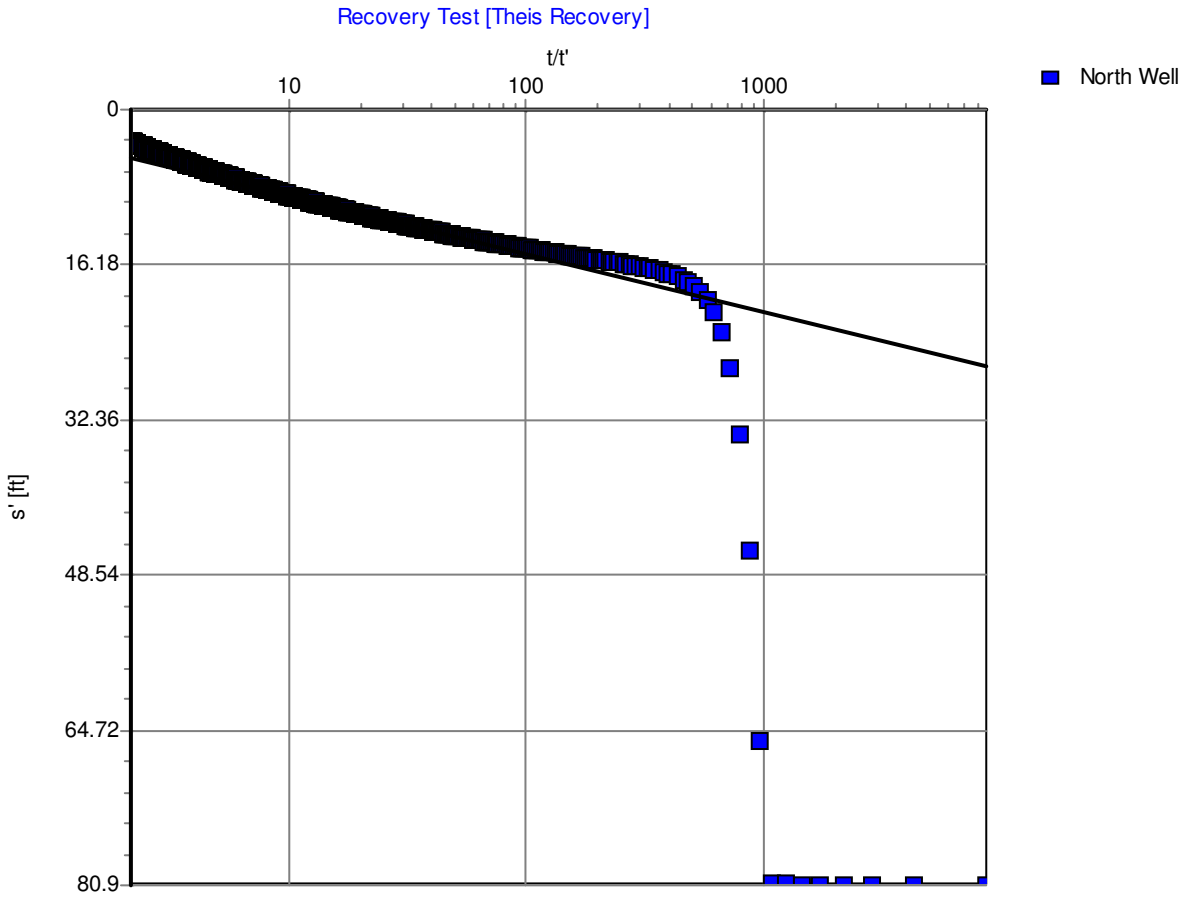
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Recovery Test**

Analysis Method: **Theis Recovery**

Analysis Results:				
	Transmissivity:	4.73E+2 [ft²/d]	Conductivity:	1.35E+0 [ft/d]

Test parameters:				
	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	81 [U.S. gal/min]		
	Pumping Time	4320 [min]		

Comments:

Evaluated by:

Evaluation Date: 11/2/2010

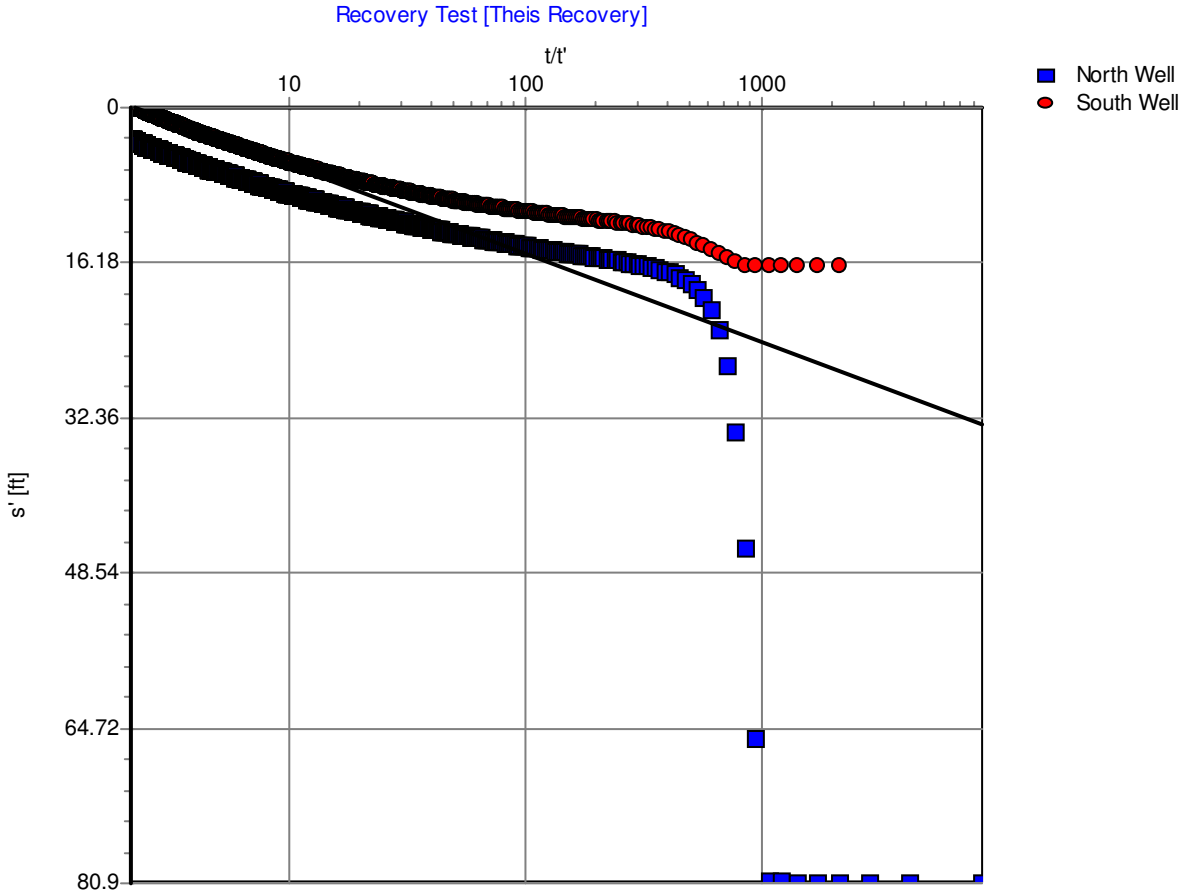
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Recovery Test**

Analysis Method: **Theis Recovery**

Analysis Results:	Transmissivity:	3.11E+2 [ft²/d]	Conductivity:	8.88E-1 [ft/d]

Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	81 [U.S. gal/min]		
	Pumping Time	4320 [min]		

Comments: South Well Recovery match to late data.

Evaluated by: MWV

Evaluation Date: 11/2/2010

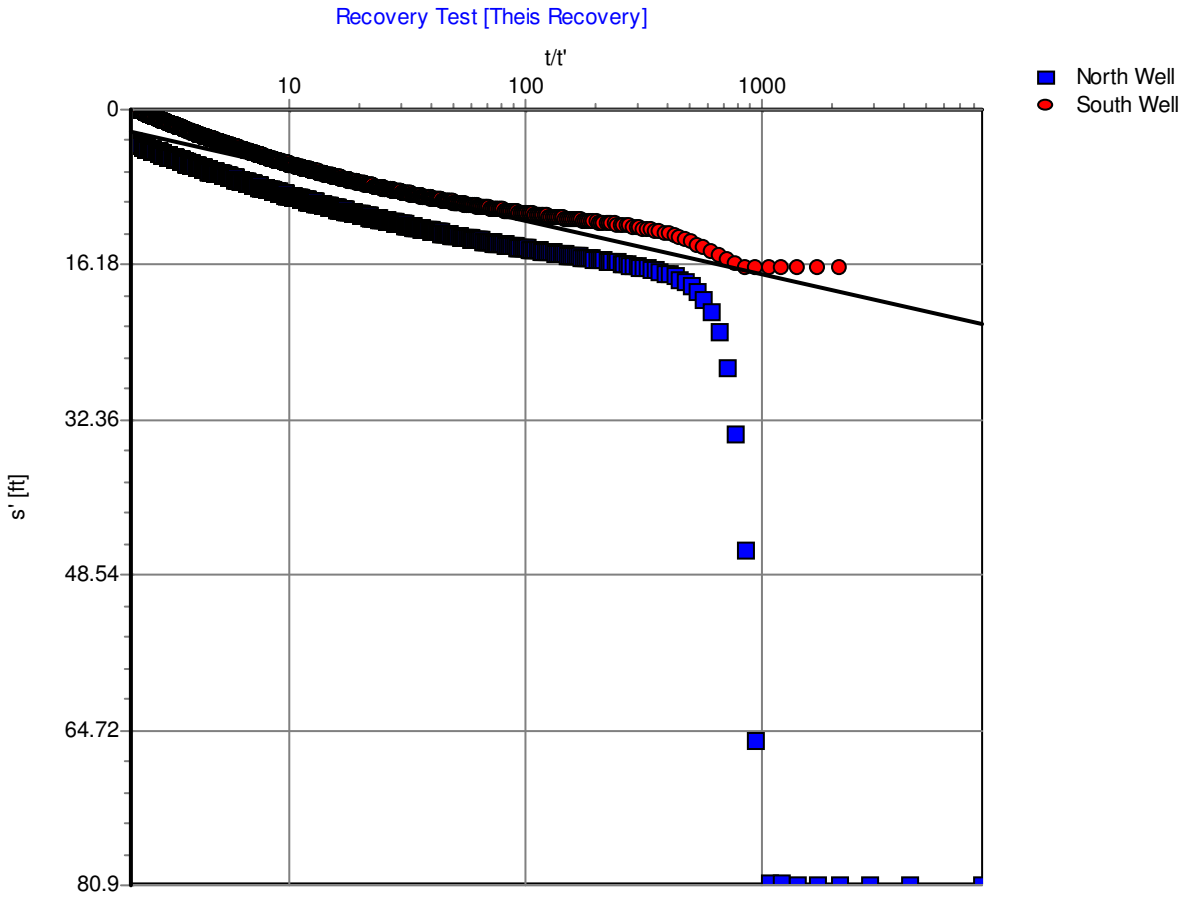
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Thing Valley

Number: 2010-0005

Client:



Pumping Test: **Recovery Test**

Analysis Method: **Theis Recovery**

Analysis Results:	Transmissivity:	5.08E+2 [ft²/d]	Conductivity:	1.45E+0 [ft/d]

Test parameters:	Pumping Well:	Pumping Well	Aquifer Thickness:	350 [ft]
	Casing radius:	0.25 [ft]	Confined Aquifer	
	Screen length:	350 [ft]		
	Boring radius:	0.42 [ft]		
	Discharge Rate:	81 [U.S. gal/min]		
	Pumping Time	4320 [min]		

Comments: South Well Recovery match to middle data.

Evaluated by: MWV

Evaluation Date: 11/2/2010

1

Abandoned / Destroyed

Too close to
Septic tank

2

Pump in well

NO power

pumped this w/
generator worked
fine

Just East of
water storage
tank

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
1255 Imperial Ave
San Diego, CA 92101
619-338-2222

WELL #2

INVOICE

ERMIT TYPE & NUMBER: LWEL 16225 INVOICE DATE: 16 SEP 2004
'ERMIT OWNER: CONTACT:
IANOS DRILLING & PUMP
6052 LAWSON VALLEY RD.

AMUL CA 91935

APN: ~~611-070-02-00~~ 611-060-03 611-070-01
APPLICANT:
FADEM ROBERT S&MARY O TRUST B1
SITE ADDRESS: ~~2750~~ MCCAIN VALLEY RD
LOCATION DESCRIPTION: ~~2750~~ MCCAIN VALLEY RD ~~JACUMBA 92036~~ BOULEVARD 91905 --

PROJECT DESCRIPTION/SCOPE
Number of Wells on Permit Application: 1
Description of Work: well drilling
Type of Use for Each Well: domestic

FEE/DEPOSIT DETAILS

FEE CODE	DESCRIPTION	TIME ACCT.	ACCT. CODE	AMOUNT
6LE01--EHO	WATER WELL PERMIT	429E01	9773-773	390.00
			TOTAL AMOUNT DUE	$390.00

1-11-2
R 7E
Sec 9

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
WELL PERMIT APPLICATION

Parcel #2 120 acres

DEH USE ONLY
PERMIT # W 16225
WELL COMPUTER #
FEE:
WATER DIST:

1. Property Owner: Hanson Companies Phone: 440-7124
   1110 Pioneer Way (Mailing Address) El Cajon (City) 92020 (Zip)
2. Well Location - Assessors Parcel Number ~~611-070-03~~ 611-060-03 611-070-01
   McCain Valley (Site Address) ~~Lucky H~~ Boulevard (City) (Zip)
3. Well Contractor - Well Driller Jim Mann Company Name: Jim Mann Drilling
   1655 La Cuesta Dr. (Mailing Address) Vista (City) 92135 (Zip)
   Phone#: 941 1926 C-57#: 376202 ☑ Cash Deposit ☐ Bond Posted
4. Use: ☐ Private ☐ Public ☐ Industrial ☐ Cathodic ☐ Other
5. Type of Work: ☐ New ☐ Reconstruction ☐ Destruction Time Extension: ☐ 1st ☐ 2nd
6. Type of Equipment: Air Rotary
7. Depth of Well: Proposed: 300 Existing: 0
8. Proposed:

Casing	Conductor Casing	Filter/Filler Material	Perforations
Type: Steel	☐ Yes ☐ No	☐ Yes ☐ No	
Depth: 280	Depth: ____ ft.	From: ____ To: ____	From: ____ To: ____
Diameter 7 in.	Diameter ____ in.	Type: ____	From: ____ To: ____
Wall/Gauge: 1/4	Wall/Gauge: ____	Wall/Gauge: ____	From: ____ To: ____

9. Annular Seal: Depth: 50 ft. Sealing Material: Cement
   Borehole diameter: 11 in. Conductor diameter: ____ in. Annular Thickness 2 in.
10. Date of Work: Start: 11-1-24 Complete: 11-2-24

On sites served by public water, contact the local water agency for meter protection requirements.

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: Jim Mann Date: 9-16-24

DISPOSITION OF APPLICATION (Department of Environmental Health Use only)

☒ Approved ☐ Denied Special Conditions: Grading and clearing associated with access to, or the construction, maintenance or destruction of water wells, may require additional permits from the County of San Diego and/or other agencies.

Specialist: Jonny D Cale Date: 9/16/24

No Public water to site

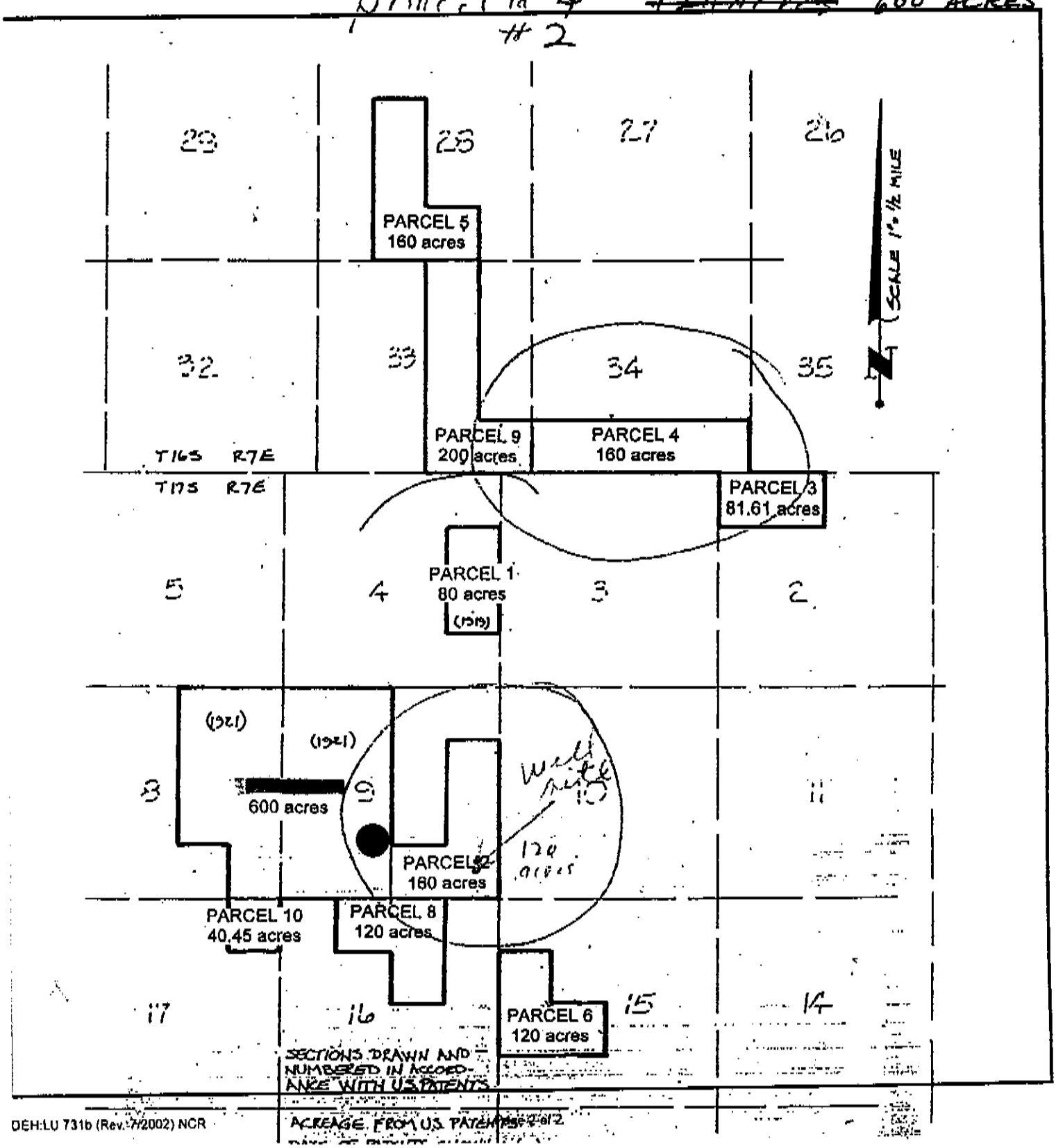
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWEL 16225
Assessor's Parcel Number: ~~611-070-03~~
611-060-03
611-070-01

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

Parcel # 2 600 ACRES



County Mail Station –A-21

ASSESSORS PARCEL NUMBER:

FIRST CARBON COPY

1/2 HP 160

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

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

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

State Well No. _____
Other Well No. _____

(1) OWNER: Name John Gibson #6
Address _____
City _____ Zip _____

(2) LOCATION OF WELL (See instructions):
County _____ Owner's Well Number _____
Well address if different from above _____
Township _____ Range _____ Section _____
Distance from cities, roads, railroads, fences, etc. _____

DEPARTMENT USE ONLY
Completed Well Construction:
Date _____
Date Inspected _____
Comments _____
Water Sample Taken? _____
Sanitarian's Approval:
6/4

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

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

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

(6) Gravel Pack: AGGA $
Yes ☐ No ☒ Size _____
Diameter of above _____
Packed from _____ to _____ ft.

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

From ft.	To ft.	Dia. in.	Gage or Wall
0	24'	7"	156

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

From ft.	To ft.	Slot Size

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

(10) WATER LEVELS:
Depth of first water, if known 70' ft.
Standing level after well completion 45' ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? DRILLER
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test — ft. At end of test _____ ft.
Discharge 10 gal/min after 3 hours Water temperature Cold
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 600 ft. Depth of completed well 185? ft.
from ft. to ft. Formation (Describe by color, character, size or material)

0-2 - LOOSE SOIL
2-15 - D.G. GRAN
15-70 - BLACK, WHITE ROCK
70-71 - WATER (2 GPM)
71-90 - BLACK, WHITE ROCK
90-92 - WATER, ORANGE (2 GPM)
92-168 - BLACK, WHITE ROCK, SOME WATER AREAS
168-178 - VERY WATER (6 GPM)

Work Started _____ 19 Completed _____ 19

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 _____ (Well Driller)

NAME _____ (Person, firm, or Corporation) (Type or Print)

ADDRESS _____

CITY _____ ZIP _____

LICENSE NO. _____ DATE THIS REPORT _____

DHS:EHP-732 (83) CONFIDENTIAL – NOT FOR PUBLIC USE – WATER CODE SEC. 13752

DUPLICATE
Driller's Copy

Owner's Well No. 2

Date Work Began 10-1-04, Ended 10-4-04

Local Permit Agency San Diego E.H.S.

Permit No. LWEL16225 Permit Date 9-16-04

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 0909404

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

CONFIDENTIAL
NOT FOR PUBLIC USE
WATER CODE SEC 13752

GEOLOGIC LOG

ORIENTATION (✓) x VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD rotary FLUID air

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 – 2	loose soil
2 – 15	dg, gray
15 – 70	black & white rock
70 – 71	softer
71 – 90	black & white rock
90 – 92	softer, orange
92 – 168	black & white rock
	some softer areas
168 – 178	very soft

TOTAL DEPTH OF BORING 600 (Feet)

TOTAL DEPTH OF COMPLETED WELL 185 (Feet)

WELL OWNER

Name Hamann Companies

Mailing Address 1000 Pioneer Way

El Cajon, Ca 92020

CITY STATE ZIP

WELL LOCATION

Address McCain Valley

City Jacumba

County San Diego

APN Book 611 Page 070 Parcel 02

Township 17 Range 7E Section 9

Lat ___ N DEG. MIN. SEC. Long ___ W DEG. MIN. SEC.

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

See Jim Carter

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.***

ACTIVITY (✓)

x NEW WELL

MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)

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

USES (✓)

WATER SUPPLY
x Domestic ___ Public
___ Irrigation ___ Industrial

MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 70 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 45 (Ft.) & DATE MEASURED 10-4-04

ESTIMATED YIELD * 10 (GPM) & TEST TYPE airlift

TEST LENGTH 3 (Hrs.) TOTAL DRAWDOWN — (Ft.)

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

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE: BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 – 24	11	x				steel	6 5/8	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 – 24	x	x		

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
1 Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME JIM MANOS DRILLING & PUMP
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

16052 LAWSON VLY RD, JAMUL, CA 91935
ADDRESS CITY STATE ZIP

Signed [signature] 3-6-06 360723
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED C-57 LICENSE NUMBER

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

#3

NO PUMP

NO POWER

WELL IS CAPPED

LOW GPM

COUNTY OF SAN DIEGO

DEPARTMENT OF ENVIRONMENTAL HEALTH
1255 Imperial Ave
San Diego, CA 92101
619-338-2222

#3

INVOICE

PERMIT TYPE & NUMBER: LWEL 16223 **INVOICE DATE:** 16 SEP 2004

PERMIT OWNER:
MANOS DRILLING & PUMP
16052 LAWSON VALLEY RD.

JAMUL CA 91935

CONTACT:

611-060-03
APN: ~~529-150-01-00~~ 611-070-01

APPLICANT:
FADEM ROBERT S&MARY O TRUST B1

SITE ADDRESS: ~~6057~~ MCCAIN VALLEY RD BOULEVARD 91905

LOCATION DESCRIPTION: ~~3057~~ MCCAIN VALLEY RD. ~~EL CAJON 92020~~

PROJECT DESCRIPTION/SCOPE
Number of Wells on Permit Application: 1
Description of Work: well drilling
Type of Use for Each Well: domestic

FEE/DEPOSIT DETAILS

FEE CODE	DESCRIPTION	TIME ACCT.	ACCT. CODE	AMOUNT
6LE01--EHO	WATER WELL PERMIT	429E01	9773-773	390.00
			09-16-04 11129 9773 773 429E01 CHECK	
			TOTAL AMOUNT DUE	$390.00

T-16 S
R 7E
Sec. 34

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
WELL PERMIT APPLICATION

Parcel 1 - 4 ~~160 acres~~ 600 ACRES

DEH USE ONLY
PERMIT # WEL16223
WELL COMPUTER #:
FEE:
WATER DIST:

1. Property Owner: Hamann Companies Phone: 440-7424
   1000 Pioneer Way (Mailing Address) El Cajon (City) 92020 (Zip)
2. Well Location - Assessors Parcel Number: Contd- ~~[illegible]~~ 611-060-03 611-070-01
   McCain Valley (Site Address) ~~[illegible]~~ BOULEVARD (City) 91905 (Zip)
3. Well Contractor - Well Driller: Van Adams Company Name: Van Adams Drilling
   11052 Campo Rd (Mailing Address) Jamul (City) 91935 (Zip)
   Phone#: 445-1926 C-57#: 566722 ☒ Cash Deposit ☐ Bond Posted
4. Use: ☒ Private ☐ Public ☐ Industrial ☐ Cathodic ☐ Other
5. Type of Work: ☑ New ☐ Reconstruction ☐ Destruction Time Extension: ☐ 1st ☐ 2nd
6. Type of Equipment: Air Rotary
7. Depth of Well: Proposed: 300 Existing: Ø
8. Proposed:

Casing	Conductor Casing	Filter/Filler Material	Perforations
Type: Steel	☐ Yes ☐ No	☐ Yes ☐ No	From: To:
Depth: 20	Depth: ft.	From: To:	From: To:
Diameter 7 in.	Diameter in.	Type:	From: To:
Wall/Gauge: .188	Wall/Gauge:	Wall/Gauge:	

9. Annular Seal: Depth: 20 ft. Sealing Material: Bentonite Cement
   Borehole diameter: 11 in. Conductor diameter: in. Annular Thickness 2 in.
10. Date of Work: Start: 9-27-04 Complete: 9-30-04

On sites served by public water, contact the local water agency for meter protection requirements.

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: [signature] Date: 9-16-04

DISPOSITION OF APPLICATION (Department of Environmental Health Use only)

☒ **Approved** ☐ **Denied** Special Conditions: Grading and clearing associated with access to, or the construction, maintenance or destruction of water wells, may require additional permits from the County of San Diego and/or other agencies.

Specialist: [signature] Date: 9/16/04

DEH-LU-731a (Rev. 4/02) NCR

No public water to site

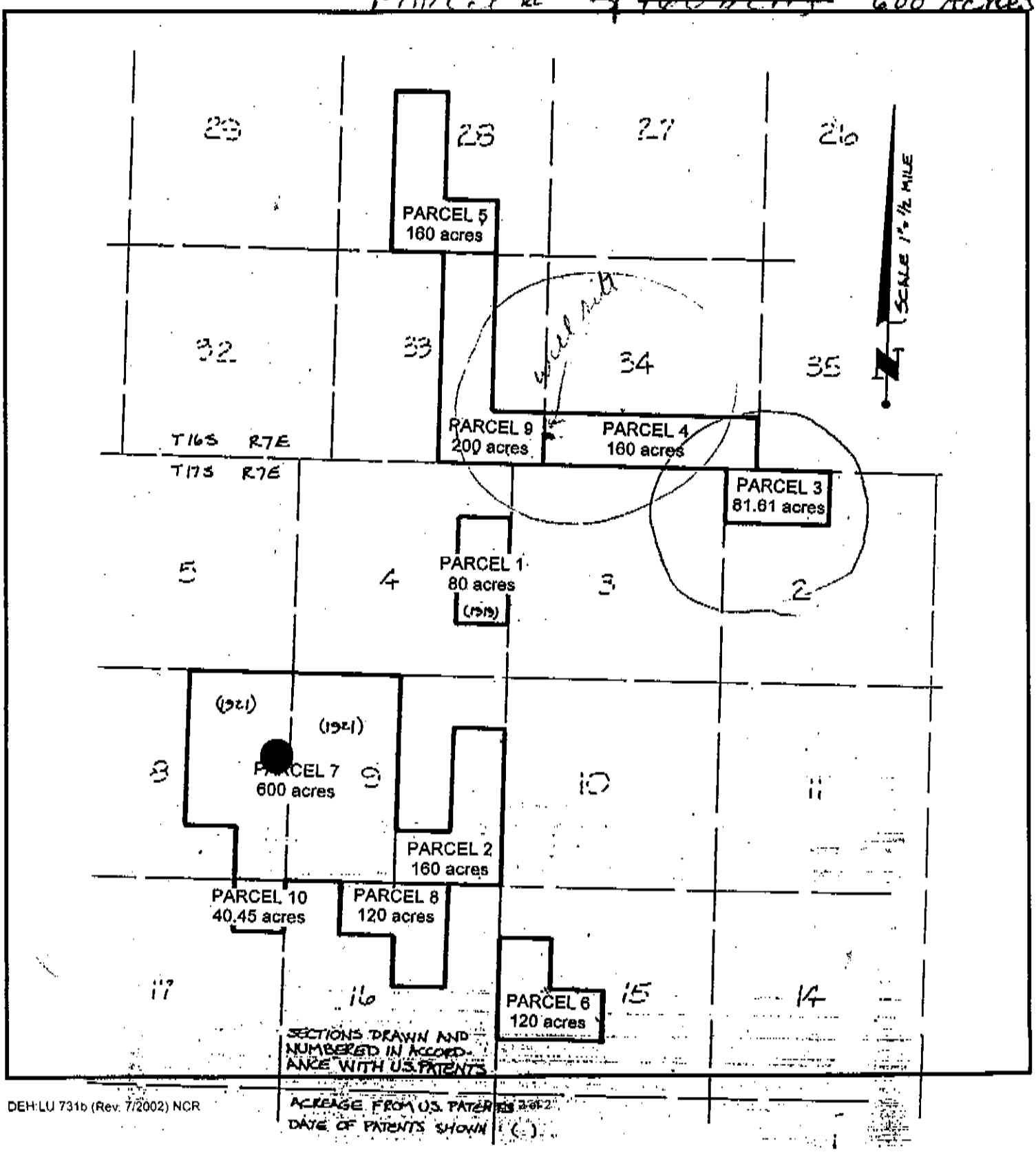
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWEL 16223
Assessor's Parcel Number: ~~526-150-07~~
611-060-03
611-070-01

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

Parcel # 4 Hooper 600 Acres



4 3

County Mail Station –A-21

ASSESSORS PARCEL NUMBER:

FIRST CARBON COPY

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

0

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

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

State Well No. _____
Other Well No. _____

(1) OWNER: Name John Gibson #5
Address MCCAIN VALLEY
City _____ Zip _____

(2) LOCATION OF WELL (See instructions):
County _____ Owner's Well Number _____
Well address if different from above _____
Township _____ Range _____ Section _____
Distance from cities, roads, railroads, fences, etc. _____

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

5 3/4

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

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

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

(6) Gravel Pack: Needs
Yes ☐ No ☒ Size _____
Diameter of above _____
Packed from _____ to _____ ft.

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

From ft.	To ft.	Dia. in.	Gage or Wall
0	209	6 5/8	188

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

From ft.	To ft.	Slot Size

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

(10) WATER LEVELS:
Depth of first water, if known 50' ft.
Standing level after well completion 35' ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? DRILLER
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge 2 gal/min after 2 hours Water temperature cool
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 900 ft. Depth of completed well 900 ft.
from ft. to ft. Formation (Describe by color, character, size or material)

0 - 2 - SANDY TOPSOIL
2 - 102 - BLACK, WHITE, ORANGE, GRAY SOFT AREAS, LOOSE ROCKS; SOUND (DRLR)
102 - 110 - BLACK, WHITE ROCK
110 - 112 - SOFTER (SOME GRAV) SOUND
112 - 349 - BLACK, WHITE ROCK
349 - 349 - SOFTER (SOME GRAV)
349 - 900 - BLACK, WHITE ROCK SOUND SOFTER AREAS

Work Started _____ 19 Completed _____ 19

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 _____ (Well Driller)

NAME _____ (Person, firm, or Corporation) (Type or Print)

ADDRESS _____

CITY _____ ZIP _____

LICENSE NO. _____ DATE THIS REPORT _____

DHS:EHP-732 (83) CONFIDENTIAL – NOT FOR PUBLIC USE – WATER CODE SEC. 13752

DUPLICATE
Driller's Copy

Page 1 of 1
Owner's Well No. 3

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0909443

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

Date Work Began 9-27-04, Ended 9-30-04
Local Permit Agency San Diego E.H.S.
Permit No. LWEL16223 Permit Date 9-16-04

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD rotary FLUID air

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 2	sandy topsoil
2 102	black, white, orange, very soft areas, loose rocks & sand
102 110	black & white rock
110 112	softer
112 348	black & white rock
348 349	soft
349 900	black & white rock, some softer areas

TOTAL DEPTH OF BORING 900 (Feet)
TOTAL DEPTH OF COMPLETED WELL 900 (Feet)

WELL OWNER
Name Hamann Companies
Mailing Address 1900 Pioneer Way
City El Cajon, Ca 92020 STATE ZIP

WELL LOCATION
Address 7057 McCain Valley Rd
City Jacumba
County San Diego
APN Book 529 Page 150 Parcel 01
Township 16 S Range 7 E Section 34
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH
NORTH / WEST / EAST / SOUTH

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

ACTIVITY (✓)
✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
✓ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH TO FIRST WATER 50 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 35 (Ft.) & DATE MEASURED 9-30-04
ESTIMATED YIELD * 2 (GPM) & TEST TYPE airlift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN - (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 209	11	x				steel	6 5/8	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 209	x	x		

ATTACHMENTS (✓)
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
✓ Other ___
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

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

NAME JIM MANOS DRILLING & PUMP
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

16052 LAWSON VLY RD, JAMUL, CA 91935
ADDRESS CITY STATE ZIP

Signed ___ 3-6-06 360722
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED C-57 LICENSE NUMBER

CONFIDENTIAL
NOT FOR PUBLIC RELEASE
WATER CODE SECTION 13752

#4

Power at well

NO pump

across road from

bathrooms in

west canyon

water was discolored

& hence quit using

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
1255 Imperial Ave
San Diego, CA 92101
619-338-2222

#4

INVOICE

ERMIT TYPE & NUMBER: LWEL 16226 — INVOICE DATE: 16 SEP 2004
ERMIT OWNER: — CONTACT:
ADEM ROBERT S&MARY O TRUST B1
53 OCEAN ST

92008

611-060-03 — APPLICANT:
PN: ~~611-110-01-00~~ 611-070-01 — FADEM ROBERT S&MARY O TRUST B1
ITE ADDRESS: ~~2533~~ MCCAIN VALLEY RD
OCATION DESCRIPTION: ~~2533~~ MCCAIN VALLEY RD,

ROJECT DESCRIPTION/SCOPE
umber of Wells on Permit Application:1
escription of Work:new
ype of Use for Each Well:private

EE/DEPOSIT DETAILS

FEE CODE	DESCRIPTION	TIME ACCT.	ACCT. CODE	AMOUNT
6LE01--EHO	WATER WELL PERMIT	429E01	9773-773	390.00
			09-16-04 11:30 9773 772 429E01 CHECK	$390.00
			TOTAL AMOUNT DUE	$390.00

27E
6.15

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
WELL PERMIT APPLICATION

Parcel 11 ~~67~~ 600 ~~12000~~

DEH USE ONLY
PERMIT # W LWCL162
WELL COMPUTER #
FEE:
WATER DIST:

1. Property Owner: Hamann Companies Phone: 440-7424
   1000 Pioneer Way — Mailing Address; El Cajon — City; 92020 — Zip
2. Well Location - Assessors Parcel Number ~~611-110-01~~ 611-060-03 611-070-01
   [illegible] — Site Address; ~~[illegible]~~ BOULEVARD — City; 91905 — Zip
3. Well Contractor - Well Driller Jim Mayes Company Name: Jim Mayes Drilling
   [illegible] — Mailing Address; [illegible] — City; [illegible] — Zip

   Phone#: 445-1926 C-57#: [illegible]722 ☐ Cash Deposit ☐ Bond Posted
4. Use: ☒ Private ☐ Public ☐ Industrial ☐ Cathodic ☐ Other ______
5. Type of Work: ☐ New ☐ Reconstruction ☐ Destruction Time Extension: ☐ 1st ☐ 2nd
6. Type of Equipment: Air Rotary
7. Depth of Well: Proposed: 300 Existing: ____
8. Proposed:

Casing	Conductor Casing	Filter/Filler Material	Perforations
Type: Steel	☐ Yes ☐ No	☐ Yes ☐ No	From: ____ To: ____
Depth: 20	Depth: ____ ft.	From: ____ To: ____	From: ____ To: ____
Diameter 7 in.	Diameter ____ in.	Type: ____	From: ____ To: ____
Wall/Gauge: [illegible]	Wall/Gauge: ____	Wall/Gauge: ____	

9. Annular Seal: Depth: [illegible] ft. Sealing Material: [illegible]
   Borehole diameter: ____ in. Conductor diameter: ____ in. Annular Thickness ____ in.
10. Date of Work: Start: [illegible] Complete: 7-27-04

On sites served by public water, contact the local water agency for meter protection requirements.

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: [signature] Date: [illegible]

DISPOSITION OF APPLICATION (Department of Environmental Health Use only)

☒ Approved ☐ Denied Special Conditions: Grading and clearing associated with access to, or the construction, maintenance or destruction of water wells, may require additional permits from the County of San Diego and/or other agencies.

Specialist: [signature] Date: 9/16/04

DEH-LU-731a (Rev. 4/02) NCR

[illegible handwriting]

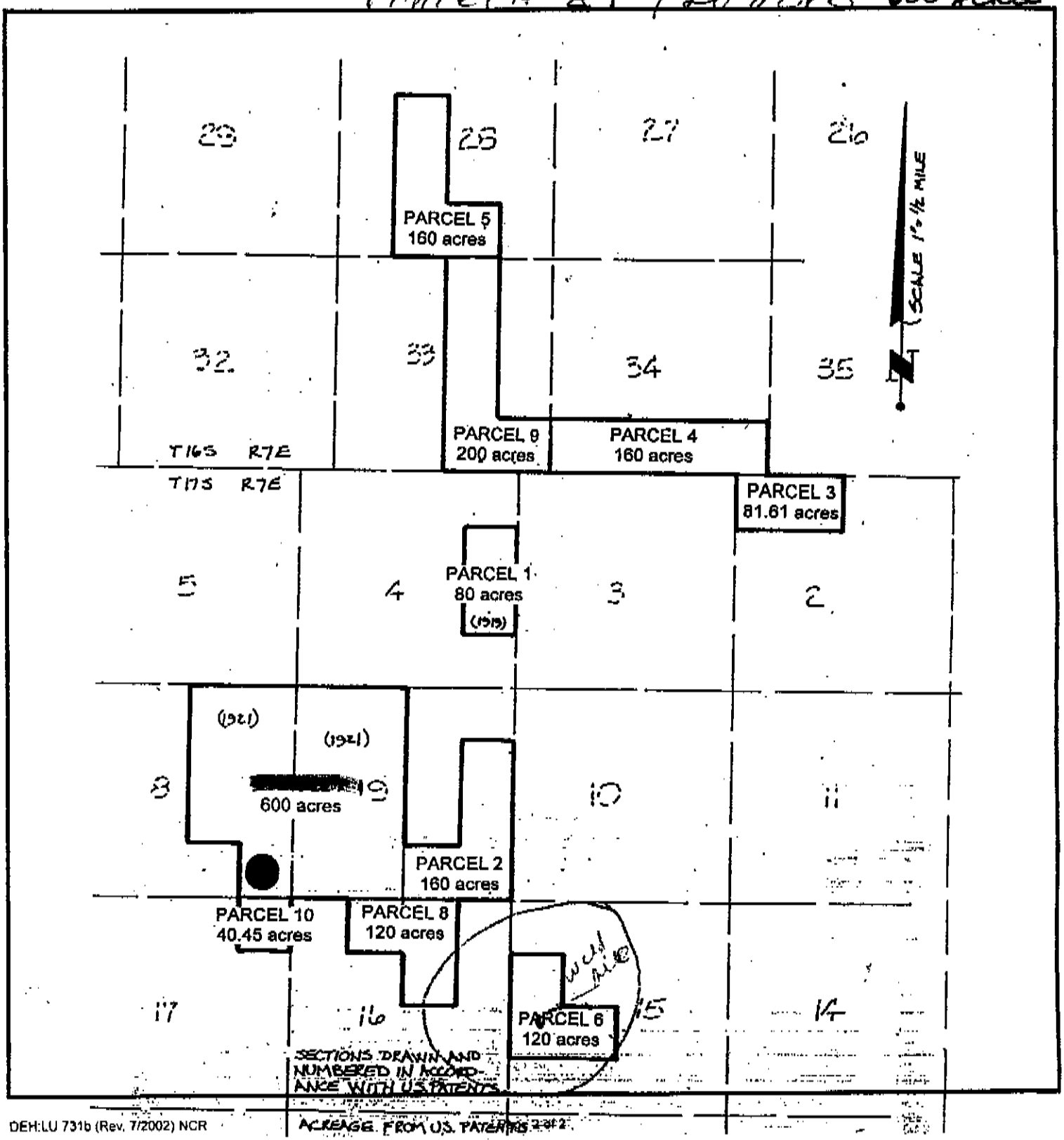
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWCL 16226
Assessor's Parcel Number: ~~611-110-07~~
611-060-03
611-070-01

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

Parcel # 87 + 88 = 600 ACRES



County Mail Station — A-21

FIRST CARBON COPY

ASSESSORS PARCEL NUMBER: ________

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

WATER WELL DRILLERS REPORT

(INSERT under ORIGINAL PAGE w/carbon of State Form)

Notice of Intent No. ________
Local Permit No. or Date ________

State Well No. ________
Other Well No. ________

(1) OWNER: Name JOHN WELL NO 2
Address ROYAL ACRES
City ________ Zip ________

(2) LOCATION OF WELL (See Instructions):
County ________ Owner's Well Number ________
Well address if different from above ________
Township ________ Range ________ Section ________
Distance from cities, roads, railroads, fences, etc. ________

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

Jeffrey #8

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

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

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

(6) Gravel Pack:
Yes ☒ No ☐ Size 3/8ths
Diameter of above 4"
Packed from 0 to 185 ft.

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

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

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot Size
0	91	6 5/8	188	0	185	3/32ths

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 91' ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval ________ ft.
Method of sealing BENTONITE - CEMENT

(10) WATER LEVELS:
Depth of first water, if known 130' ft.
Standing level after well completion 85 ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? Driller
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test — ft. At end of test — ft.
Discharge 15 gal/min after 1 hours Water temperature Cold
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 260 ft. Depth of completed well 185 ft.
from ft. to ft. Formation (Describe by color, character, size or material)

0-91 - SANDY, D.G.
91-130 - SOFT, ORANGE, WHITE & BROWN
130-132 - GRAY SOFT (5 GPM)
132-185 - SOFT ORANGE, WHITE, BLACK
185-190 - LOOSE ROCKS (20 GPM)
190-260 - SOFT & HARD

Work Started ________ 19 __ Completed ________ 19 __

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 [signature]
(Well Driller)

NAME ________
(Person, firm, or Corporation) (Type or Print)

ADDRESS ________
CITY ________ ZIP ________
LICENSE NO. ________ DATE THIS REPORT ________

DHS:EHP-732 (83) CONFIDENTIAL — NOT FOR PUBLIC USE — WATER CODE SEC. 13752

DUPLICATE
Driller's Copy

Page 1 of 1
Owner's Well No. X 4
Date Work Began 9-25-04, Ended 9-27-04
Local Permit Agency San Diego E.H.S.
Permit No. LWEL16226 Permit Date 9-16-04

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0909442

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

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD rotary FLUID air

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 91	sandy, dg
91 130	soft, orange, white & brown
130 133	very soft
133 185	soft, orange, white & black
185 190	loose rocks
190 260	soft & hard

TOTAL DEPTH OF BORING 260 (Feet)
TOTAL DEPTH OF COMPLETED WELL 185 (Feet)

WELL OWNER
Name Hamann Companies
Mailing Address 1000 Pioneer Way
CITY El Cajon, Ca. 92020 STATE ZIP

WELL LOCATION
Address McCain Valley Rd
City Jacumba
County San Diego
APN Book 611 Page 110 Parcel 01
Township 17 S Range 7 E Section 15
Lat ___ DEG. ___ MIN. ___ SEC. N Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH
NORTH / WEST / EAST / SOUTH
Sandhills

*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.***

ACTIVITY (✓)
X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH TO FIRST WATER 130 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 35 (Ft.) & DATE MEASURED 9-27-04
ESTIMATED YIELD * 15 (GPM) & TEST TYPE airlift
TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN — (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 91	11	x				steel	5 5/8	.188	
0 185	6¼		x			pvc	4	sch 40	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 91	x	x		
0 185			x	5/16 pea gravel

ATTACHMENTS (✓)
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

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

NAME TIM MANOS DRILLING & PUMP
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 16052 LAWSON VLY RD. JAMUL, CA 91935
CITY STATE ZIP
Signed [signature] 3-6-05
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED
360722
C-57 LICENSE NUMBER

DWR 188 REV. 05-03
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

CONFIDENTIAL
NOT FOR PUBLIC DISCLOSE
SECTION 13752
WATER CODE

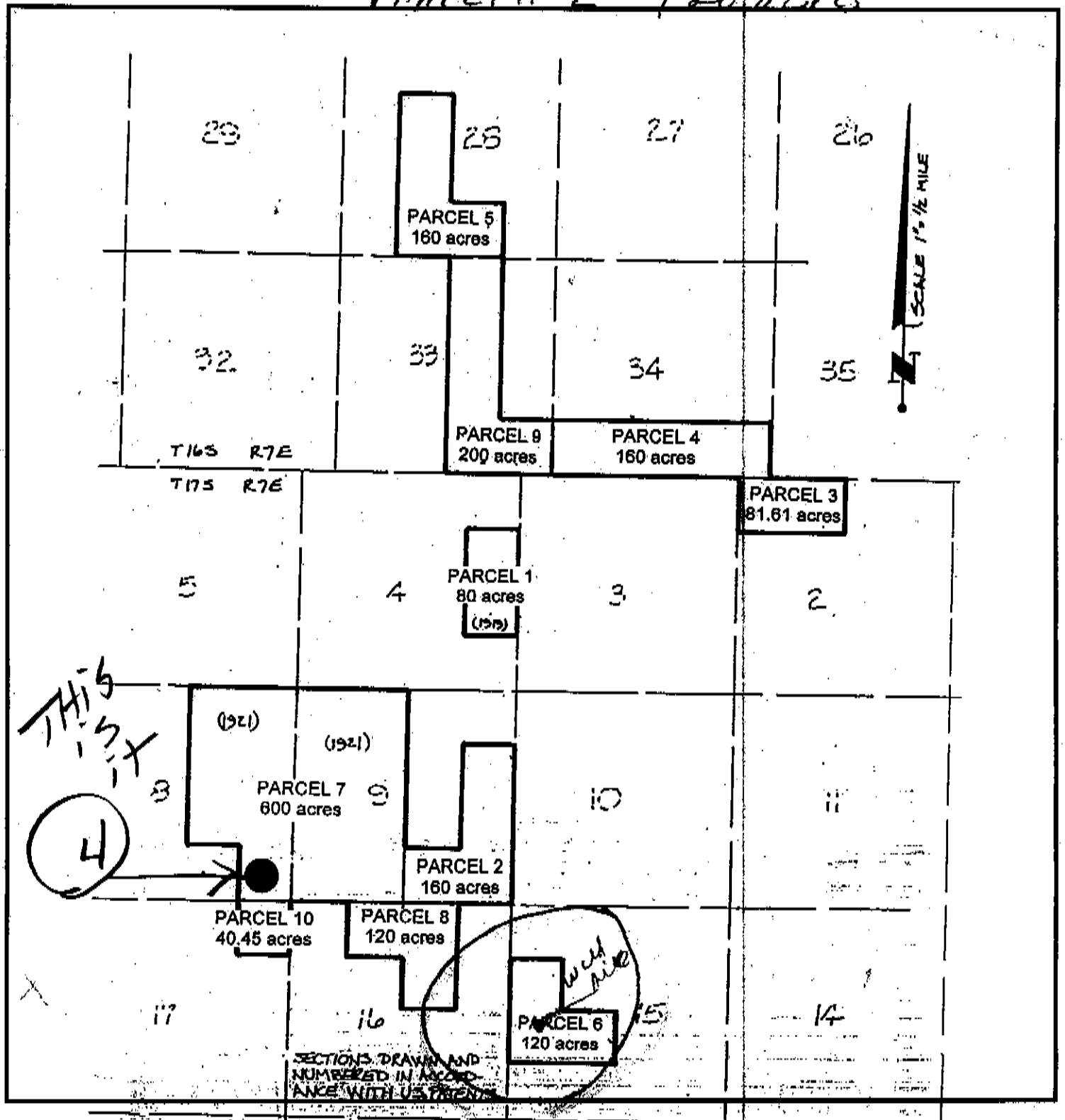
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWEL 16226
Assessor's Parcel Number: 611-110-01

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

Parcel # 6 120 acres



DEH:LU 731b (Rev. 7/2002) NCR

5

Pump & power
to well

Have never
used this well

COUNTY OF SAN DIEGO

DEPARTMENT OF ENVIRONMENTAL HEALTH
1255 Imperial Ave
San Diego, CA 92101
619-338-2222

H5

INVOICE

PERMIT TYPE & NUMBER: LWEL 16224
INVOICE DATE: 16 SEP 2004

PERMIT OWNER:
MANOS DRILLING & PUMP
16052 LAWSON VALLEY RD.

JAMUL CA 91935

CONTACT:

APPLICANT:
HAMANN ROBERT D FAMILY TRUST 04

APN: 611-030-01-00
SITE ADDRESS: 3041 MCCAIN VALLEY RD
LOCATION DESCRIPTION: 3041 MCCAIN VALLEY RD. JACUMBA 91935

PROJECT DESCRIPTION/SCOPE
Number of Wells on Permit Application: 1
Description of Work: well drilling
Type of Use for Each Well: domestic

FEE/DEPOSIT DETAILS

FEE CODE	DESCRIPTION	TIME ACCT.	ACCT. CODE	AMOUNT
6LE01--EHO	WATER WELL PERMIT	429E01	9773-773	390.00
			09-16-04 11:32 9773 773 429E01 CHECK	#39
			TOTAL AMOUNT DUE	$390.00

R-7E
Sec 4

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
WELL PERMIT APPLICATION

Parcel #1 80 Acres

DEH USE ONLY
PERMIT # WEL 16224
WELL COMPUTER #
FEE:
WATER DIST:

1. Property Owner: Hamann Companies Phone: [illegible] 7424
1000 [illegible] [illegible]
Mailing Address City Zip

2. Well Location - Assessors Parcel Number 611-030-08
McCain Vly [illegible]
Site Address City Zip

3. Well Contractor - Well Driller Jim Manos Company Name: [illegible] Drilling

Mailing Address City Zip

Phone#: 445-1926 C-57#: 361-722 ☒ Cash Deposit ☐ Bond Posted

4. Use: ☒ Private ☐ Public ☐ Industrial ☐ Cathodic ☐ Other ______

5. Type of Work: ☒ New ☐ Reconstruction ☐ Destruction Time Extension: ☐ 1st ☐ 2nd

6. Type of Equipment: [illegible]

7. Depth of Well: Proposed: 300 Existing: —

8. Proposed:

Casing	Conductor Casing	Filter/Filler Material	Perforations
Type: Steel	☐ Yes ☐ No	☐ Yes ☐ No	
Depth: [illegible]	Depth: ______ ft.	From: ______ To: ______	From: ______ To: ______
Diameter ______ in.	Diameter ______ in.	Type: ______	From: ______ To: ______
Wall/Gauge: [illegible]	Wall/Gauge: ______	Wall/Gauge: ______	From: ______ To: ______

9. Annular Seal: Depth: ______ ft. Sealing Material: [illegible]
Borehole diameter: ______ in. Conductor diameter: ______ in. Annular Thickness ______ in.

10. Date of Work: Start: [illegible] Complete: [illegible]

On sites served by public water, contact the local water agency for meter protection requirements.

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: [signature] Date: 9-16-04

DISPOSITION OF APPLICATION (Department of Environmental Health Use only)

☒ **Approved** ☐ **Denied** Special Conditions: Grading and clearing associated with access to, or the construction, maintenance or destruction of water wells, may require additional permits from the County of San Diego and/or other agencies.

Specialist: [signature] Date: 9/16/04

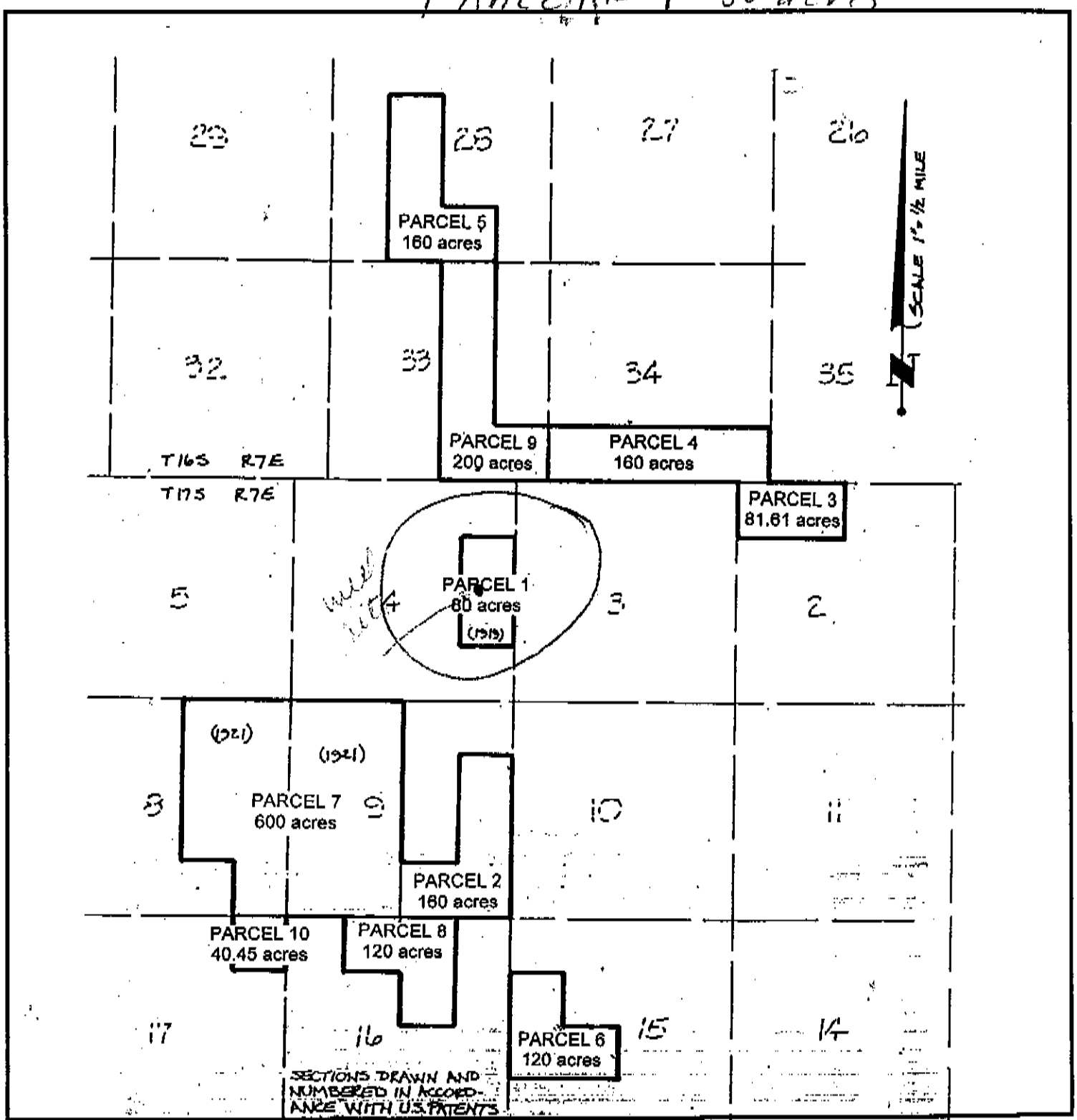
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWQ 16774
Assessor's Parcel Number: 611-030-08

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

Parcel # 1 80 acres



County Mail Station –A-21

FIRST CARBON COPY

ASSESSORS PARCEL NUMBER: _____

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

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

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

State Well No. _____
Other Well No. _____

(1) OWNER: Name JOHN WELL #3
Address _____
City _____ Zip _____

(2) LOCATION OF WELL (See instructions):
County _____ Owner's Well Number _____
Well address if different from above _____
Township _____ Range _____ Section _____
Distance from cities, roads, railroads, fences, etc. _____

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

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

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

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

(6) Gravel Pack:
Yes ☐ No ☒ Size _____
Diameter of above _____
Packed from _____ to _____ ft.

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

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

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot Size
0	92	2"	.188			

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 20' ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval _____ ft.
Method of sealing BENTONITE - CEMENT

(10) WATER LEVELS:
Depth of first water, if known 50' ft.
Standing level after well completion 45' ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? DRILLER
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test – ft. At end of test _____ ft.
Discharge 7 gal/min after 1 hours Water temperature COOL
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 800 ft. Depth of completed well 800 ft.
from ft. to ft. Formation (Describe by color, character, size or material)

0 - 1½ TOPSOIL
1½ - 50 - BLACK, WHITE ROCK
50 - 51 - (5 GPM)
51 - 110 - BLACK, WHITE ROCK
110 - 112 - SOFTER, ORANGE (1 GPM)
112 - 726 - BLACK, WHITE ROCK
726 - 727 - (5 GPM)
727 - 800 - BLACK, WHITE ROCK

Work Started _____ 19 Completed _____ 19

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 _____ (Well Driller)

NAME _____ (Person, firm, or Corporation) (Type or Print)

ADDRESS _____

CITY _____ ZIP _____

LICENSE NO. _____ DATE THIS REPORT _____

DHS:EHP-732 (8 CONFIDENTIAL – NOT FOR PUBLIC USE – WATER CODE SEC. 13752

DUPLICATE
Driller's Copy

Page 1 of 1
Owner's Well No. 5
Date Work Began 9-21-04, Ended 9-25-04
Local Permit Agency San Diego E.H.S.
Permit No. LWEL16224 Permit Date 9-16-04

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0909441

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

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD rotary FLUID air

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 1½	topsoil
1½ 50	black & white rock
50 51	crack
51 110	black & white rock
110 112	softer, orange
112 726	black & white rock
726 727	crack
727 800	black & white rock

TOTAL DEPTH OF BORING 800 (Feet)
TOTAL DEPTH OF COMPLETED WELL 800 (Feet)

WELL OWNER

Name Hamann Companies
Mailing Address 1000 Rioneer Way
City El Cajon, Ca 92020 State Zip

WELL LOCATION

Address 3041 McCain Valley Rd
City Jacumba
County San Diego
APN Book 611 Page 030 Parcel 01
Township 16 S Range 7E Section 4
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

See Sketch

*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.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 50 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 45 (Ft.) & DATE MEASURED 9-25-04
ESTIMATED YIELD * 7 (GPM) & TEST TYPE airlift
TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN – (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 21	11	x				steel	6 5/8	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 21	x	x		

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME JIM MANOS DRILLING & PUMP (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 16052 LAWSON VLY RD. JAMUL, CA 91935 CITY STATE ZIP
Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 3-6-05
C-57 LICENSE NUMBER 360722

CONFIDENTIAL NOT FOR PUBLIC RELEASE SECTION 13752 WATER CODE

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

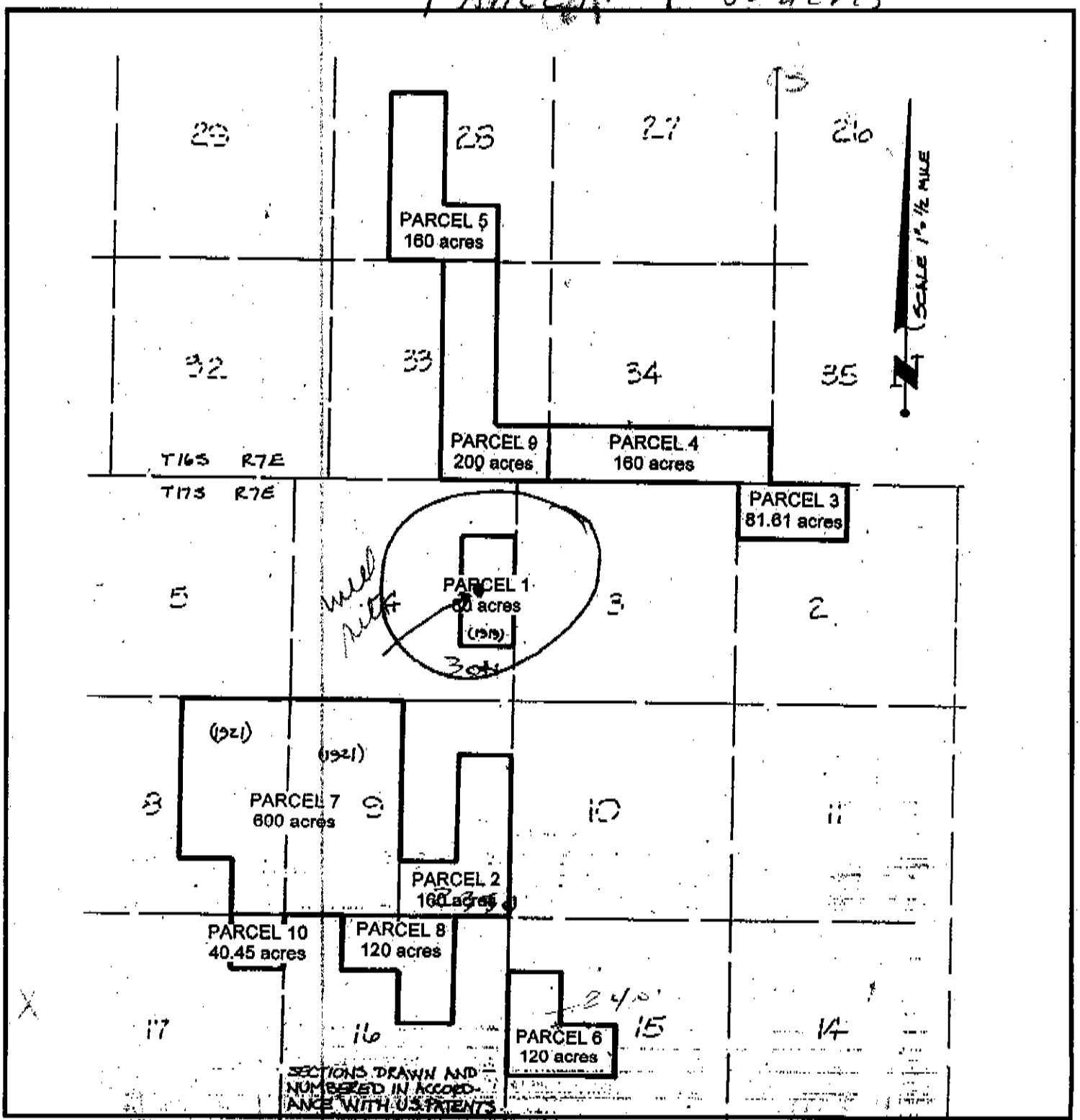
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWEL 16224
Assessor's Parcel Number: 611-030-08

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

PARCEL # 1 80 acres



Fully operational

#6 no Logs available

original well on ranch

6A NEW Public Well

Fully operational

QUADRUPLICATE
For Local Requirements
Page 1 of 1
Owner's Well No. 1

FEB 09 2010

County of San Diego
Dept. of Environmental Health
Land & Water Quality Div.

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1089956

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

Date Work Began 11-4-09, Ended 11-10-09
Local Permit Agency San Diego C.W.Q.
Permit No. LW-620420 Permit Date 11-13-09

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD ROTARY FLUID AIR

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 10	sandy-rocks
10 30	sandy-slightly firm
30 32	soft
32 70	sandy
70 85	harder
85 87	cracks
87 230	black & white rock, softer areas
230 233	softer, orange
233 330	black/white & orange
330 332	softer, orange
332 395	black & white rock, softer areas
395 395	sand
395 420	black & white rock

Completed Well Construction
Date 2/9/10
Date Inspected
Comments KIVA patrol at this site.
Water Sample Taken?

TOTAL DEPTH OF BORING 420 (Feet)
TOTAL DEPTH OF COMPLETED WELL 420 (Feet)

WELL OWNER

Name Harmony Grove Partners
Mailing Address 1900 Pioneer Way
City El Cajon, Ca 92020 STATE ZIP

WELL LOCATION

Address Mc Leanwalley Road
City Jacumba, Ca
County San Diego
APN Book 611 Page 090 Parcel 04
Township 17 S Range 7 E Section 17
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH

NORTH
WEST
EAST
SOUTH

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

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)

WATER SUPPLY
___ Domestic X Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 30 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 30 (Ft.) & DATE MEASURED 11-10-09
ESTIMATED YIELD * 60 (GPM) & TEST TYPE airlift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN -- (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 56	12	X				steel		.188	
0 75		X				steel	6 5/8	.188	
0 385	6¼		X			pvc	4	Cl200	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 56	X	cement grout		
0 75		X		
0 385			X	6/16 pea gravel

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME TIM MANOR DRILLING & PUMP
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

16052 LAWSON VALLEY ROAD, JAMUL, CA 91935
ADDRESS CITY STATE ZIP

Signed ___ 2/9/10 3607
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED C-57 LIC

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

CONFIDENTIAL
NOT FOR PUBLIC USE
WATER WELL CODE SECTION

#7 unstable hole
not much
water
well destroyed

Fain Drilling & Pump Co. Inc.

12029 Old Castle Rd.
Valley Center, CA 92082
Phone (760) 749-0701
Fax (760) 749-6380

Invoice

Date	Invoice #
2/15/2005	8049

RP hole Abandoned

#7

Bill To
HAMANN COMPANIES 1000 PIONEER WAY EL CAJON, CA 92020

P.O. No.	Terms	Project
	Due on receipt	

Description	Qty	Rate	Amount
WELL DRILLING (TEST HOLE) APN 611 090 03 PARCEL # 10 40.45 ACRES			
MOVE IN AND SET UP 1ST. TIME	1	500.00	500.00
DRILLING 6.5" DIA HOLE	400	12.00	4,800.00
BACKFILL TEST HOLE AND CEMENT TOP	1	400.00	400.00
MOVE BACK TO TEST HOLE AND SET UP 2ND TIME	1	500.00	500.00
DRILL OUT AND CLEAN OUT EXISTING 400 FT.	1	400.00	400.00
DRILLING FROM 400-850 FT. 6.5" DIA HOLE	450	14.00	6,300.00
BACKFILL AND DESTROY TEST HOLE	1	400.00	400.00
WELL PERMIT AND FILING FEES	1	490.00	490.00

Total	$13,790.00
Payments/Credits	$0.00
Balance Due	$13,790.00

TRIPLICATE
Owner's Copy

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 0909548

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

Owner's Well No. Test Well Par 10
Date Work Began 2/4/05, Ended 2/14/05
Local Permit Agency DEH
Permit No. 16457 Permit Date 2/7/05

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Rotary FLUID Air

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	6	Slope wash - sand and silt brown color
6	62	Weathered, decomposed rock
62		1st water - seepage
62	112	quartz diorite
112	114	Fracture - seepage of water
114	274	Quartz diorite, soft weathered
274		Fracture - water
275	654	Quartz diorite, soft weathered
654		Fracture - seepage of water
654	720	Quartz diorite
720		Seepage of water
720	850	Quartz diorite
		Backfill and destroy bore hole

TOTAL DEPTH OF BORING 850 (Feet)
TOTAL DEPTH OF COMPLETED WELL 0 (Feet)

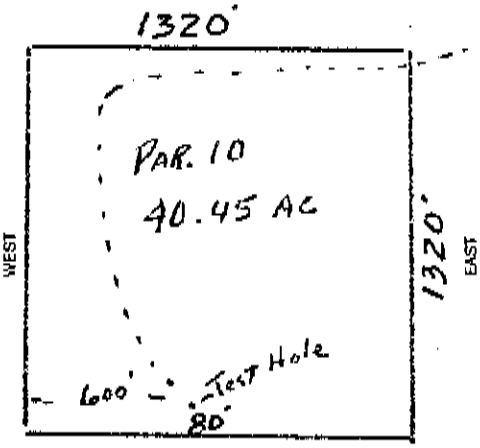
WELL OWNER

Name Hamann Companies
Mailing Address 1000 Pioneer Way
City El Cajon, CA STATE 92020 ZIP

WELL LOCATION

Address Mc Cain Valley Rd.
City Boulevard
County San Diego
APN Book 611 Page 090 Parcel 03
Township 17 S Range 7 E Section 17
Lat 32° 41' 735" N DEG. MIN. SEC. Long 116° 11' 613" W DEG. MIN. SEC.

LOCATION SKETCH



*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.***

ACTIVITY (✓)

___ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ✓
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 62 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 28 (Ft.) & DATE MEASURED 2/14/05
ESTIMATED YIELD * 10 (GPM) & TEST TYPE Airlift
TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 500 (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
NONE										

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	5			X	
5	25	X			
25	850			X	

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
✓ Other Site Map

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Eain Drilling & Pump Co Inc (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
12029 Old Castle Rd. Valley Center, Ca 92082
ADDRESS CITY STATE ZIP
Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR
2-14-05 DATE SIGNED
328287 C-57 LICENSE NUMBER

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

8

THIS WELL HAS
NO PUMP OR POWER
NEEDS TO BE
RELOCATED EAST
OUTSIDE OF
TRANSMISSION LINE
POWER EASEMENT

Fain Drilling & Pump Co. Inc.

12029 Old Castle Rd.
Valley Center, CA 92082
Phone (760) 749-0701
Fax (760) 749-6380

#8

Invoice

Date	Invoice #
2/11/2005	8048

Bill To
THE HAMANN COMPANIES 1000 PIONEER WAY EL CAJON, CA 92020

P.O. No.	Terms	Project
	Due on receipt	

Description	Qty	Rate	Amount
DRILLING 970 FT DEEP WELL APN 611 110 01 PARCEL 6 120 AC			
EQUIPMENT SET UP	1	500.00	500.00
DRILLING 6.5" DIA HOLE	400	12.00	4,800.00
DRILLING 400-800' 6.5" DIA HOLE	400	14.00	5,600.00
DRILLING 800 - 970' 6.5" DIA HOLE	170	16.00	2,720.00
REAMING 6" TO 10" DIA HOLE	226	12.00	2,712.00
FURNISH AND INSTALL 6" WELL CASING	228	13.00	2,964.00
INSTALL 50 FT. SURFACE SEAL	1	1,500.00	1,500.00
WELL PERMIT AND FILING FEES	1	490.00	490.00

Total	$21,286.00
Payments/Credits	$0.00
Balance Due	$21,286.00

TRIPLICATE
Owner's Copy
Page 1 of 1
Owner's Well No. Par. 6 -120
Date Work Began 2/1/05 , Ended 2/9/05
Local Permit Agency ~~DEH~~
Permit No. ~~16456~~ Permit Date ~~2/1/05~~

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0909549

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

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Rotary FLUID Air

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	12	Slope wash - sandy decomposed granite - brown color
12	212	Weathered Granitic Rock
212	226	Broken Rock
226	310	Weathered granitic rock mostly white quartz
310		Water 8 gpm
310	961	Granitic rock large crystals of white quartz
961		Water 40+ gpm
961	970	Fractured granitic rock large quartz crystals

TOTAL DEPTH OF BORING 970 (Feet)
TOTAL DEPTH OF COMPLETED WELL 970 (Feet)

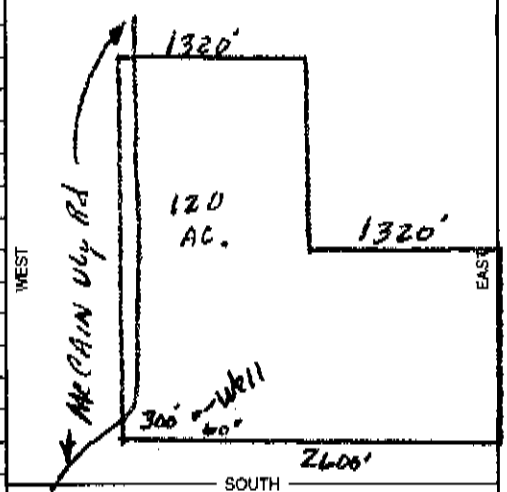
WELL OWNER

Name The Hamann Companies
Mailing Address 1000 Pioneer Way
El Cajon Ca 92020
CITY STATE ZIP

WELL LOCATION

Address Rough Acres Ranch McCain Valley Rd.
City Boulevard
County San Diego
APN Book 611 Page 110 Parcel 01
Township 17S Range 7E Section 15
Lat 36 DEG. 16 MIN. 772 SEC. N Long 115 DEG. 69 MIN. 465 SEC. W

LOCATION SKETCH



*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.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 30 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 18 (Ft.) & DATE MEASURED
ESTIMATED YIELD * 50 (GPM) & TEST TYPE airlift
TEST LENGTH 8 (Hrs.) TOTAL DRAWDOWN 800 (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	226	10	X				Steel	6	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50	X			
50	226			X	

ATTACHMENTS (✓)

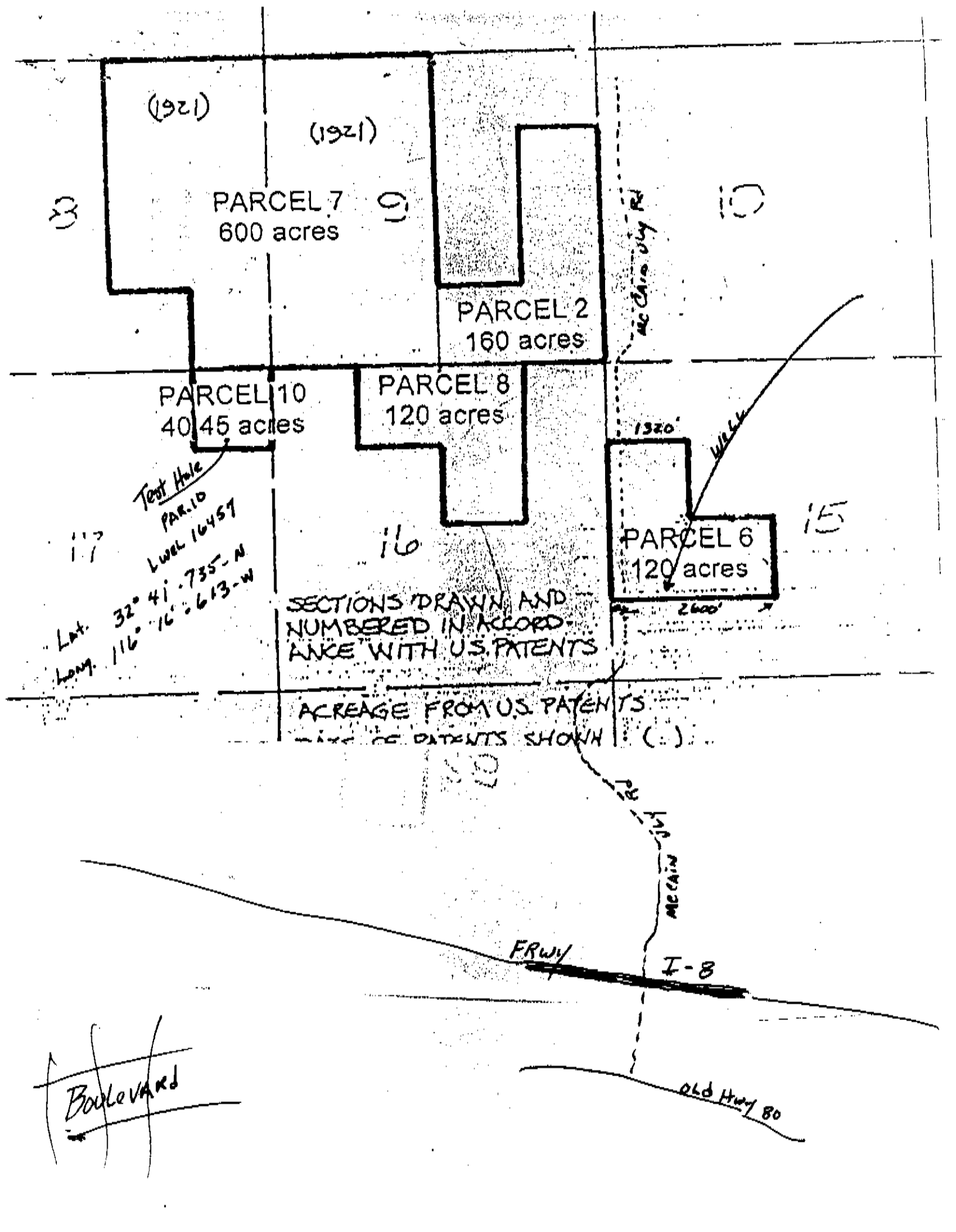
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Fain Drilling & Pump Co. Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 12029 Old Castle Rd. Valley Center, Ca 92082
CITY STATE ZIP
Signed Joe R. Fain
C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 2/11/05
C-57 LICENSE NUMBER 328287

DWR 188 REV. 05-03
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM


(1921)
(1921)
PARCEL 7
600 acres
PARCEL 2
160 acres
PARCEL 10
40.45 acres
PARCEL 8
120 acres
PARCEL 6
120 acres
1320'
2600'
McCain Valley Rd
Test Hole
PAR. ID
LWEL 16457
Lat. 32° 41' 735" N
Long. 116° 16' 613" W
SECTIONS DRAWN AND NUMBERED IN ACCORDANCE WITH U.S. PATENTS
ACREAGE FROM U.S. PATENTS
McCain Valley Rd
FRWY
I-8
Boulevard
Old Hwy 80

9

Fully operational
old well
No info
Probably 5-10 GPM
Shallow

APPENDIX B

OBSERVATIONS AND ANALYSIS OF AQUIFER CHARACERISTICS

ROUGH ACRES RANCH

MCCAIN VALLEY, EAST SAN DIEGO COUNTY, CALIFORNIA

Geo-Logic
ASSOCIATES
Geologists, Hydrogeologists and Engineers

Date: December 1, 2010
Project No.: 2010-0005

To: John Hower, CEG
Sarah Battelle, CHG

From: Mark Vincent, CHG

Regarding: **Observations and Analyses of Aquifer Characteristics**
Rough Acres Ranch, San Diego County, California

INTRODUCTION

This memo presents a summary of observations and analyses made following a stepped and a constant rate aquifer pumping and recovery test in wells located at Rough Acres Ranch located approximately in McCain Valley in eastern San Diego County, California. The tests were performed to determine whether sufficient volumes of water are available for the Tule Wind Farm construction projects. Analyses performed included calculation of transmissivity, hydraulic conductivity, and storativity for a pumping well and observation wells.

WELL AND AQUIFER CONDITIONS

A well labeled as Well #6a was used as the pumping well for this test. Another well labeled as Well #6 (also referred to as South Well) is located 36 feet away from the pumping well and was monitored and analyzed as an observation well. More distant observation wells were monitored including Well #9 (Horse Corral Well), Walker Residence Well, Well #4 (RV Well), Well #2, and Well #8 (Far Field Well) (Figure 1).

Records for drilling and construction of the wells used for these pumping tests are incomplete or nonexistent. A well identified on Department of Water Resources (DWR) records as being owned by Harmony Grove Partners (identified as Form No. 1089956) is believed to be the log for Well #6a. Logs for Well #4 (RV Well) and Well #8 (Far Field Well) were also obtained. No records are available for Well #6 (South Well), The Walker Residence Well, Well #9 (Horse Corral Well), or Well #2.

Although DWR records indicate the borehole for Well #6a was drilled to a total depth of 420 feet, the bottom of the well is recorded to be at a depth of 385 feet below ground surface. Records are incomplete but it was assumed that the well screen extends from a depth of 75 to 385 feet below ground surface. A cement sanitary seal is reported to extend from ground surface to a depth of 56 feet. Wells #6 and #6a used in this pumping test have existing electric submersible pumps installed in them. Based on the production rates achieved during the tests performed, the wells are likely to be outfitted with four-inch diameter electric submersible pumps. Based on the depth and pressure head on the

transducers installed in the wells for the test, it was assumed that both of the boreholes are 385 feet deep and are 6.5-inches in diameter. It was further assumed that the wells were constructed with 4-inch diameter well casing and that they are perforated or screened from a depth of 75 feet below ground surface. Details of well construction could not be verified in the field because of the presence of pumps, discharge pipes, electrical wires, and surface sanitary seals. Available well logs are included at the back of this document.

The area immediately around Well #6 and #6a is underlain by alluvium comprised of poorly sorted sand, gravel, and silt derived from the crystalline basement rock exposed on the adjacent canyon sidewalls. The crystalline basement rocks are classified as tonalite and yield groundwater from fractures. The well log reportedly recorded for Well #6a indicates that there is about 70 to 85 feet of alluvium overlying the tonalite. Groundwater was measured at a depth of 27.81 feet below the top of sanitary seal on Well #6a.

TEST METHODS

Observations of groundwater elevation were recorded in a pumping well and six observation wells in McCain Valley. Data was collected using pressure transducers connected to data loggers. Barometric pressure changes were recorded during the test and corrections were made to the pressure head data collected during the tests.

A stepped aquifer pumping test was performed using Well #6a to determine the optimum pumping rate for a longer duration test. The pressure transducers were deployed and began recording data on August 20, 2010 to perform the stepped pumping test. The stepped pumping test was performed at pumping rates of 28 gallons per minute (gpm), 38 gpm, 55 gpm and 60 gpm. A semi-logarithmic plot of elapsed time versus drawdown for the stepped pumping test is shown on Figure 2.

The constant rate pumping and recovery test was performed from August 24 through 27, 2010. The pump was powered-down on August 27, 2010 and allowed to recover for 10 hours when the pressure transducers were removed from the wells. A recovery test was performed by turning off the pumps and recording the increasing head levels over time.

DATA ANALYSIS

Changes in groundwater level data recorded during this test were corrected for barometric pressure changes and used to generate a file containing tabulated time and changes in pressure head. The data was used to generate time-drawdown graphs for the pumping and observation wells and imported into computer software used to calculate the transmissivity and storativity of the fractured tonalite.

The stepped pump test analysis consists of plotting the drawdown versus time for each pumping rate on a time versus drawdown plot with time plotted on a logarithmic scale. Forward projections of each segment representing a different pumping rate can be used to predict the likely drawdown for the pumping well during for the selected duration of the test. A pumping rate of 50 gpm was selected as the target pumping rate because it would allow for ample drawdown without the well running dry during the test.

The method of Schafer (1978) was employed to determine how much of the data set for Well #6a was impacted by casing storage effects. The method is a simplification of the method first developed by Papadopulos and Cooper (1967) but does not require prior knowledge of the transmissivity or well efficiency. The point at which casing storage effects are overcome was calculated to occur approximately 23 to 25 minutes into the test based on the assumptions about well construction practices, pumping rates, and drawdown. Very early pumping data was ignored in the analyses described below due to casing storage effects.

Time versus drawdown plots were prepared for the pumping and observation wells for the pumping and recovery portions of the test. The plots are shown with the time axis plotted on a logarithmic scale and drawdown on a linear scale.

Figure 3 shows the time-drawdown plot for Well #6a during pumping. The first 23 to 25 minutes of the test show the casing storage effects. Well #6a drawdown plots as a straight line on the time-drawdown chart representing constant aquifer properties during that portion of the drawdown cone development. A sudden change in the drawdown curve starts at approximately 11 or 12 minutes; which may reflect leakage from the alluvium above the fractured bedrock.

A residual drawdown plot for Well #6a is shown on Figure 4. The plot shows the change in drawdown versus the ratio of the time since the pump test started divided by the time since the recovery portion of the test started (t/t`). The residual drawdown at a t/t` ratio of 1 is shown to be about 0.33 feet (a less than significant change in storage noted in the pumping well over the course of the pumping and recovery portions of the aquifer stress test).

A time-drawdown plot of Well #6 (the observation well also referred to as South Well) located 36 feet away from the pumping well shows a decrease in drawdown from approximately 30 minutes to approximately 400 minutes which may result from leakage from the alluvium above the fractured bedrock (Figure 5). The Well #6 plot shows even less drawdown versus time after 400 minutes possibly reflecting the fractured bedrock aquifer.

The Well #6 recovery portion of the test is plotted as the residual drawdown versus t/t` shows a flat line on the semi-logarithmic plot (Figure 6) indicative of uniform aquifer conditions from a t/t` ratio of about 8 to 110 into the recovery test period. The residual drawdown value measured for a t/t' ratio of 1 is about -0.22 feet. It is not regarded to be significant compared to the County standard maximum change of 0.5 feet.

The Well #9 (Horse Corral Well) was monitored and the time-drawdown plot reflects that the well pump cycled on and off five times during the test (Figure 7). No analyses were performed for this well because the changes in drawdown versus time due to the pump activating are far greater than any drawdown likely to be induced by the pumping test at Well #6a.

Well #2 (Pond Well) and Well #9 (Far Field Well) were monitored for changes in head during the pumping test. Figure 8 and 9 show the time-drawdown plots for Wells #2 and #9. Both plots show similar small, cyclic, barometric changes in head but are not likely to have resulted from the pumping test. No analyses were performed using the data from these wells.

Water level drawdown data were evaluated using the computer software program AquiferTest version 3.5 (Waterloo Hydrogeologic, 2002). The program performs curve matching of the time drawdown data to calculate transmissivity, hydraulic conductivity, and storativity using different methods. The methods employed included Cooper-Jacob (1946), Moench (1993), Neuman (1975), and Theis (1935).

DISCUSSION

As shown on Table 1, the calculated hydraulic conductivity values for all of the analytical methods employed ranged from a low of 7.50E-04 feet/day for data collected from Well #6 (South Well) using the Theis method for the data collected from the end of the recovery test to a high of 7.50E+00 feet/day using the Cooper Jacob method with late time data for Well #6 (South Well). An average conductivity of 1.85 feet/day was calculated from all methods from both Well #6 and #6a. The Storativity values range from a low of 4.48E-06 for Well #6 late time data calculated using the Moench Fracture Flow method and a high of 7.87E-01 for a match to the late time data recorded in Well #6 using the Moench method with the vertical hydraulic conductivity set at one-tenth the horizontal hydraulic conductivity.

All of the analytical results show a higher transmissivity and hydraulic conductivity value for matches to the observation Well #6. The pumping well and observation well used for these analyses are located in a portion of McCain Valley which is entirely covered in up to 75 to 80 feet of alluvium (Figure 10). Based on the measured depth to groundwater in Well #6 and #6a, approximately 47 to 52 of saturated alluvium overlies the fractured bedrock at the test site (Figure 11). The saturated alluvium is likely to act like a reservoir recharging the fractures in the bedrock. The aerial extent of the fractured bedrock aquifer and the amount of storage in the fractures is likely controlled in part by the presence of the alluvial aquifer. Because the fractures in the bedrock appear to be of aerially limited extent, the actual volume of groundwater available may be limited with larger volumes of groundwater available within the canyon areas where fracturing may be most prevalent and alluvium is saturated.

CLOSURE

This summary of observations and analyses has been prepared in general accordance with accepted professional geotechnical and hydrogeologic principles and practices. This report makes no other warranties, either expressed or implied as to the professional advice or information included in it. Our firm should be notified of any pertinent change in the project, or if conditions are found to differ from those described herein, because this may require a reevaluation of the conclusions. This report has not been prepared for use by parties or projects other than those named or described herein. It may not contain sufficient information for other parties or purposes.

Geo-**L**ogic **A**ssociates

Mark W. Vincent, PG 5767, CEG 1873, CHg 865
Senior Geologist

Attachments: Table 1 - Aquifer Stress Test Results
Figure 1 - Well Location Plan
Figure 2 - Step Test Time Drawdown Plot
Figure 3 - North Well Time Drawdown Plot Pumping
Figure 4 - North Well Time Drawdown Plot Recovery
Figure 5 - South Well Time Drawdown Plot Pumping
Figure 6 - South Well Time Drawdown Plot Recovery
Figure 7 - Thing Valley Well Time Drawdown Pumping
Figure 8 - Thing Valley Well Time Drawdown Recovery
Figure 9 - Geologic Map
Appendix A - Analytical Results from Aquifer Test Program
Appendix B - Department of Water Resources Well Completion Reports

REFERENCES

Cooper, H.H., Jr. and Jacob, C.E., 1946, A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well Field History, *Transactions, American Geophysical Union*, Vol. 27, No. 4.

Driscoll, D.G., 1986, Groundwater and Wells, Johnson Filtration Systems Inc., St. Paul, Minnesota.

Moench, S.P., 1993, Combining the Neuman and Boulton Models for Flow to a Well in an Unconfined Aquifer, *Ground Water*, Vol. 33, No. 3.

Neuman S.P., 1975, Analysis of Pumping Test Data from Anisotropic Unconfined Aquifers Considering Delayed Yield, *Water Resources Research*, Vol. 11, No. 2, pp. 329-342.

Papadopulos, I.S. and Cooper, H.H., Jr., 1967, Drawdown in a well of large diameter, *Water Resources Research*, vol. 3, pp 241-244.

Schafer, D.C., 1978, Casing Storage Can Affect Pumping Test Data, *Johnson Drillers' Journal*, Jan/Feb, Johnson Division, UOP Inc., St. Paul, Minnesota.

Theis, C.V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Groundwater Storage, *American Geophysical Union Transactions*, Vol. 16, pp. 519-524.

Waterloo Hydrogeologic (co-developed with Thomas Roerich), 2002, AquiferTest version 3.5, Advanced Pumping Test and Slug Test Analytical Software.

Table 1
Aquifer Stress Test Results
Rough Acres Ranch - McCain Valley

Well Designation	Condition	Distance From Pumping Well (feet)	Groundwater Depth from Ground Surface (feet)	Assumed Aquifer Thickness (feet)	Average Pumping Rate (gpm)	Analytical Method	Transmissivity (feet^2/day)	Conductivity (feet/day)	Storativity	Comments
Well #6a	Pumping	1	28	500	50	Cooper-Jacob	6.30E+02	1.26E+00	NA	Match to late data.
Well #6a	Pumping	1	28	500	50	Moench Fracture Flow	1.12E+02	2.25E-01	2.70E-04	Match to late data.
Well #6a	Pumping	1	28	500	50	Moench	1.21E+02	2.43E-01	1.72E-01	Match to late data.
Well #6a	Pumping	1	28	500	50	Neuman	5.69E+01	1.14E-01	1.62E-02	Spec Yld. = 1.62E+02
Well #6a	Pumping	1	28	500	50	Theis	2.69E+01	5.39E-02	1.64E-01	Match to early data.
Well #6a	Pumping	1	28	500	50	Theis	1.51E+02	3.03E-01	3.19E-05	Match to late data.
Well #6a	Pumping	1	28	500	50	Walton	1.11E+02	2.21E-01	7.08E-04	Match to late data.
Well #6a	Recovery	1	28	500	0	Theis Recovery	2.17E-02	4.35E-05	NA	Match to early data.
Well #6a	Recovery	1	28	500	0	Theis Recovery	7.27E+00	1.45E-02	NA	Match to late data.
South Well #6	Pumping	36	27.81	500	50	Cooper-Jacob	2.14E+03	4.28E+00	NA	Match to middle data.
South Well #6	Pumping	36	27.81	500	50	Cooper-Jacob	3.75E+03	7.50E+00	NA	Match to late data.
South Well #7	Pumping	36	27.81	500	50	Moench Fracture Flow	2.95E+03	5.91E+00	4.48E-06	Match to late data.
South Well #6	Pumping	36	27.81	500	50	Moench	1.30E+03	2.60E+00	7.87E-01	Kv=1/10 Kh
South Well #6	Pumping	36	27.81	500	50	Neuman	9.67E+02	1.93E+00	NA	Match to all data.
South Well #6	Pumping	36	27.81	500	50	Theis	3.18E+03	6.36E+00	3.29E-06	Match to late data.
South Well #6	Pumping	36	27.81	500	50	Walton	1.13E+03	2.26E+00	1.47E-03	Match to early data.
South Well #6	Recovery	36	27.81	500	0	Theis Recovery	3.75E-01	7.50E-04	NA	Match to early data.
South Well #6	Recovery	36	27.81	500	0	Theis Recovery	2.23E+00	4.47E-03	NA	Match to late data.
						Average Values	**9.24E+02**	**1.85E+00**	**1.14E-01**	

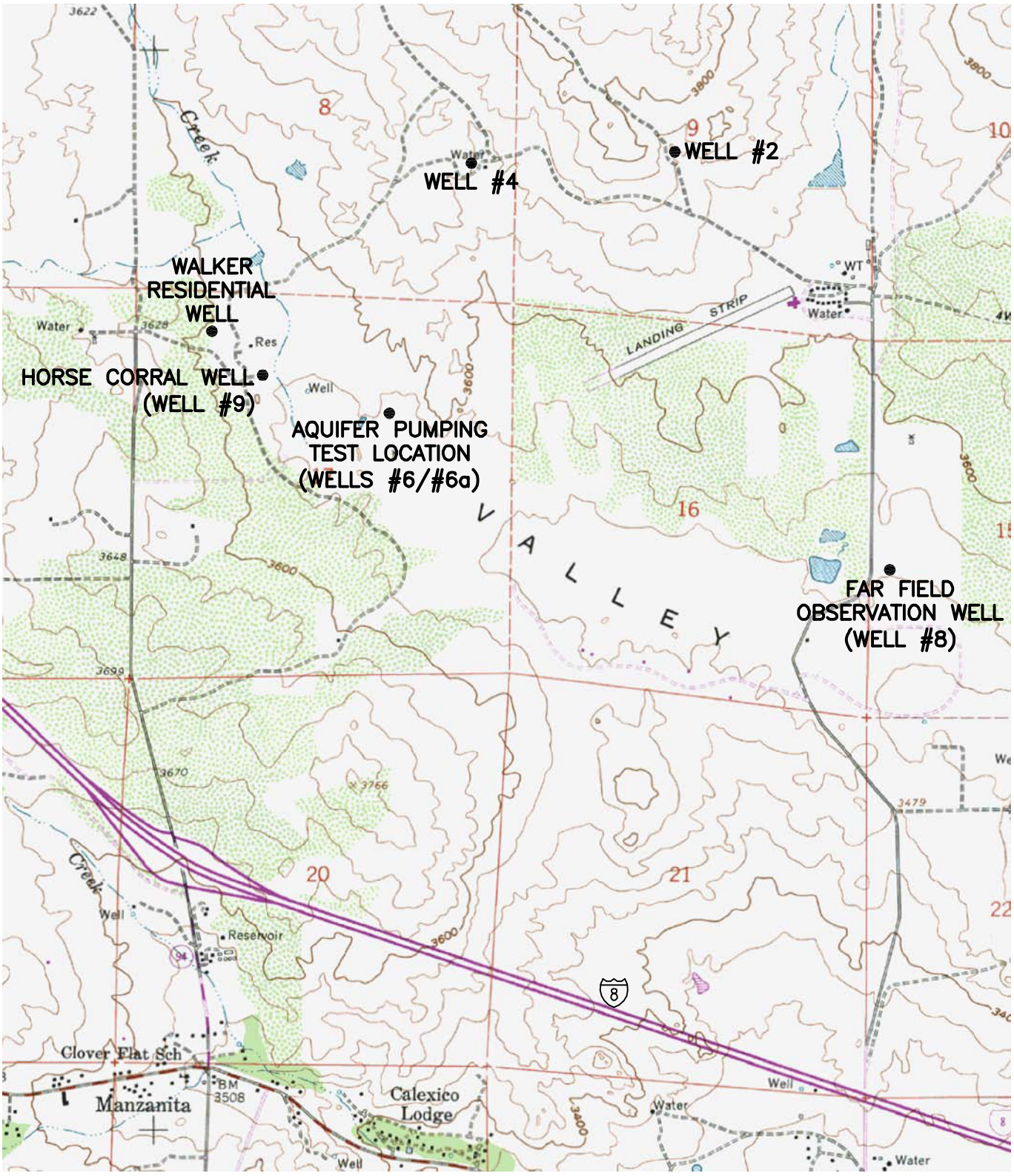


FIGURE 2B

GRAPHIC SCALE
1000 0 500 1000 2000
(in feet)
1 inch = 2000 ft.

N

REFERENCE: 7.5 MINUTE SERIES (TOPOGRAPHIC) LIVE OAK SPRINGS (1975) CALIFORNIA QUADRANGLE

WELL LOCATION MAP
ROUGH ACRES RANCH AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

Geo-Logic ASSOCIATES

DRAWN BY: VL	DATE: NOVEMBER 2010	JOB NO. 2010-005

Figure 2
Step Drawdown Test
Well #6a - Pumping Well
Rough Acres Ranch, McCain Valley

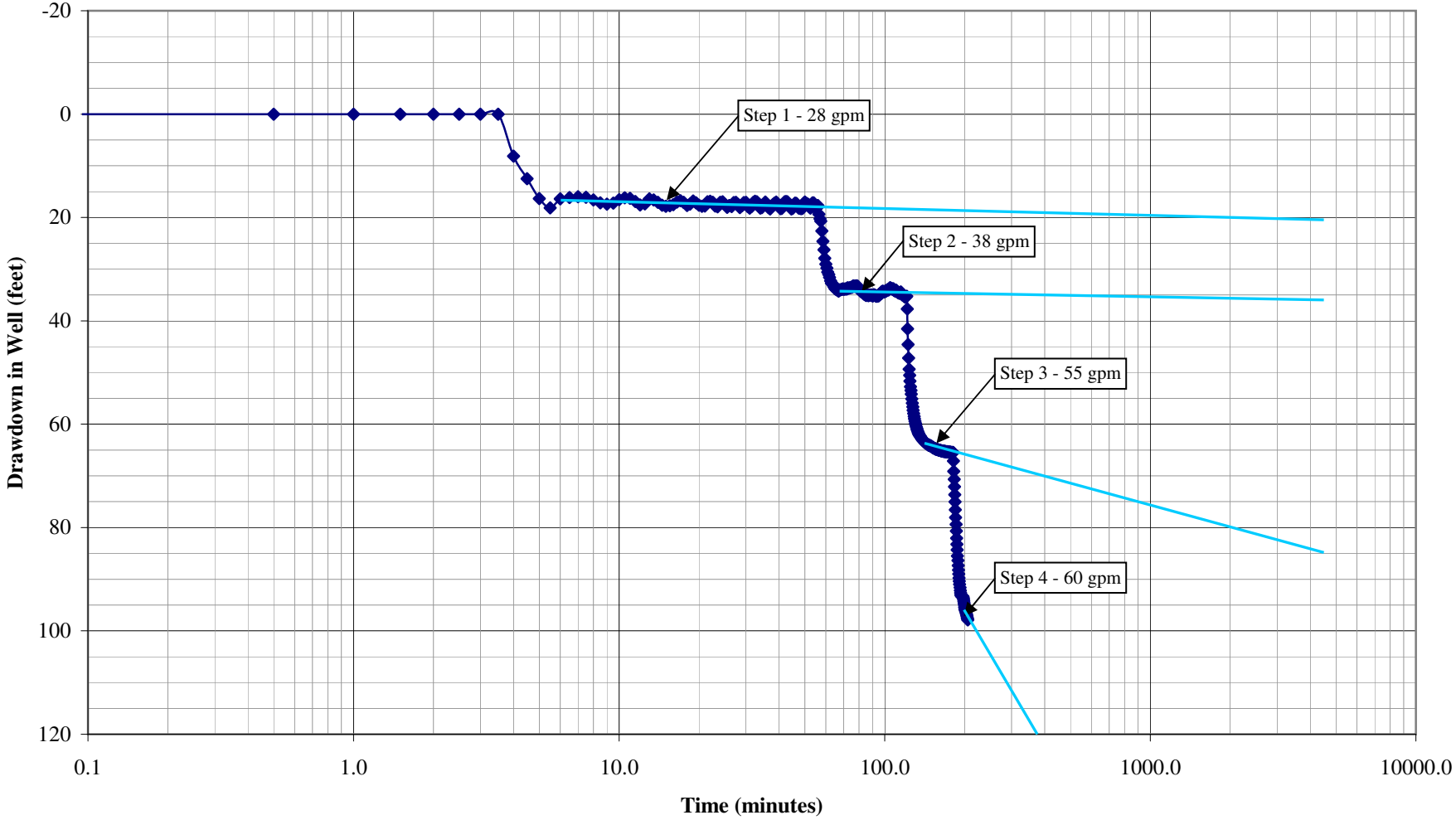


Figure 3
Drawdown in Pumping Well during 72-hour Pumping Test at 50 gpm
North Well at Rough Acres Ranch

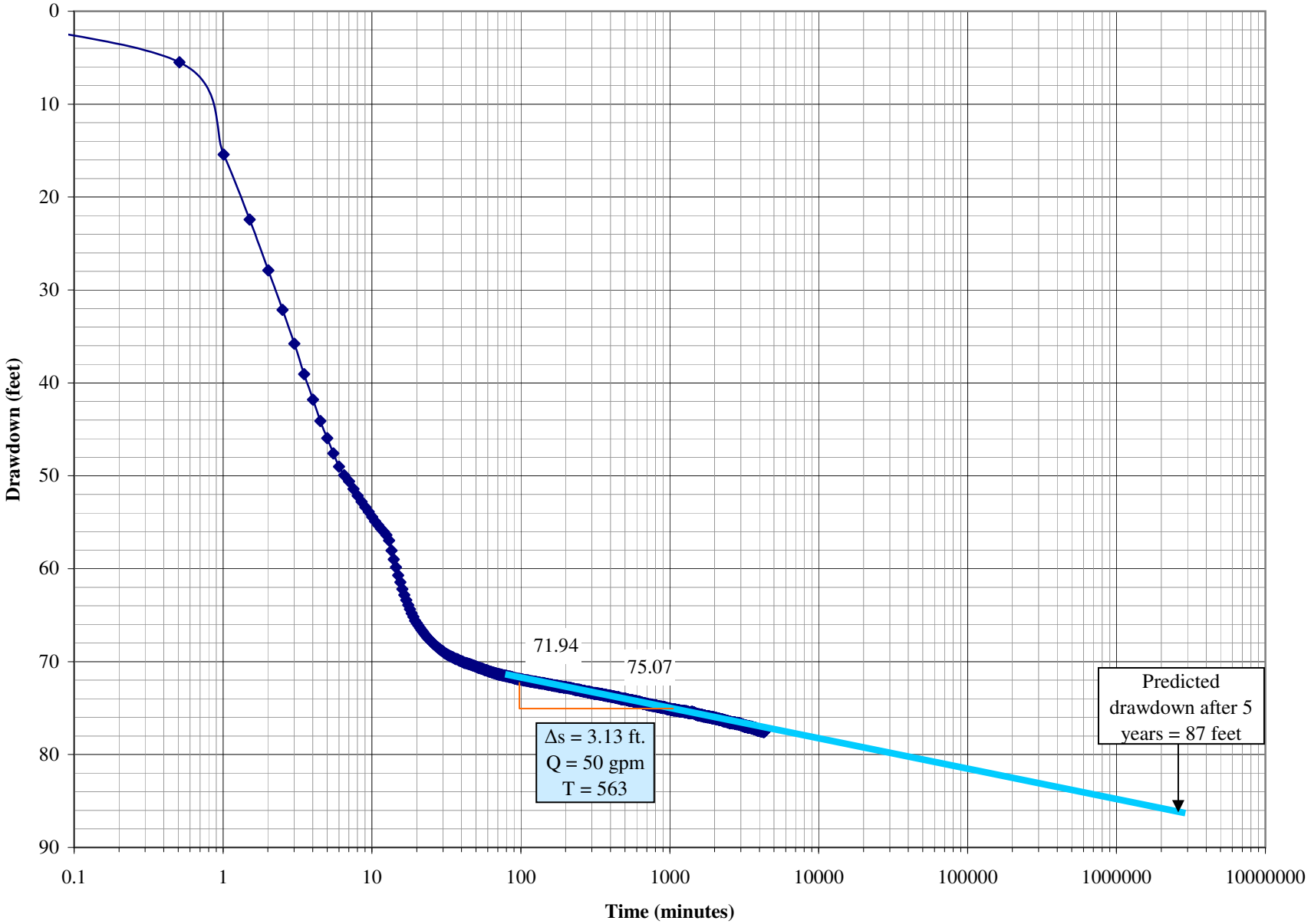


Figure 4
Residual Drawdown Plot
Pumping Well #6a

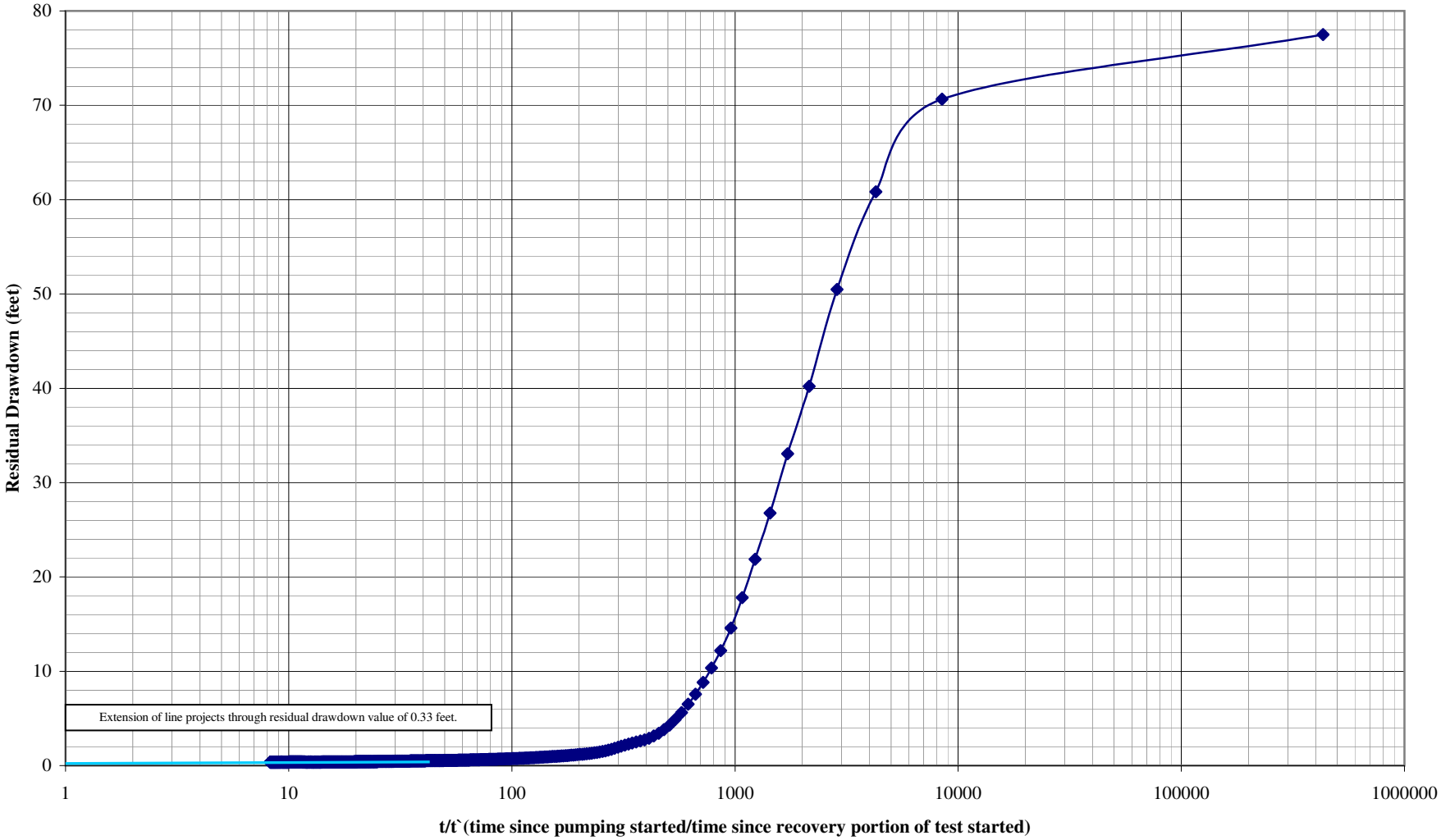


Figure 5
Well #6 - Observation Well
Time-Drawdown Plot
Rough Acres Ranch

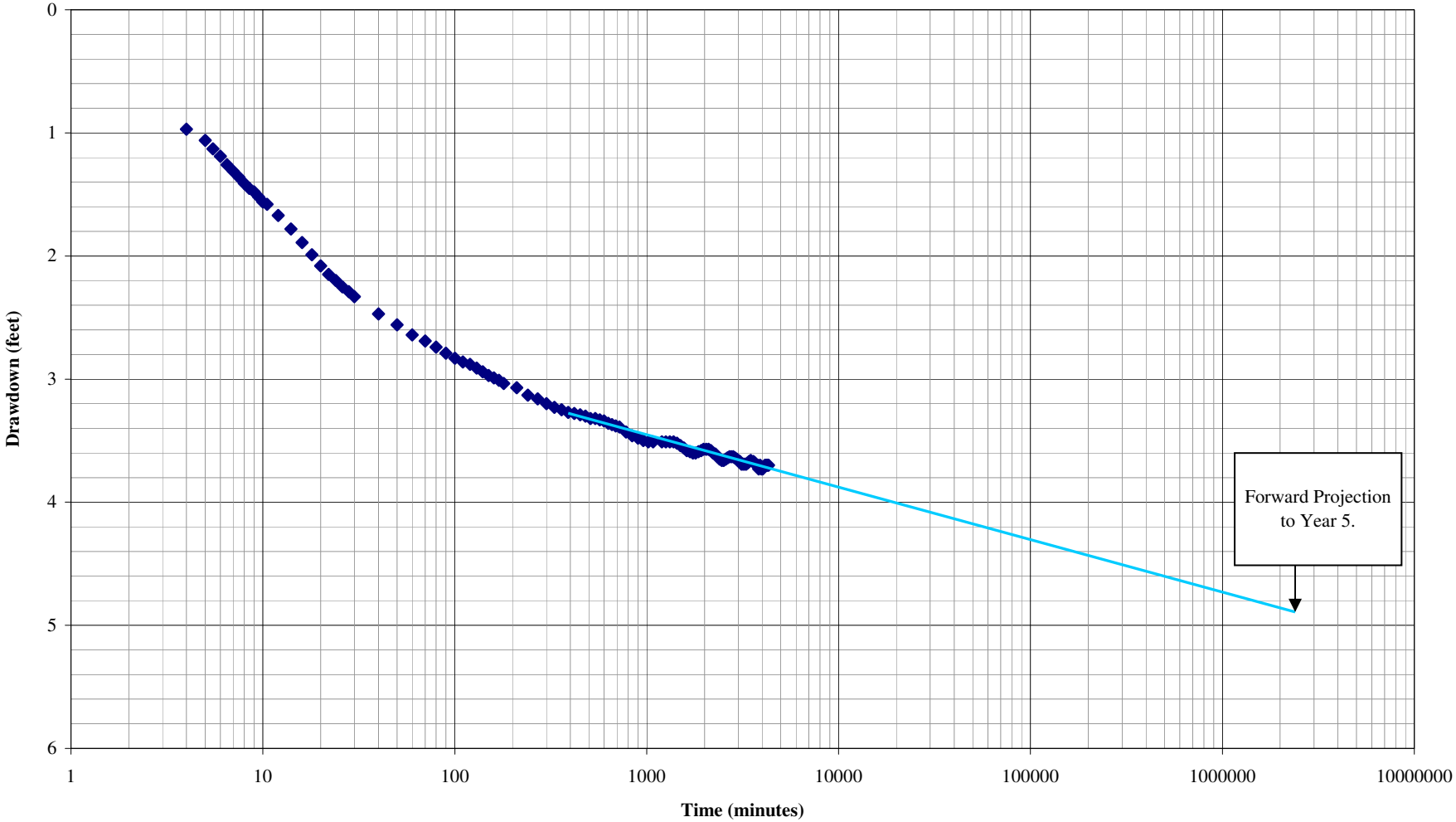


Figure 6
South Well - Observation Well
Residual Drawdown Plot
Rough Acres Ranch

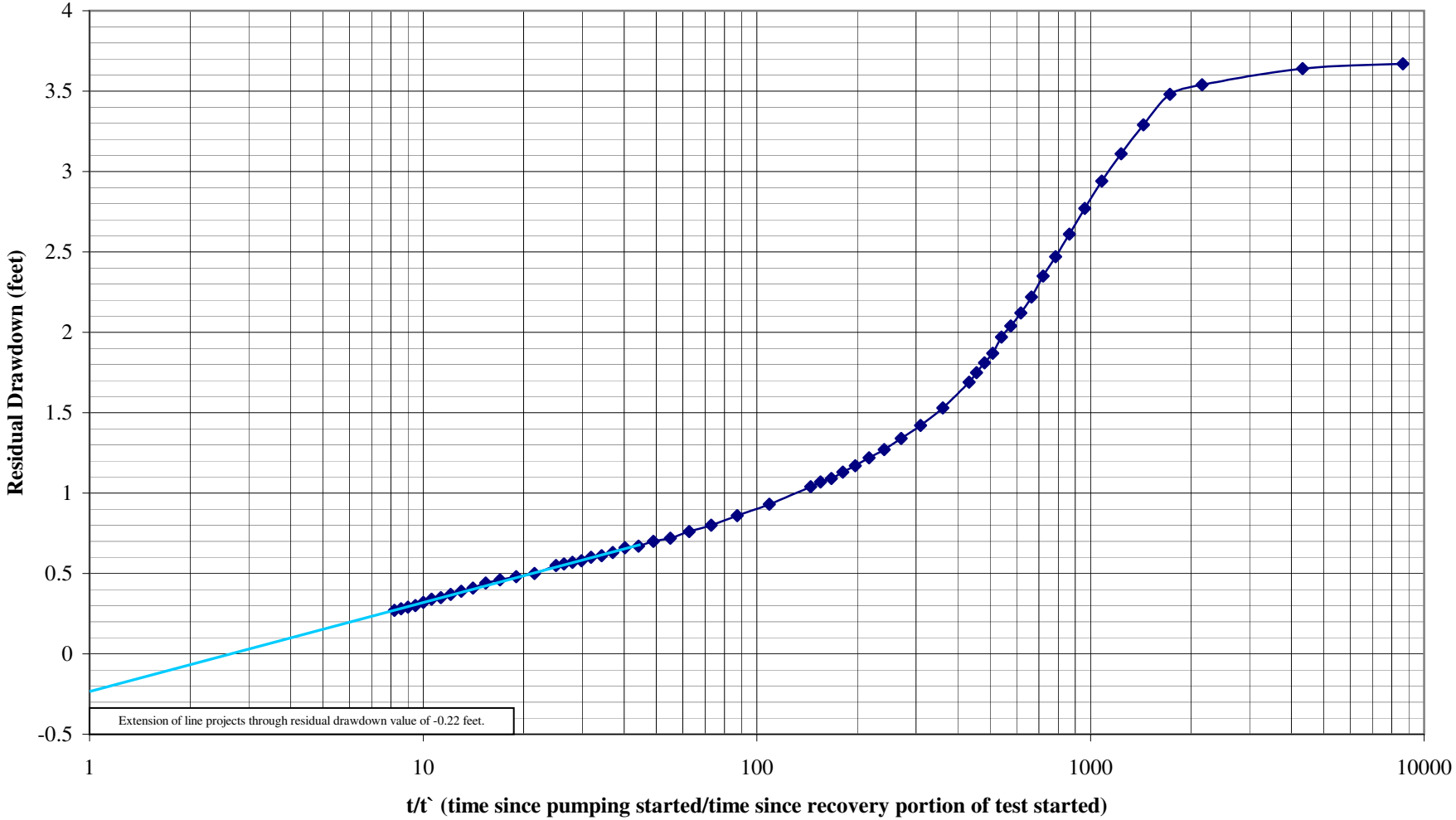


Figure 7
Horse Corral Well
(Observation Well)
Time-Drawdown Plot

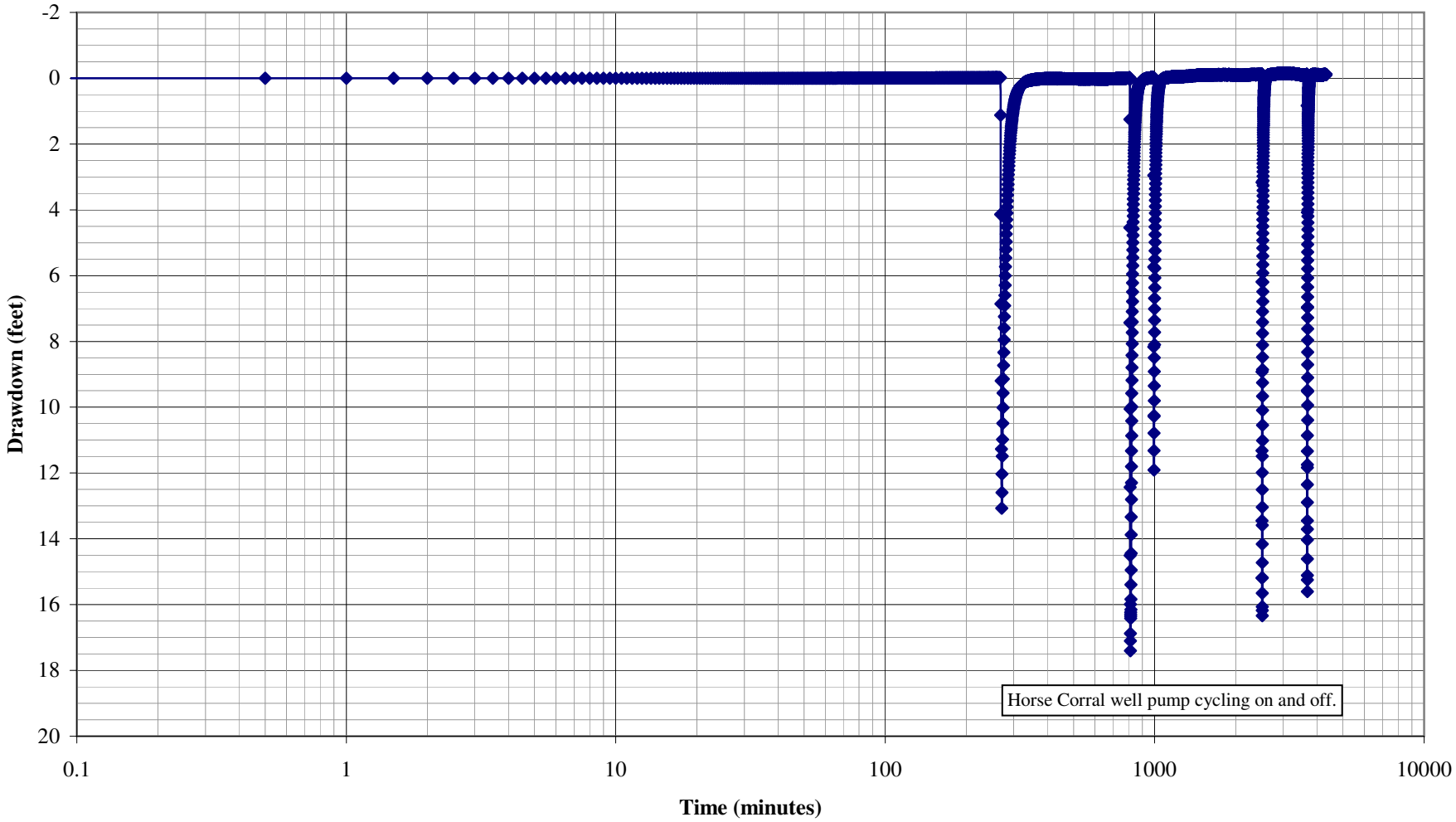


Figure 8
Well #2 - Observation Well
Distance-Drawdown Plot
Rough Acres Ranch

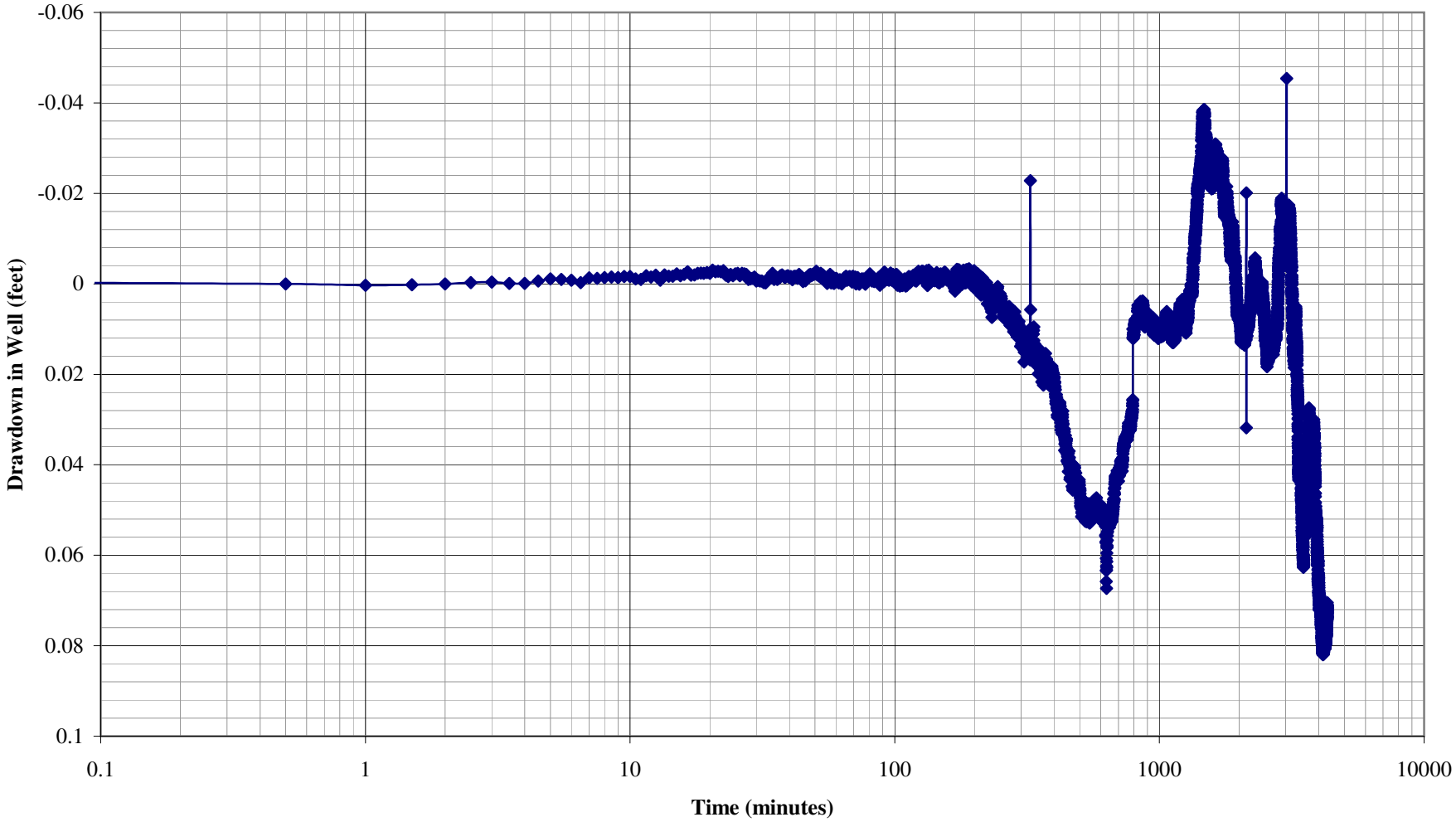
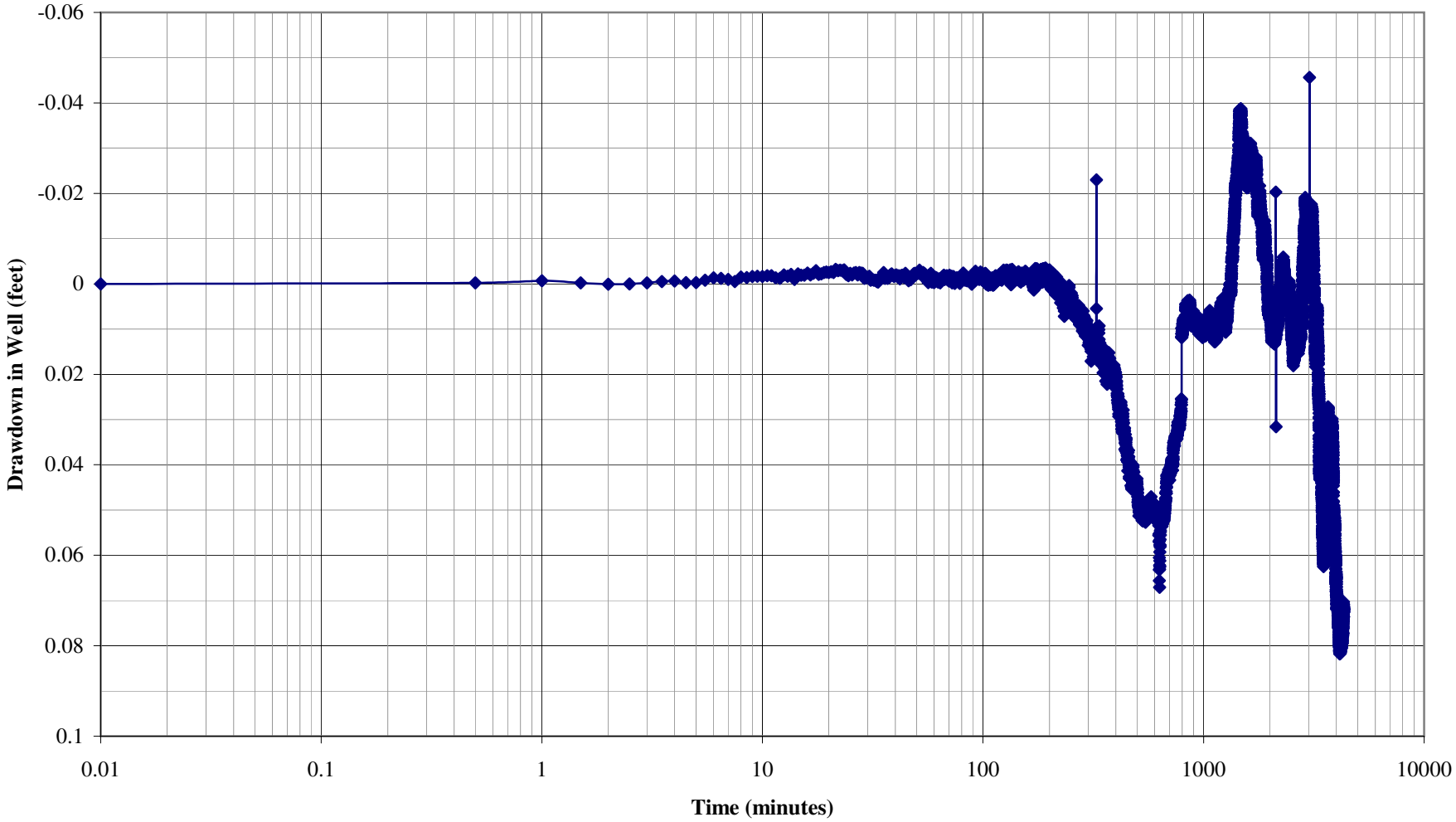
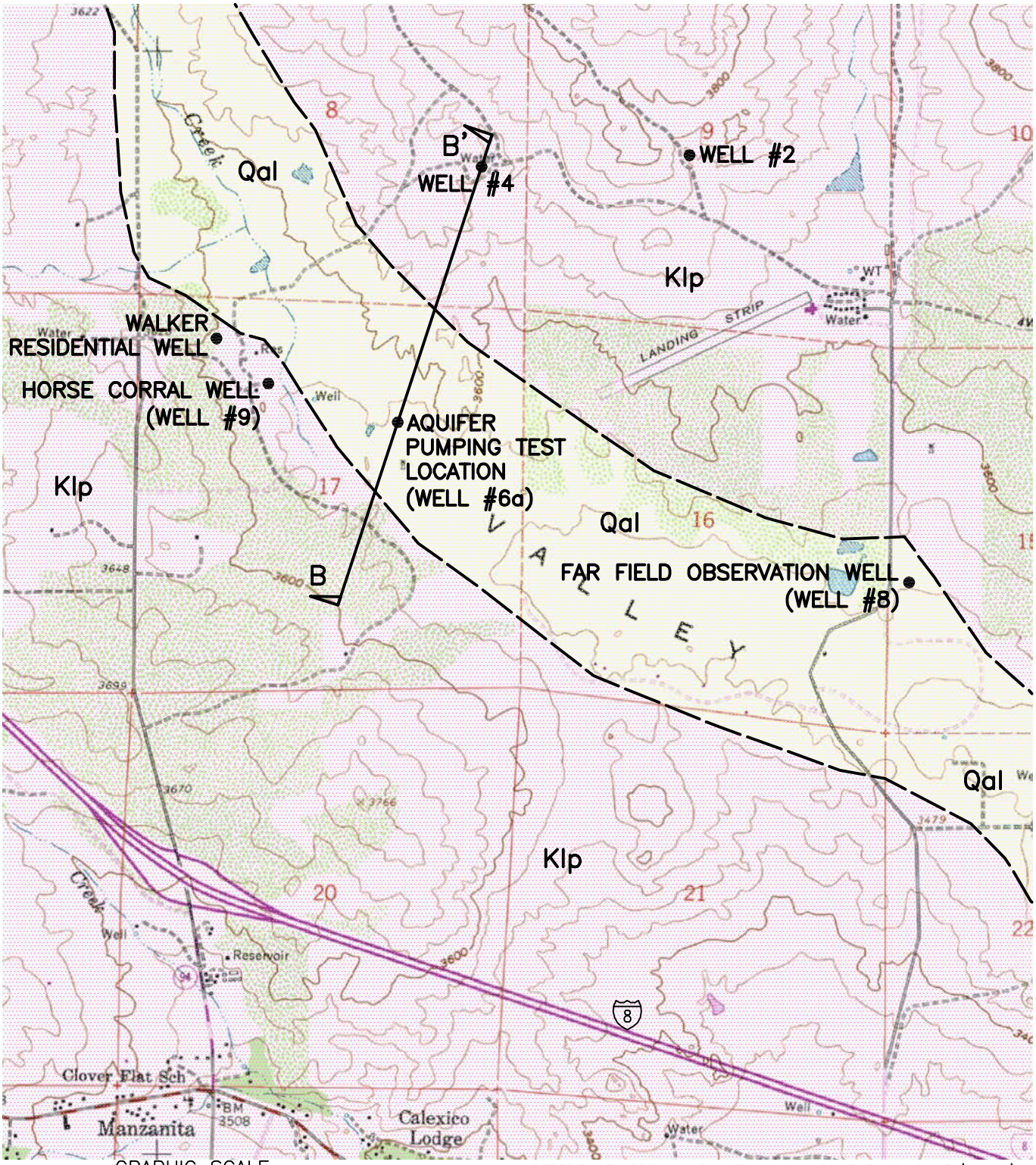


Figure 9
Well #8 Far Field - Observation Well
Time-Drawdown Plot
Rough Acres Ranch





GRAPHIC SCALE

1000 0 500 1000 2000

(in feet)

1 inch = 2000 ft.

N

REFERENCE: PRELIMINARY GEOLOGIC MAP OF EL CAJON 30' x 60' QUADRANGLE, SOUTHERN CALIFORNIA, V. R. TODD, 2004

FIGURE 7

EXPLANATION:

Qal	ALLUVIUM
Klp	TONALITE OF LA POSTA (EARLY AND LATE CRETACEOUS)
	APPROXIMATE GEOLOGIC CONTACT
B B'	CROSS-SECTION LOCATION

GEOLOGIC MAP
ROUGH ACRES RANCH AQUIFER TEST SITE

TULE WIND PROJECT
SAN DIEGO COUNTY, CA

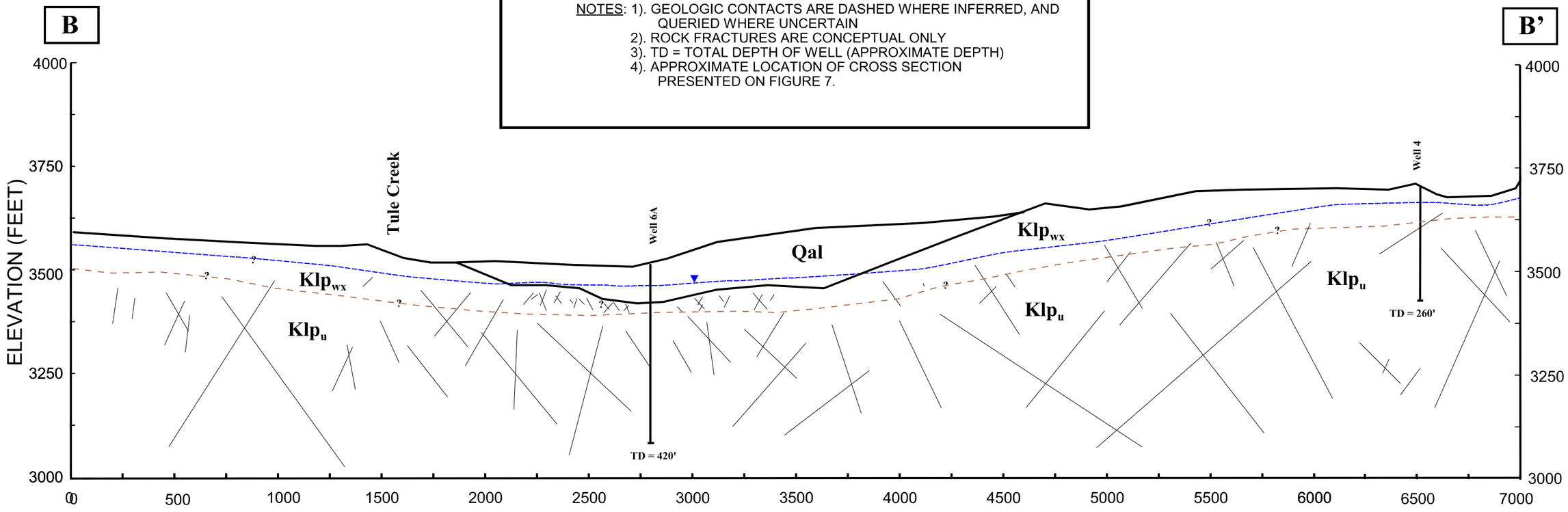
Geo-Logic ASSOCIATES

DRAWN BY:	DATE:	JOB NO.
VL	NOVEMBER 2010	2010-005

LEGEND

Qal	RECENT ALLUVIUM
Klp_{wx}	LA POSTA TONALITE, WEATHERED
Klb_{u}	LA POSTA TONALITE, UNWEATHERED
	APPROXIMATE GROUNDWATER TABLE
	ROCK FRACTURES (SCHEMATIC ONLY)

NOTES: 1). GEOLOGIC CONTACTS ARE DASHED WHERE INFERRED, AND QUERIED WHERE UNCERTAIN
2). ROCK FRACTURES ARE CONCEPTUAL ONLY
3). TD = TOTAL DEPTH OF WELL (APPROXIMATE DEPTH)
4). APPROXIMATE LOCATION OF CROSS SECTION PRESENTED ON FIGURE 7.



NORTH 18° EAST

HORIZONTAL SCALE: 1 INCH = 500 FEET
VERTICAL SCALE: 1 INCH = 250 FEET
2x VERTICAL EXAGGERATION
(11 X 17 INCH FORMAT ONLY)

FIGURE 8

CONCEPTUAL HYDROGEOLOGIC CROSS SECTION

ROUGH ACRES STUDY AREA
SAN DIEGO COUNTY, CALIFORNIA

Geo-Logic ASSOCIATES

Draft	Date	Project No.
JGF	OCT 2010	2010-0005

References: USGS, 1975, 7.5' Live Oak Springs, CA Quadrangle.

Appendix A
Analytical Results from Aquifer Test Program

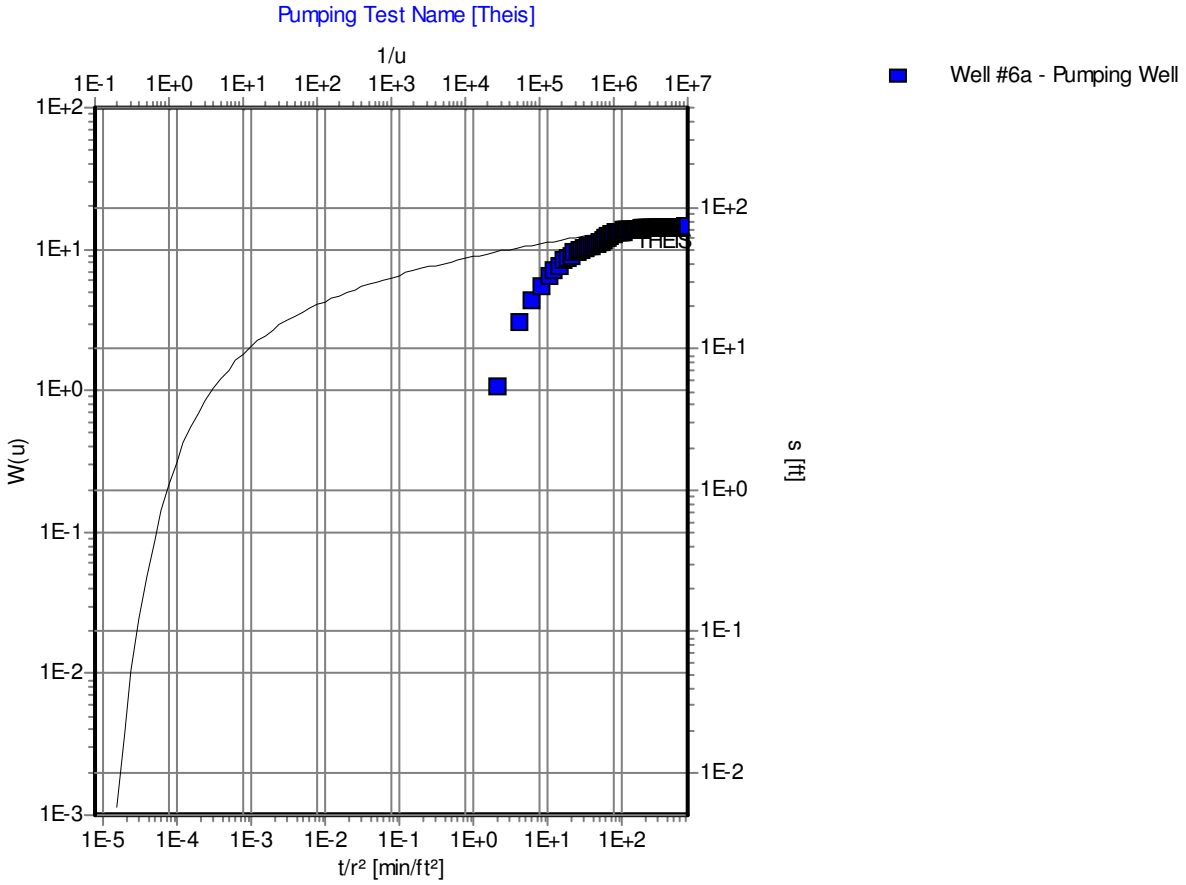
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	1.51E+2 [ft²/d]	Conductivity:	3.03E-1 [ft/d]
	Storativity:	3.19E-5		
Test parameters:	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Confined Aquifer	
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments: Match to late time data. Pumping Well.

Evaluated by: MWV

Evaluation Date: 11/18/2010

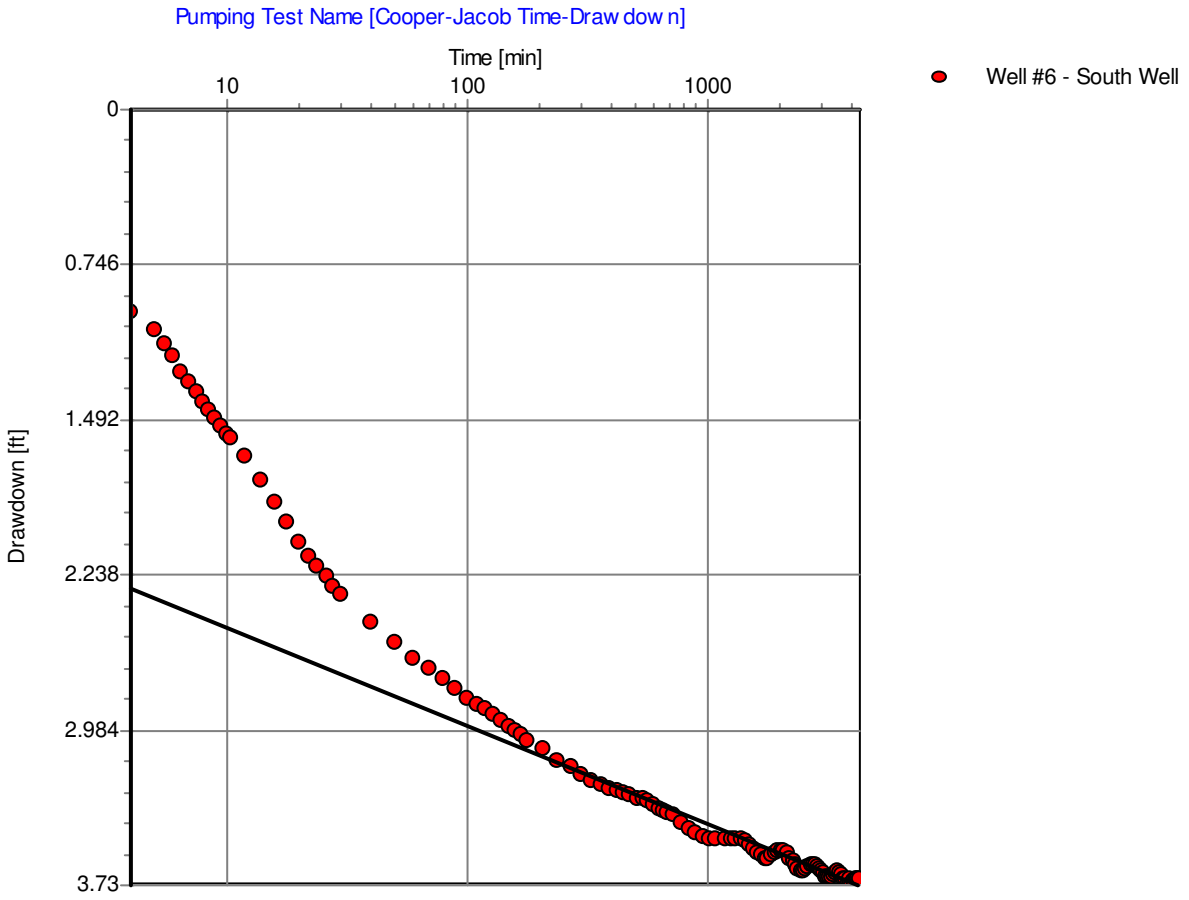
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	3.75E+3 [ft²/d]	Conductivity:	7.50E+0 [ft/d]
	Storativity:	2.28E-7		
Test parameters:	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Confined Aquifer	
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments: Match to latest time data. Observation Well.

Evaluated by: MWV

Evaluation Date: 11/18/2010

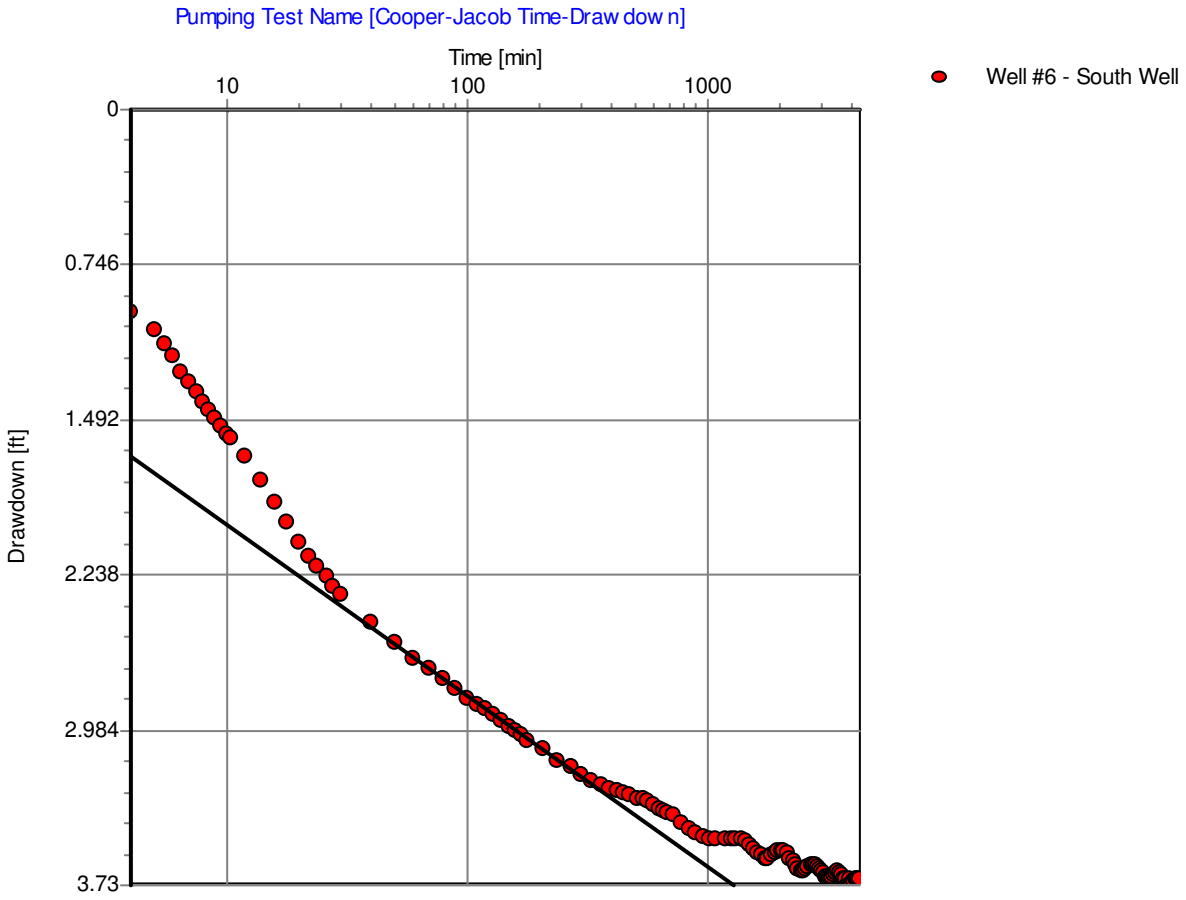
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	2.14E+3 [ft²/d]	Conductivity:	4.28E+0 [ft/d]
	Storativity:	1.01E-4		
Test parameters:	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Confined Aquifer	
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments: Match to middle time data. Observation Well.

Evaluated by: MWV

Evaluation Date: 11/18/2010

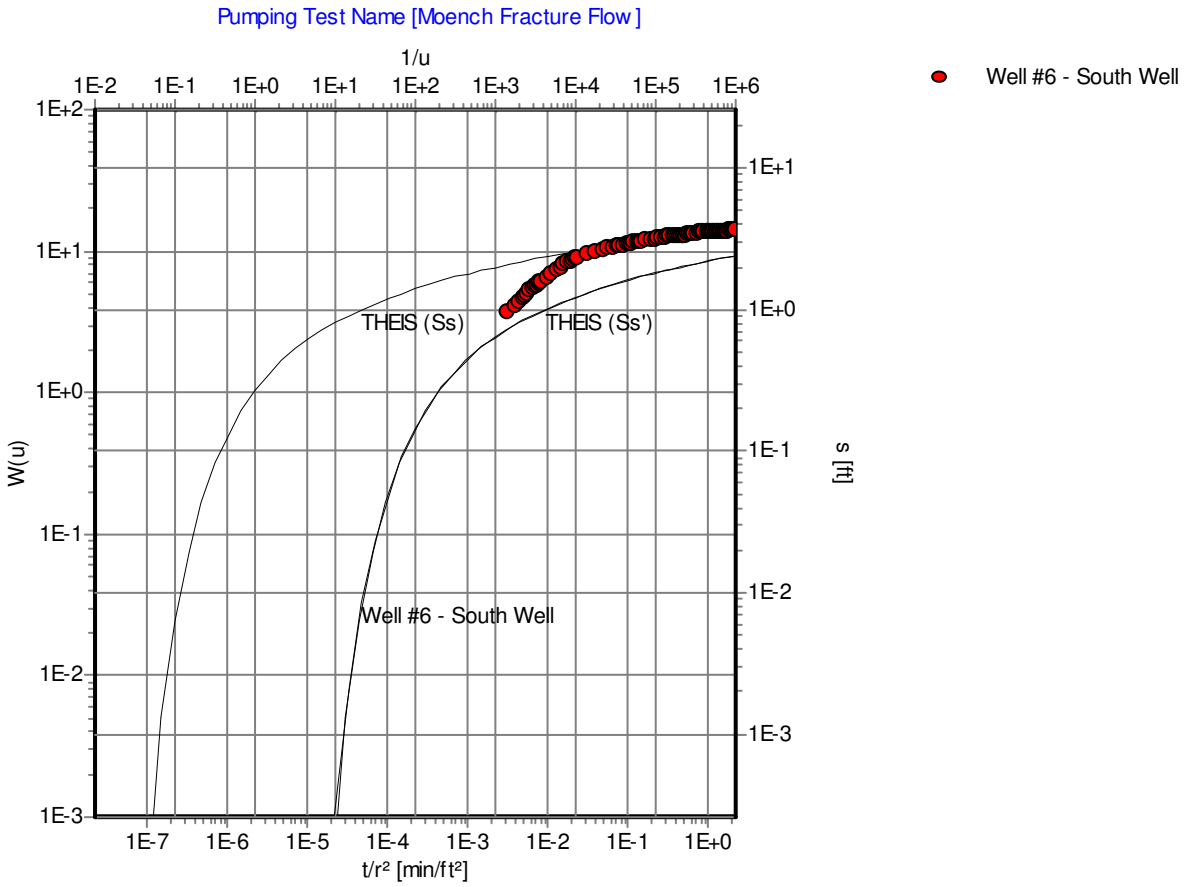
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Moench Fracture Flow**

Analysis Results:	Transmissivity:	2.95E+3 [ft²/d]	Conductivity:	5.91E+0 [ft/d]
	Storativity:	4.48E-6		

Test parameters:	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	b:	357 [ft]
	Screen length:	310 [ft]	Kv/Kh:	0.1
	Boring radius:	0.271 [ft]	C:	0.231
	Discharge Rate:	50 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments: Match to late time data.

Evaluated by: MWV

Evaluation Date: 11/18/2010

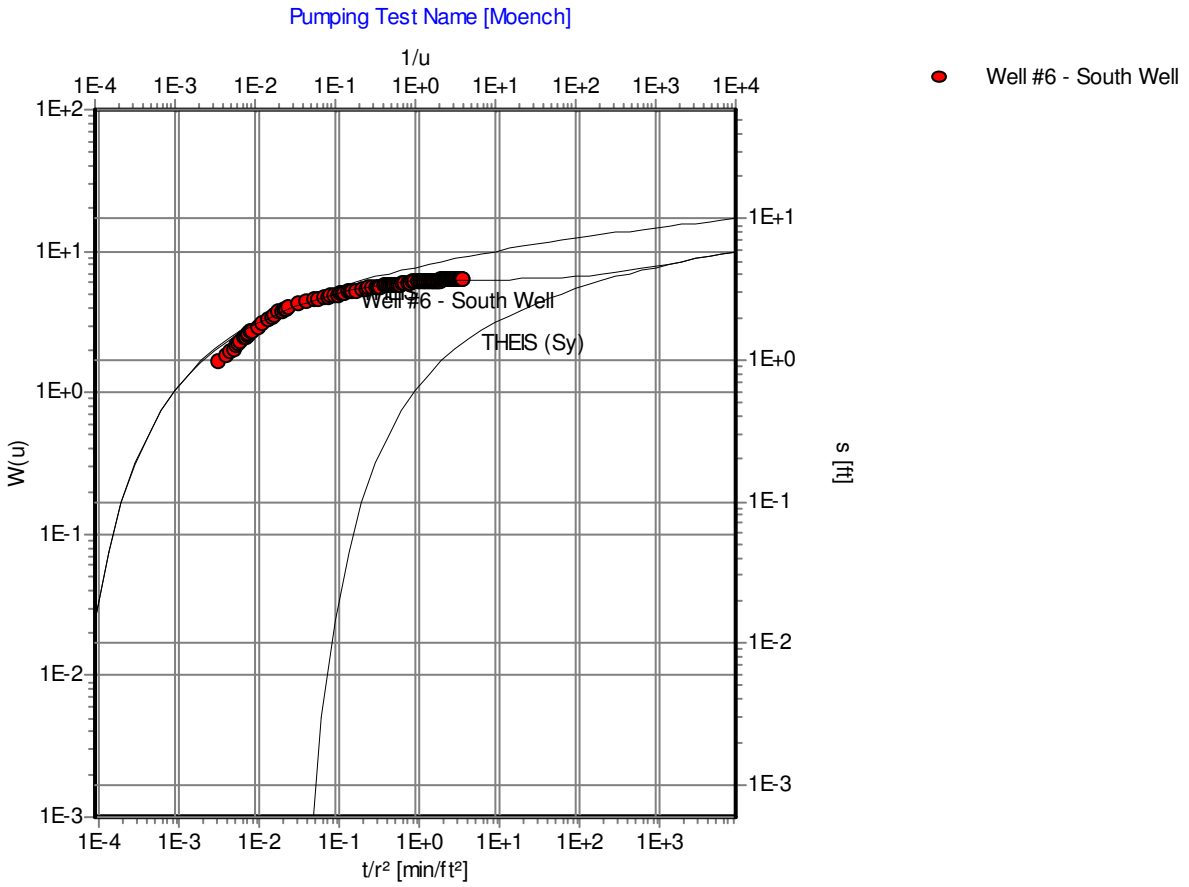
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Moench**

Analysis Results:	Transmissivity:	1.30E+3 [ft²/d]	Conductivity:	2.60E+0 [ft/d]
	Storativity:	7.87E-1	Conductivity (vertical):	2.60E-1 [ft/d]
Test parameters:	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Unconfined Aquifer	
	Screen length:	310 [ft]	S/Sy:	0.001
	Boring radius:	0.271 [ft]	Kv/Kh:	0.1
	Discharge Rate:	50 [U.S. gal/min]	Gamma:	1E9
	b:	357 [ft]		

Comments: Match to late time data.

Evaluated by: MWV

Evaluation Date: 11/18/2010

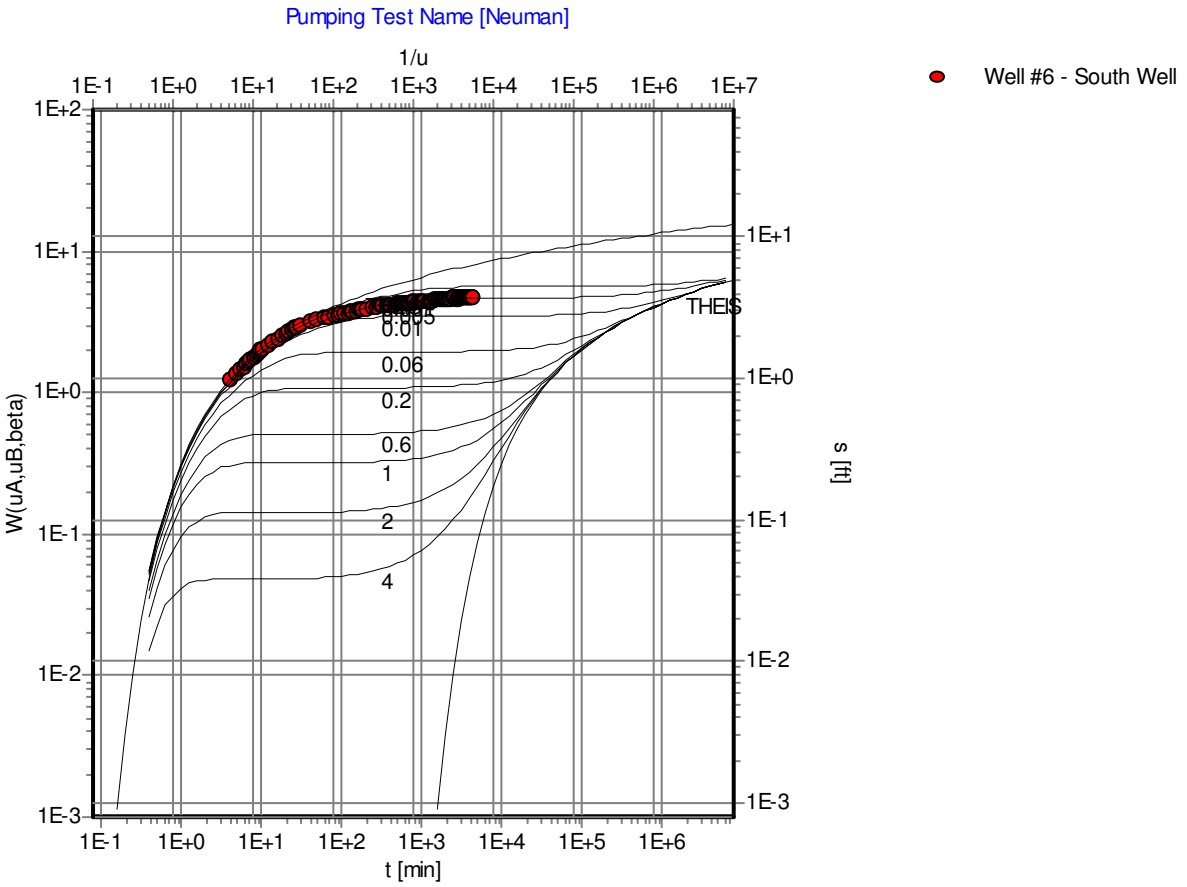
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Neuman**

Analysis Results:				
	Transmissivity:	9.67E+2 [ft²/d]	Conductivity:	1.93E+0 [ft/d]

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Beta:	0.005
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		
	LOG(Sy/S):	4		

Comments: Match to entire data set.

Evaluated by: MWV

Evaluation Date: 11/18/2010

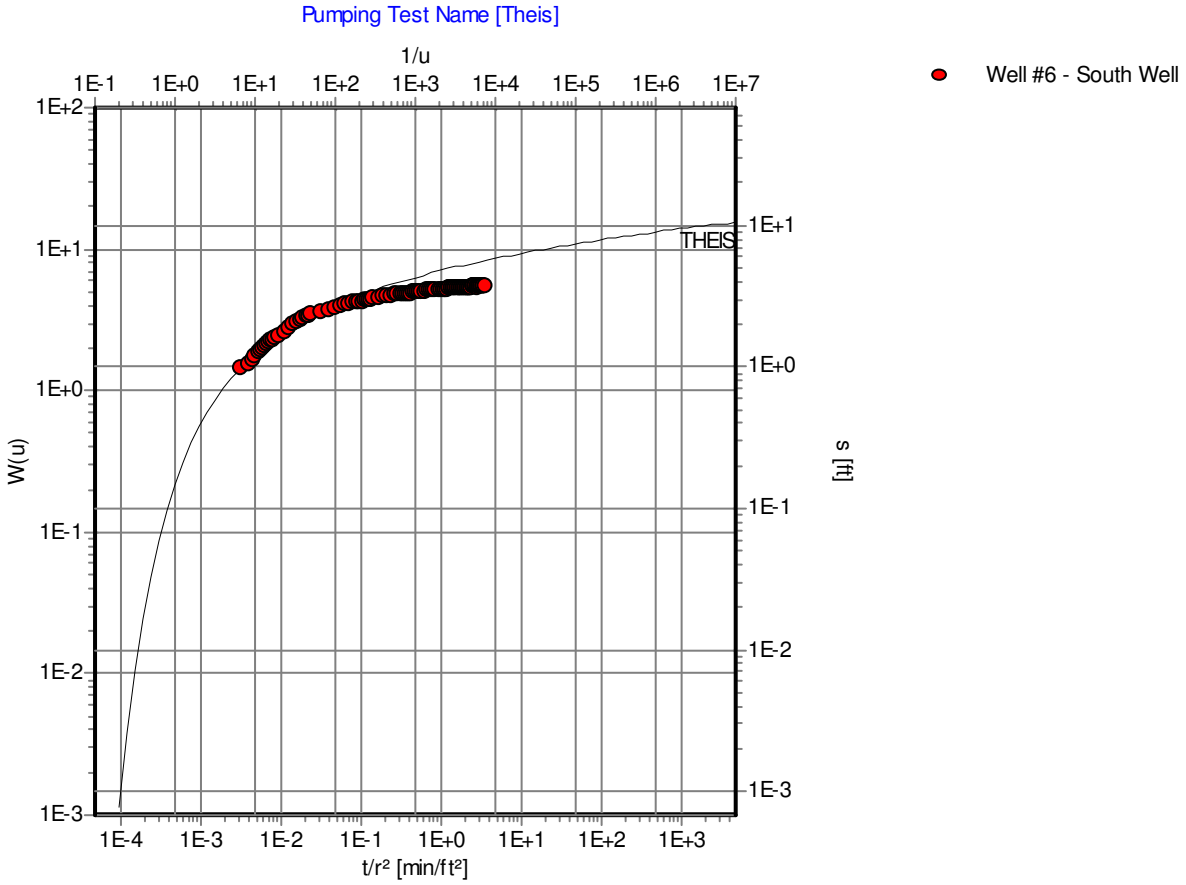
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Theis**

Analysis Results:				
	Transmissivity:	1.13E+3 [ft²/d]	Conductivity:	2.26E+0 [ft/d]
	Storativity:	1.47E-3		

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Confined Aquifer	
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments: Match to early time data. Observation Well.

Evaluated by: MWV

Evaluation Date: 11/18/2010

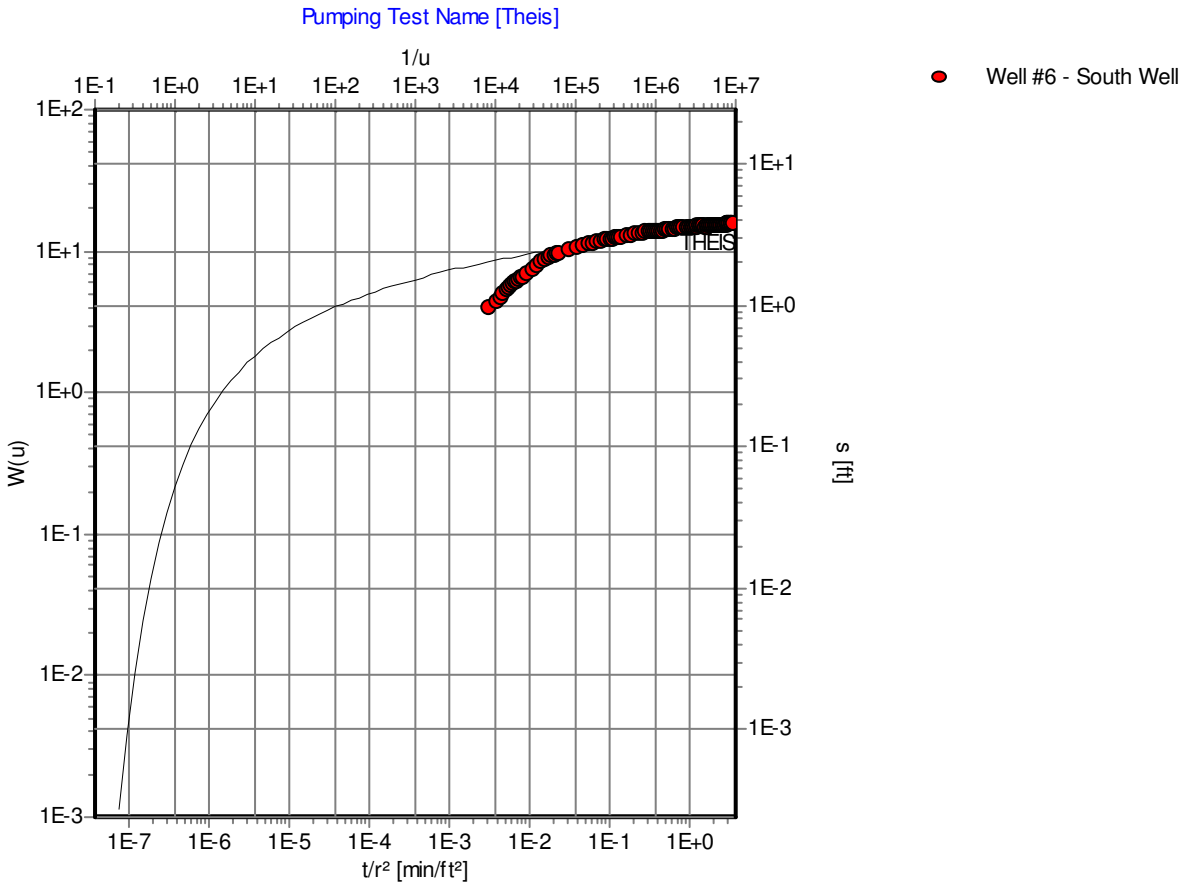
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Theis**

Analysis Results:				
	Transmissivity:	3.18E+3 [ft²/d]	Conductivity:	6.36E+0 [ft/d]
	Storativity:	3.29E-6		

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Confined Aquifer	
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments: Match to late time data.

Evaluated by: MWV

Evaluation Date: 11/18/2010

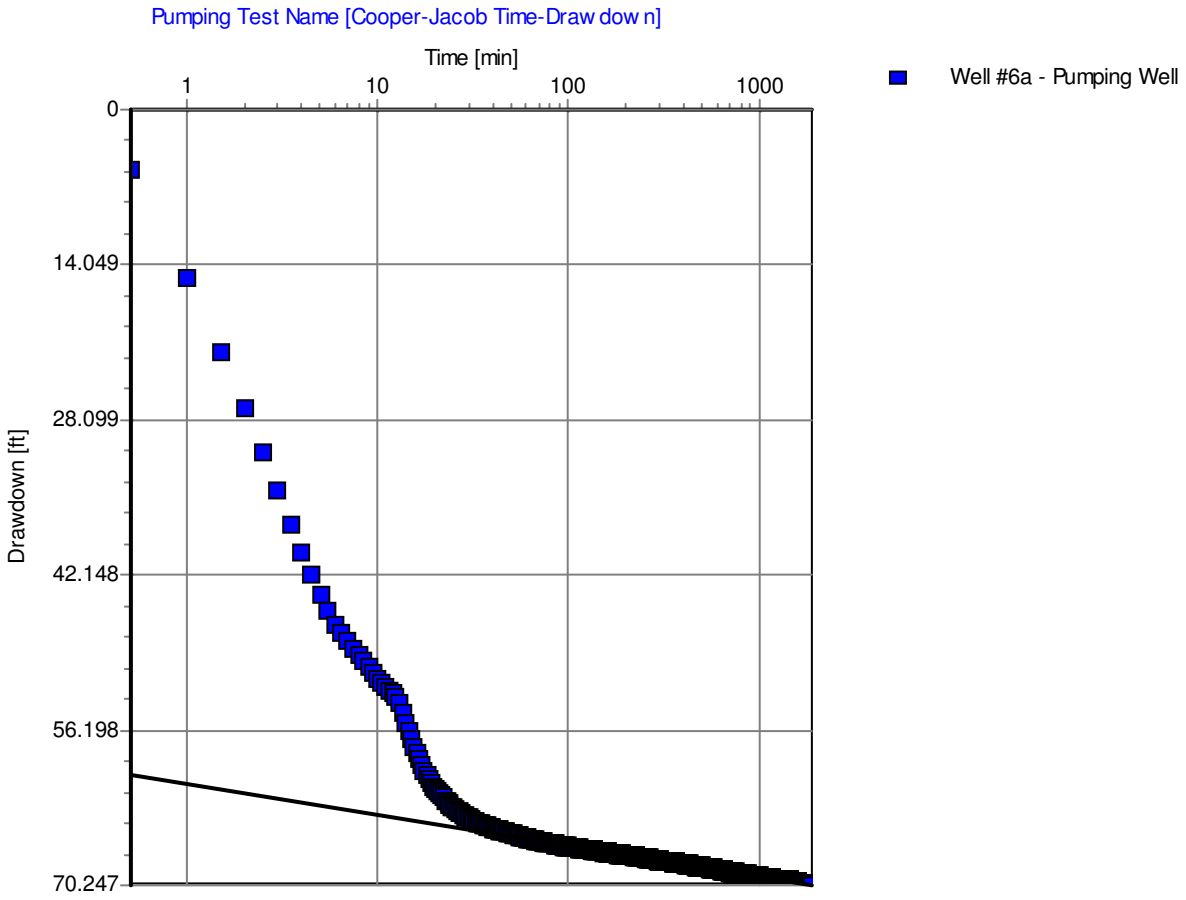
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:				
	Transmissivity:	6.30E+2 [ft²/d]	Conductivity:	1.26E+0 [ft/d]

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Unconfined Aquifer	
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments: Match to late time data.

Evaluated by: MWV

Evaluation Date: 11/17/2010

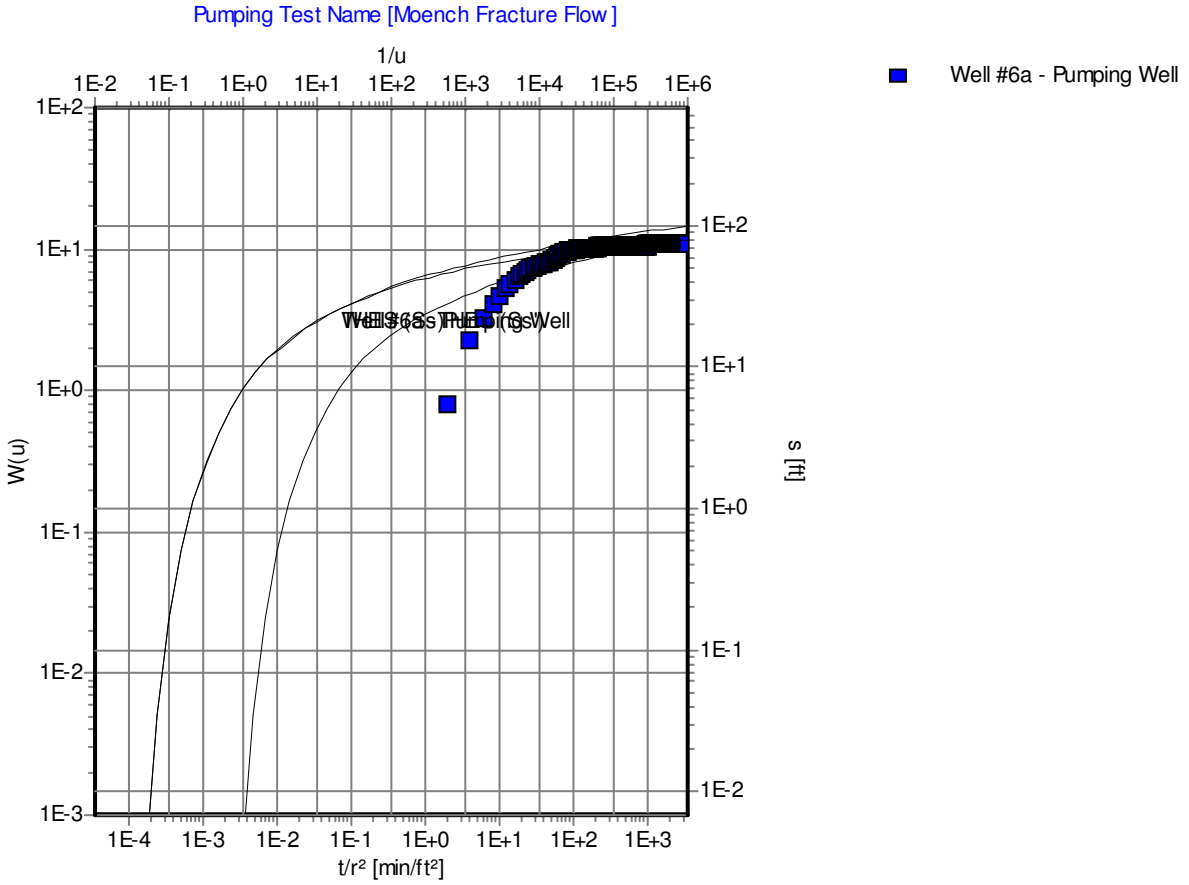
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Moench Fracture Flow**

Analysis Results:				
	Transmissivity:	1.12E+2 [ft²/d]	Conductivity:	2.25E-1 [ft/d]
	Storativity:	2.70E-4		

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	b:	357 [ft]
	Screen length:	310 [ft]	Kv/Kh:	1
	Boring radius:	0.271 [ft]	C:	0.231
	Discharge Rate:	50 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	20	K(block)/K(fracture):	0.1

Comments: Match to late time data.

Evaluated by: MWV

Evaluation Date: 11/17/2010

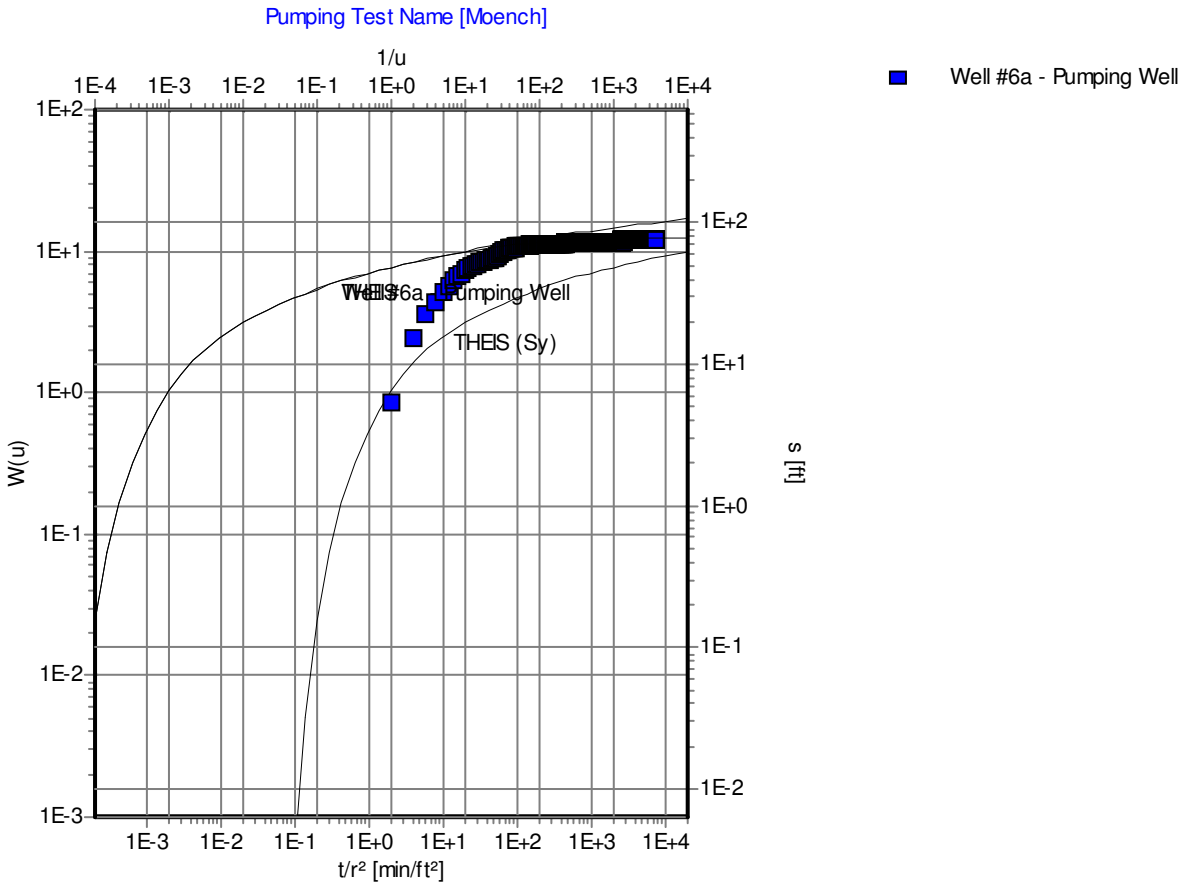
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Moench**

Analysis Results:				
	Transmissivity:	1.21E+2 [ft²/d]	Conductivity:	2.43E-1 [ft/d]
	Storativity:	1.72E-1	Conductivity (vertical):	2.43E-1 [ft/d]

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Unconfined Aquifer	
	Screen length:	310 [ft]	S/Sy:	0.001
	Boring radius:	0.271 [ft]	Kv/Kh:	1
	Discharge Rate:	50 [U.S. gal/min]	Gamma:	1E9
	b:	357 [ft]		

Comments:

Evaluated by:

Evaluation Date: 11/17/2010

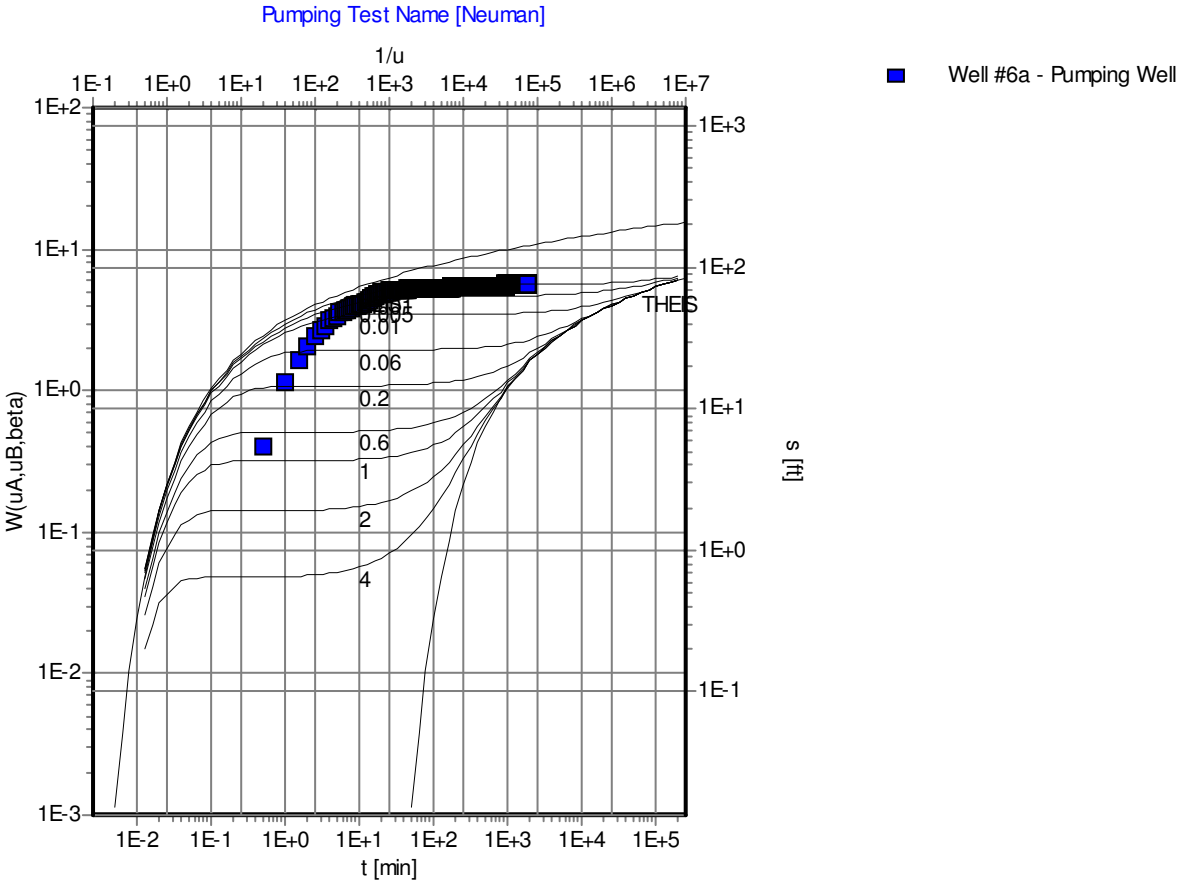
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Neuman**

Analysis Results:				
	Transmissivity:	5.69E+1 [ft²/d]	Conductivity:	1.14E-1 [ft/d]
	Storativity:	1.62E-2	Specific Yield:	1.62E+2

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Beta:	0.005
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		
	LOG(Sy/S):	4		

Comments: Match to late time drawdown data.

Evaluated by: MWV

Evaluation Date: 11/17/2010

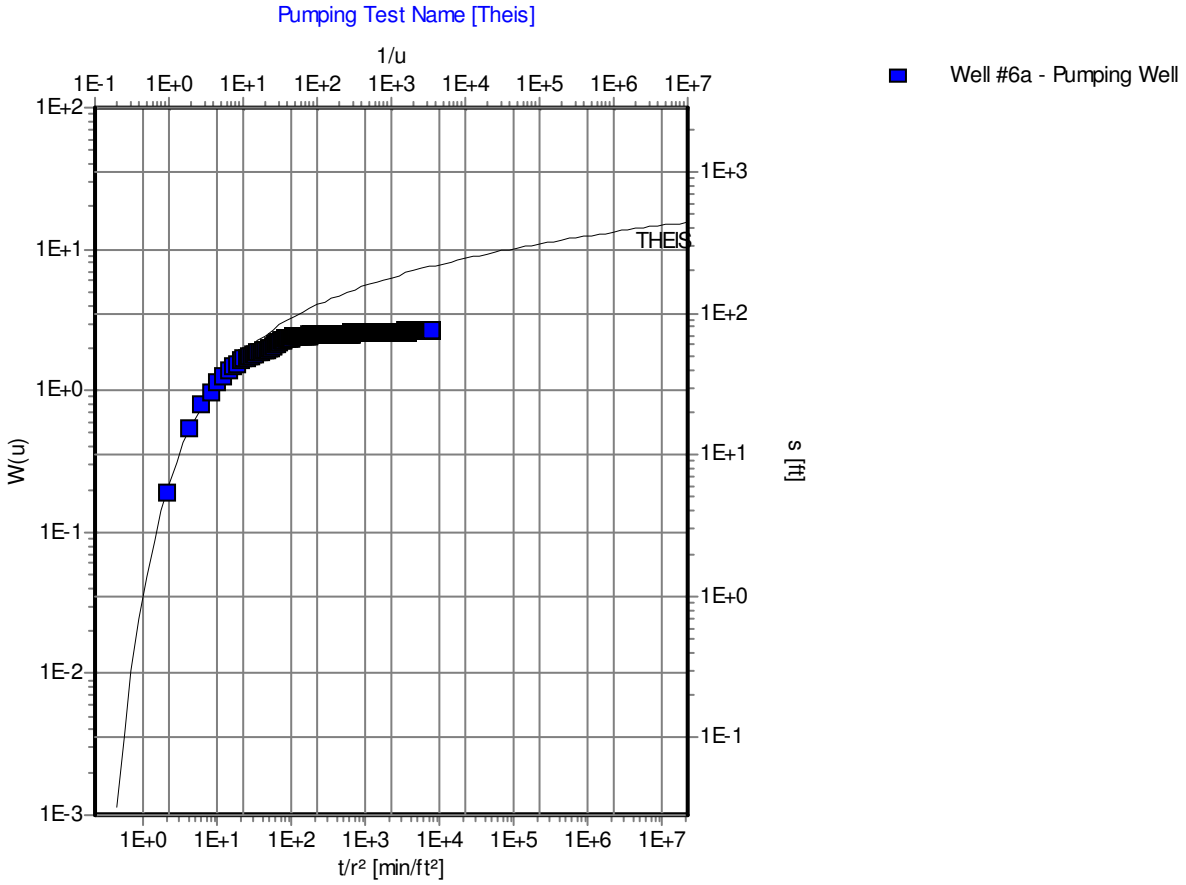
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	2.69E+1 [ft²/d]	Conductivity:	5.39E-2 [ft/d]
	Storativity:	1.64E-1		
Test parameters:	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	Confined Aquifer	
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments: Match to early time data.

Evaluated by: MWV

Evaluation Date: 11/18/2010

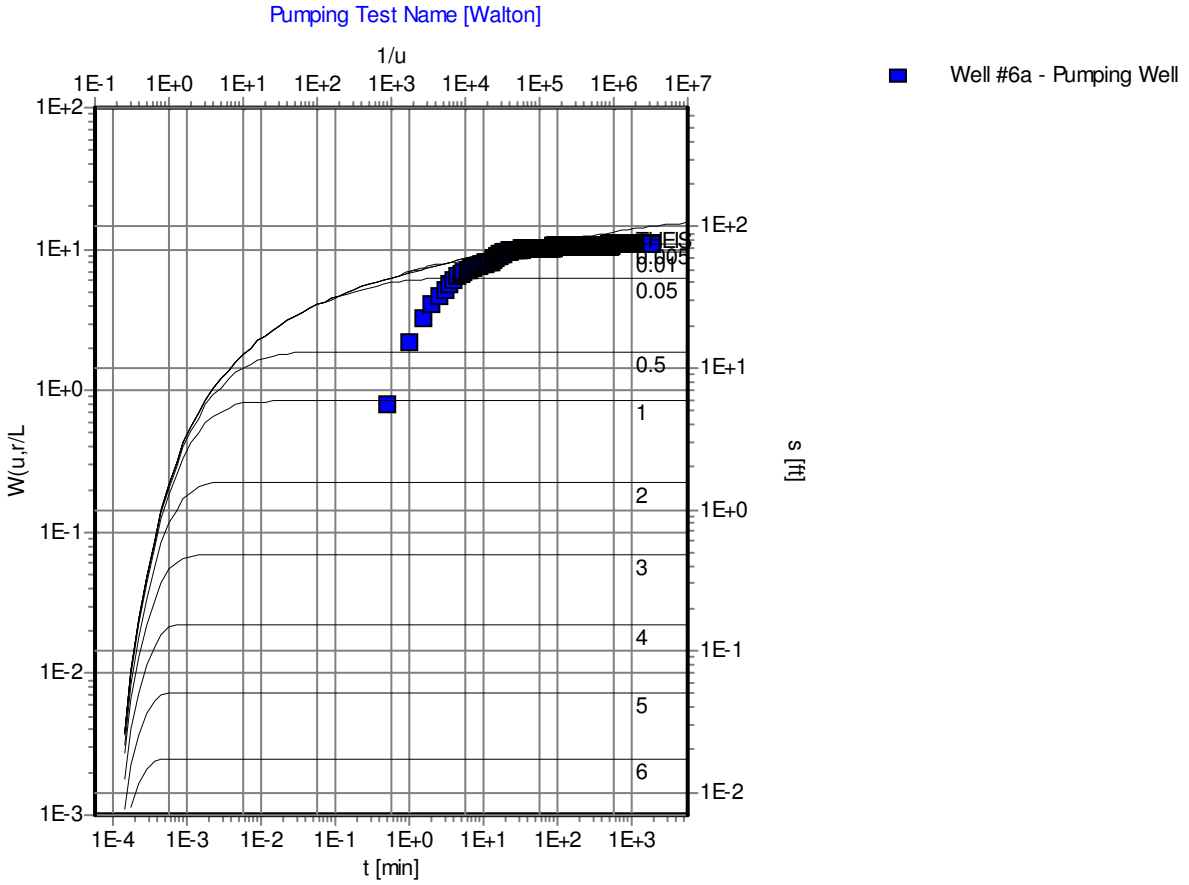
Waterloo Hydrogeologic, Inc.
460 Philip Street - Suite 101
Waterloo, Ontario, Canada
Phone: +1 519 746 1798

Pumping Test Analysis Report

Project: Rough Acres

Number:

Client:



Pumping Test: **Pumping Test Name**

Analysis Method: **Walton**

Analysis Results:				
	Transmissivity:	1.11E+2 [ft²/d]	Conductivity:	2.21E-1 [ft/d]
	Storativity:	7.08E-4	c:	1.30E+5 [min]

Test parameters:				
	Pumping Well:	Well #6a	Aquifer Thickness:	500 [ft]
	Casing radius:	0.167 [ft]	r/L:	0.005
	Screen length:	310 [ft]		
	Boring radius:	0.271 [ft]		
	Discharge Rate:	50 [U.S. gal/min]		

Comments:

Evaluated by: MWV

Evaluation Date: 11/17/2010

Appendix B
Department of Water Resources Well Completion Reports

#4

Power at well

NO pump

Across road from
Bathrooms in
West Canyon

Water was discolored
& hence quit using

COUNTY OF SAN DIEGO

DEPARTMENT OF ENVIRONMENTAL HEALTH
1255 Imperial Ave
San Diego, CA 92101
619-338-2222

#4

INVOICE

ERMIT TYPE & NUMBER: LWEL 16226 — INVOICE DATE: 16 SEP 2004
ERMIT OWNER: — CONTACT:
ADEM ROBERT S&MARY O TRUST B1
53 OCEAN ST

92008

611-060-03 — APPLICANT:
PN: ~~611-110-01-00~~ 611-070-01 — FADEM ROBERT S&MARY O TRUST B1
ITE ADDRESS: ~~2533~~ MCCAIN VALLEY RD
OCATION DESCRIPTION: ~~2533~~ MCCAIN VALLEY RD,

ROJECT DESCRIPTION/SCOPE
umber of Wells on Permit Application:1
escription of Work:new
ype of Use for Each Well:private

EE/DEPOSIT DETAILS

FEE CODE	DESCRIPTION	TIME ACCT.	ACCT. CODE	AMOUNT
6LE01--EHO	WATER WELL PERMIT	429E01	9773-773	390.00
			09-14-04 11:30 9773 772 429E01 CHECK	[illegible]
			TOTAL AMOUNT DUE	$390.00

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
WELL PERMIT APPLICATION

Parcel 1 of 7 600 Lights

DEH USE ONLY
PERMIT # W [illegible]
WELL COMPUTER #
FEE: _____
WATER DIST: _____

1. Property Owner: Hanson Companies Phone: [illegible]
   1600 Pioneer Way — City — Zip
2. Well Location - Assessors Parcel Number 611-060-03 611-070-01
   Site Address — City — BOULEVARD 91905 Zip
3. Well Contractor - Well Driller Jim Mayes Company Name: [illegible]
   Mailing Address — City — Zip
   Phone#: [illegible] C-57#: [illegible] ☐ Cash Deposit ☐ Bond Posted
4. Use: ☐ Private ☐ Public ☐ Industrial ☐ Cathodic ☐ Other _____
5. Type of Work: ☐ New ☐ Reconstruction ☐ Destruction Time Extension: ☐ 1st ☐ 2nd
6. Type of Equipment: Air Rotary
7. Depth of Well: Proposed: 3[illegible] Existing: [illegible]
8. Proposed:

Casing	Conductor Casing	Filter/Filler Material	Perforations
Type: [illegible]	☐ Yes ☐ No	☐ Yes ☐ No	From: _____ To: _____
Depth: [illegible]	Depth: _____ ft.	From: _____ To: _____	From: _____ To: _____
Diameter [illegible] in.	Diameter _____ in.	Type: _____	From: _____ To: _____
Wall/Gauge: [illegible]	Wall/Gauge: _____	Wall/Gauge: _____	

9. Annular Seal: Depth: [illegible] ft. Sealing Material: [illegible]
   Borehole diameter: _____ in. Conductor diameter: _____ in. Annular Thickness _____ in.
10. Date of Work: Start: [illegible] Complete: [illegible]

On sites served by public water, contact the local water agency for meter protection requirements.

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: Jim Mayes Date: [illegible]

DISPOSITION OF APPLICATION (Department of Environmental Health Use only)

☒ **Approved** ☐ **Denied** Special Conditions: Grading and clearing associated with access to, or the construction, maintenance or destruction of water wells, may require additional permits from the County of San Diego and/or other agencies. _____

Specialist: Danny O'Cull Date: 5/16/04

DEH-LU-731a (Rev. 4/02) NCR

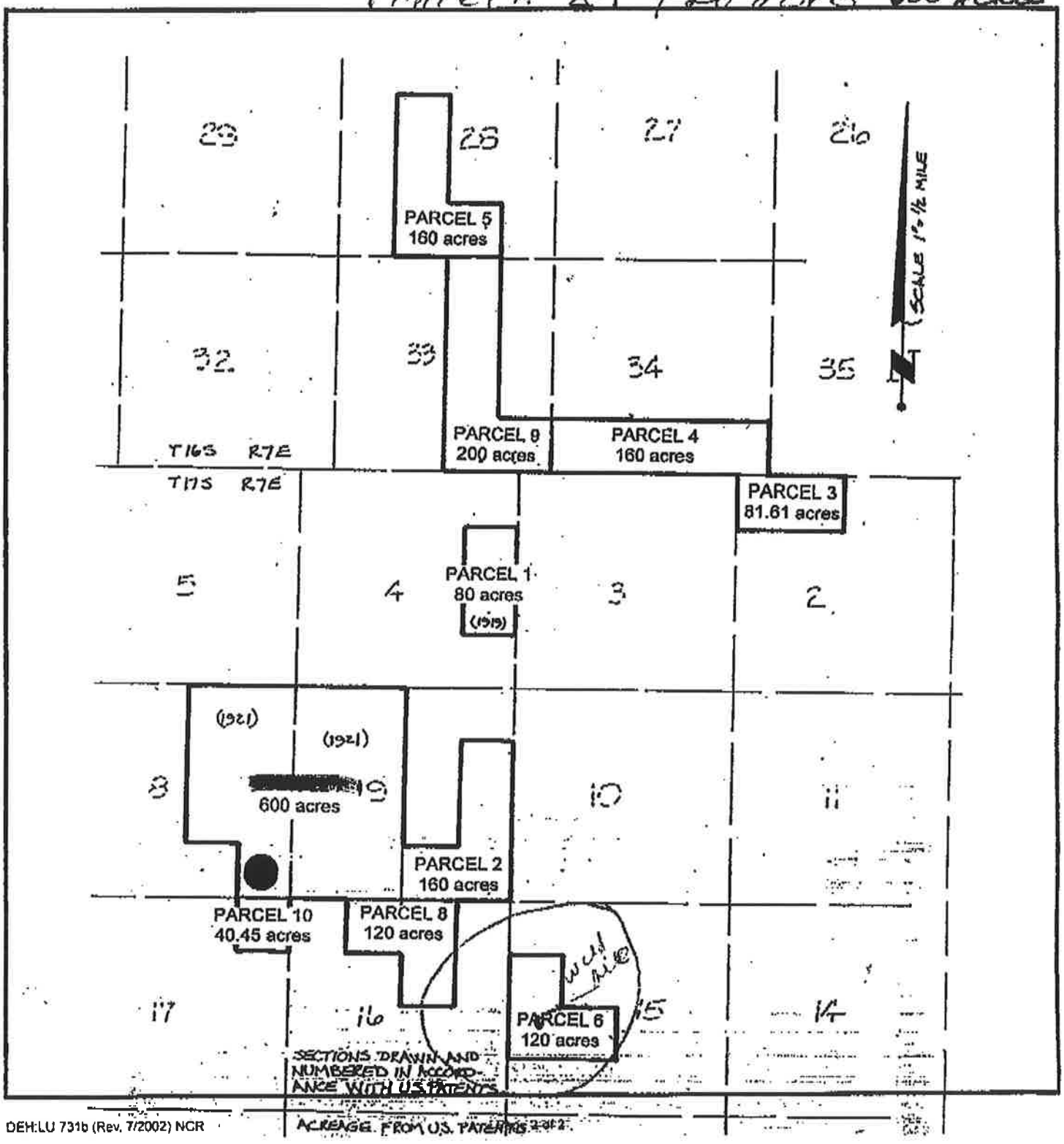
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWQL 16226
Assessor's Parcel Number: ~~611-110-07~~
611-060-03
611-070-01

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

Parcel # 5 ~~+200 acres~~ 600 ACRES



County Mail Station — A-21

FIRST CARBON COPY

ASSESSORS PARCEL NUMBER: ______

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

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

Notice of Intent No. ______
Local Permit No. or Date ______

State Well No. ______
Other Well No. ______

(1) OWNER: Name John Well No. 2
Address Bauer Acres
City ______ Zip ______

(2) LOCATION OF WELL (See instructions):
County ______ Owner's Well Number ______
Well address if different from above ______
Township ______ Range ______ Section ______
Distance from cities, roads, railroads, fences, etc. ______

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

Jettey #8

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

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

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

(6) Gravel Pack: 3/8ths
Yes ☒ No ☐ Size ______
Diameter of above 9"
Packed from 0 to 185 ft.

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

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

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot Size
0	91	6 5/8	.188	0	185	3/32ths

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 91' ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval ______ ft.
Method of sealing Bentonite - cement

(10) WATER LEVELS:
Depth of first water, if known 130' ft.
Standing level after well completion 85 ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? Driller
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test — ft. At end of test — ft.
Discharge 15 gal/min after 1 hours Water temperature Cool
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 260 ft. Depth of completed well 185 ft.
from ft. to ft. Formation (Describe by color, character, size or material)

0-91 - Sandy, D.G.
91-130 - Soft, orange, white & brown
130-133 - Gray soft (3 GPM)
133-185 - Soft orange, white, black
185-190 - Loose rocks (20 GPM)
190-260 - Soft & hard

Work Started 19 Completed 19

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 [signature] (Well Driller)

NAME ______ (Person, firm, or Corporation) (Type or Print)

ADDRESS ______

CITY ______ ZIP ______

LICENSE NO. ______ DATE THIS REPORT ______

DHS:EHP-732 (83) CONFIDENTIAL — NOT FOR PUBLIC USE — WATER CODE SEC. 13752

DUPLICATE
Driller's Copy

Page 1 of 1
Owner's Well No. X 4
Date Work Began 9-25-04, Ended 9-27-04
Local Permit Agency San Diego F.H.S.
Permit No. LWEL16226 Permit Date 9-16-04

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0909442

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

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD rotary FLUID air

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 91	sandy, dg
91 130	soft, orange, white & brown
130 133	very soft
133 185	soft, orange, white & black
185 190	loose rocks
190 260	soft & hard

TOTAL DEPTH OF BORING 260 (Feet)
TOTAL DEPTH OF COMPLETED WELL 185 (Feet)

CONFIDENTIAL
NOT FOR PUBLIC DISCLOSURE
WATER CODE SECTION 13752

WELL OWNER
Name Hamann Companies
Mailing Address 1000 Pioneer Way
City El Cajon, Ca 92020 STATE ZIP

WELL LOCATION
Address McCain Valley Rd
City Jacumba
County San Diego
APN Book 611 Page 110 Parcel 01
Township 17 S Range 7 E Section 15
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH
NORTH
WEST
EAST
SOUTH
Scattered
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.

ACTIVITY (✓)
X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH TO FIRST WATER 130 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 35 (Ft.) & DATE MEASURED 9-27-04
ESTIMATED YIELD * 15 (GPM) & TEST TYPE airlift
TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN — (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 91	11	x				steel	5 5/8	.189	
0 185	6¼		x			pvc	4	sch 40	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 91	x	x		
0 185			x	5/16 pea gravel

ATTACHMENTS (✓)
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

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

NAME JIM MANOS DRILLING & PUMP (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 16052 LAWSON VLY RD, JAMUL, CA 91935 CITY STATE ZIP
Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 3-6-05
C-57 LICENSE NUMBER 360722

DWR 188 REV. 05-03
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

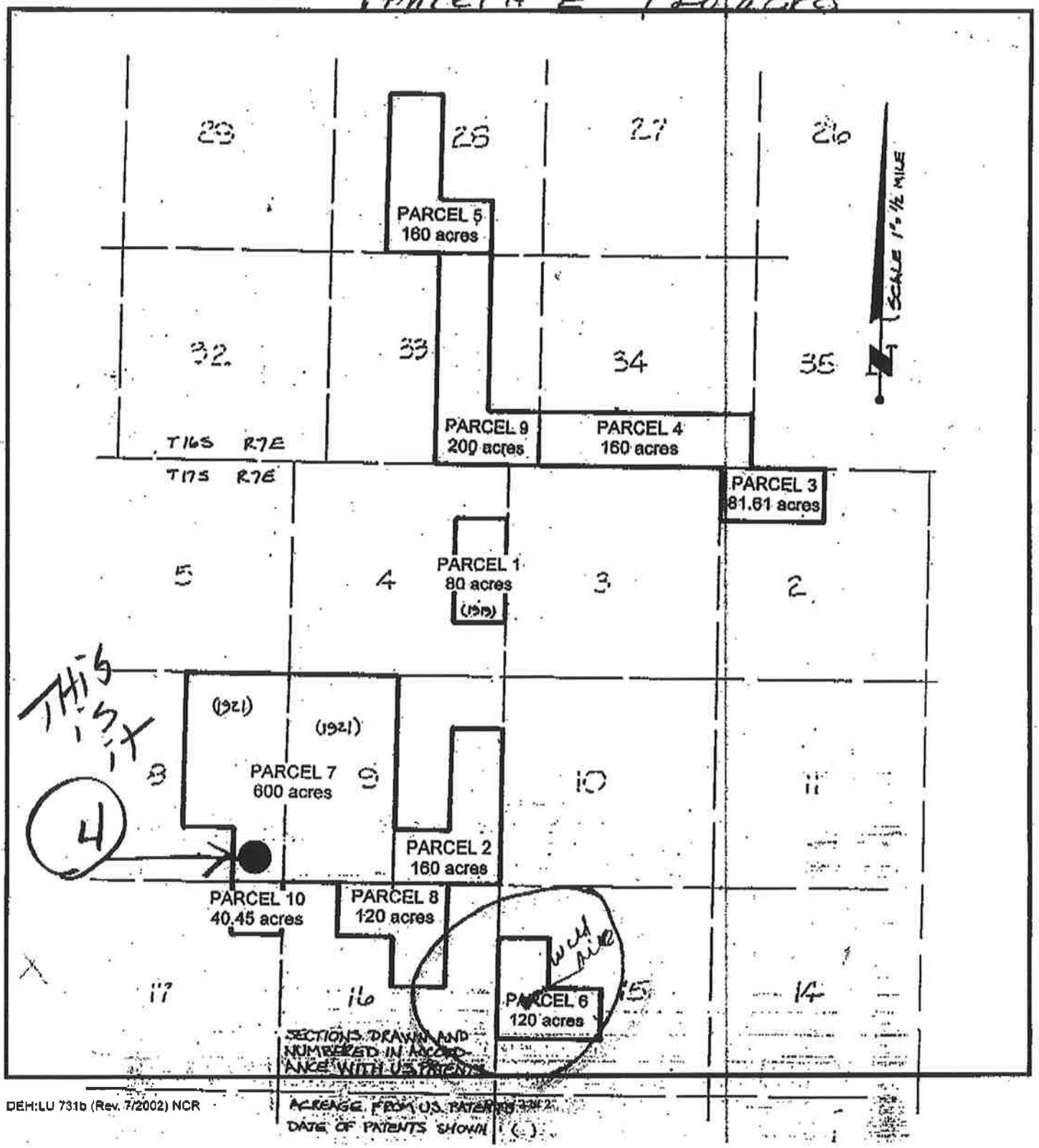
COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH

Control #: LWEL 16226
Assessor's Parcel Number: 611-110-01

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.

Parcel # 6 120 acres



Fully operational

#6 No Logs Available

Original well on Ranch

6A NEW Public Well

Fully operational

QUADRUPLICATE FEB 09 201[illegible]
For Local Requirements

County of San Diego
Dept. of Environmental Health
Land & Water Quality Div.

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 1089956

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

Page 1 of 1
Owner's Well No. 1
Date Work Began 11-4-09, Ended 11-10-09
Local Permit Agency San Diego C.[illegible]
Permit No. LWE620420 Permit Date 11-13-09

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD ROTARY FLUID AIR

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 – 10	sandy-rocks
10 – 30	sandy-slightly firm
30 – 32	soft
32 – 70	sandy
70 – 85	harder
85 – 87	cracks
87 – 230	black & white rock, softer areas
230 – 233	softer, orange
233 – 330	black, white & orange
330 – 332	softer, orange
332 – 385	black & white rock, softer areas
385 – 395	sand
395 – 420	black & white rock

Completed Well Construction
Date 2/9/10
Date Inspected
Comments KIVA entered on this date.
Water Sample Taken? [illegible]

TOTAL DEPTH OF BORING 420 (Feet)
TOTAL DEPTH OF COMPLETED WELL [illegible] (Feet)

WELL OWNER

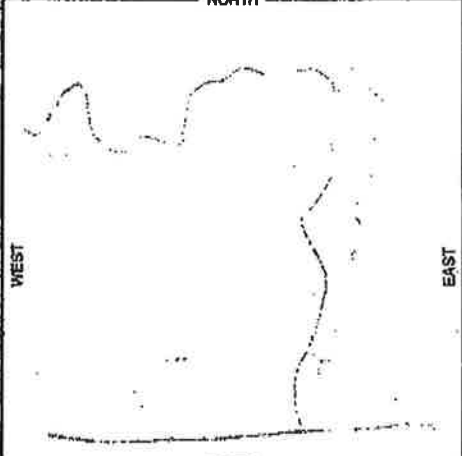
Name [illegible] Drive Partners
Mailing Address 1000 Pioneer Way
El Cajon, Ca 92020 CITY STATE ZIP

WELL LOCATION

Address Mc[illegible] Valley Road
City [illegible], Ca
County San Diego
APN Book 511 Page 090 Parcel 04
Township 17 [illegible] Range [illegible] Section 17
Lat ___ DEG. MIN. SEC. N Long ___ DEG. MIN. SEC. W

LOCATION SKETCH

NORTH



WEST — EAST — SOUTH

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

ACTIVITY (✓)

✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

USES (✓)
WATER SUPPLY
___ Domestic ___ Public
___ Irrigation X Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 30 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 30 (Ft.) & DATE MEASURED 11-10-09
ESTIMATED YIELD * 60 (GPM) & TEST TYPE airlift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN -- (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE: BLANK	TYPE: SCREEN	TYPE: CON-DUCTOR	TYPE: FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 – 56	12	x				steel		.188	
0 – 75		x				steel	6 5/8	.188	
0 – 385	6½		x			pvc	4	CL200	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 – 56	x			cement was pumped
0 – 75		x		
0 – 385			x	5/15 pea gravel

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other [illegible]

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME TIM MANOS DRILLING & PUMP (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
16052 LAWSON VALLEY ROAD, JAMUL, CA 91935 ADDRESS CITY STATE ZIP
Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR 1/14/10 DATE SIGNED 3602 C-57 LICENSE NUMBER

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

CONFIDENTIAL — NOT FOR PUBLIC USE — SEC. 13752 WATER CODE

8

This well has no pump or power needs to be relocated east outside of transmission line power easement

Fain Drilling & Pump Co. Inc.

12029 Old Castle Rd.
Valley Center, CA 92082
Phone (760) 749-0701
Fax (760) 749-6380

#8

Invoice

Date	Invoice #
2/11/2005	8048

Bill To

THE HAMANN COMPANIES
1000 PIONEER WAY
EL CAJON, CA 92020

P.O. No.	Terms	Project
	Due on receipt	

Description	Qty	Rate	Amount
DRILLING 970 FT DEEP WELL APN 611 110 01 PARCEL 6 120 AC			
EQUIPMENT SET UP	1	500.00	500.00
DRILLING 6.5" DIA HOLE	400	12.00	4,800.00
DRILLING 400-800' 6.5" DIA HOLE	400	14.00	5,600.00
DRILLING 800 - 970' 6.5" DIA HOLE	170	16.00	2,720.00
REAMING 6" TO 10" DIA HOLE	226	12.00	2,712.00
FURNISH AND INSTALL 6" WELL CASING	228	13.00	2,964.00
INSTALL 50 FT. SURFACE SEAL	1	1,500.00	1,500.00
WELL PERMIT AND FILING FEES	1	490.00	490.00

Total	$21,286.00
Payments/Credits	$0.00
Balance Due	$21,286.00

TRIPLICATE
Owner's Copy
Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0909549

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

Owner's Well No. Par. 6 -120
Date Work Began 2/1/05 Ended 2/9/05
Local Permit Agency DEH
Permit No. 16456 Permit Date 2/1/05

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Rotary FLUID Air

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	12	Slope wash - sandy decomposed granite - brown color
12	212	Weathered Granitic Rock
212	226	Broken Rock
226	310	Weathered granitic rock mostly white quartz
310		Water 8 gpm
310	961	Granitic rock large crystals of white quartz
961		Water 40± gpm
961	970	Fractured granitic rock large quartz crystals

TOTAL DEPTH OF BORING 970 (Feet)
TOTAL DEPTH OF COMPLETED WELL 970 (Feet)

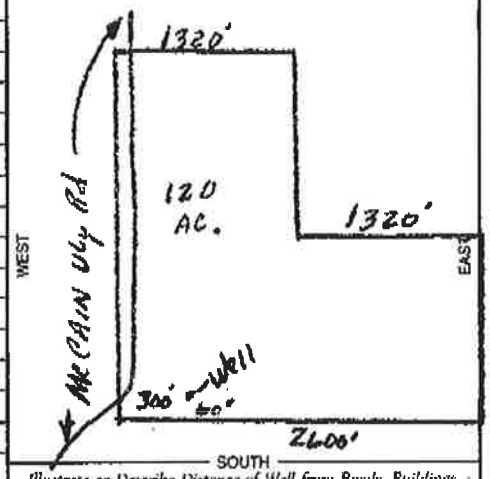
WELL OWNER

Name The Hamann Companies
Mailing Address 1000 Pioneer Way
City El Cajon State Ca ZIP 92020

WELL LOCATION

Address Rough Acres Ranch McCain Valley Rd.
City Boulevard
County San Diego
APN Book 611 Page 110 Parcel 01
Township 17S Range 7E Section 15
Lat 36 DEG. 16 MIN. 772 SEC. N Long 115 DEG. 69 MIN. 465 SEC. W

LOCATION SKETCH



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.

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 30 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 18 (Ft.) & DATE MEASURED
ESTIMATED YIELD * 50 (GPM) & TEST TYPE airlift
TEST LENGTH 8 (Hrs.) TOTAL DRAWDOWN 800 (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	226	10	X				Steel	6	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50	X			
50	226			X	

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

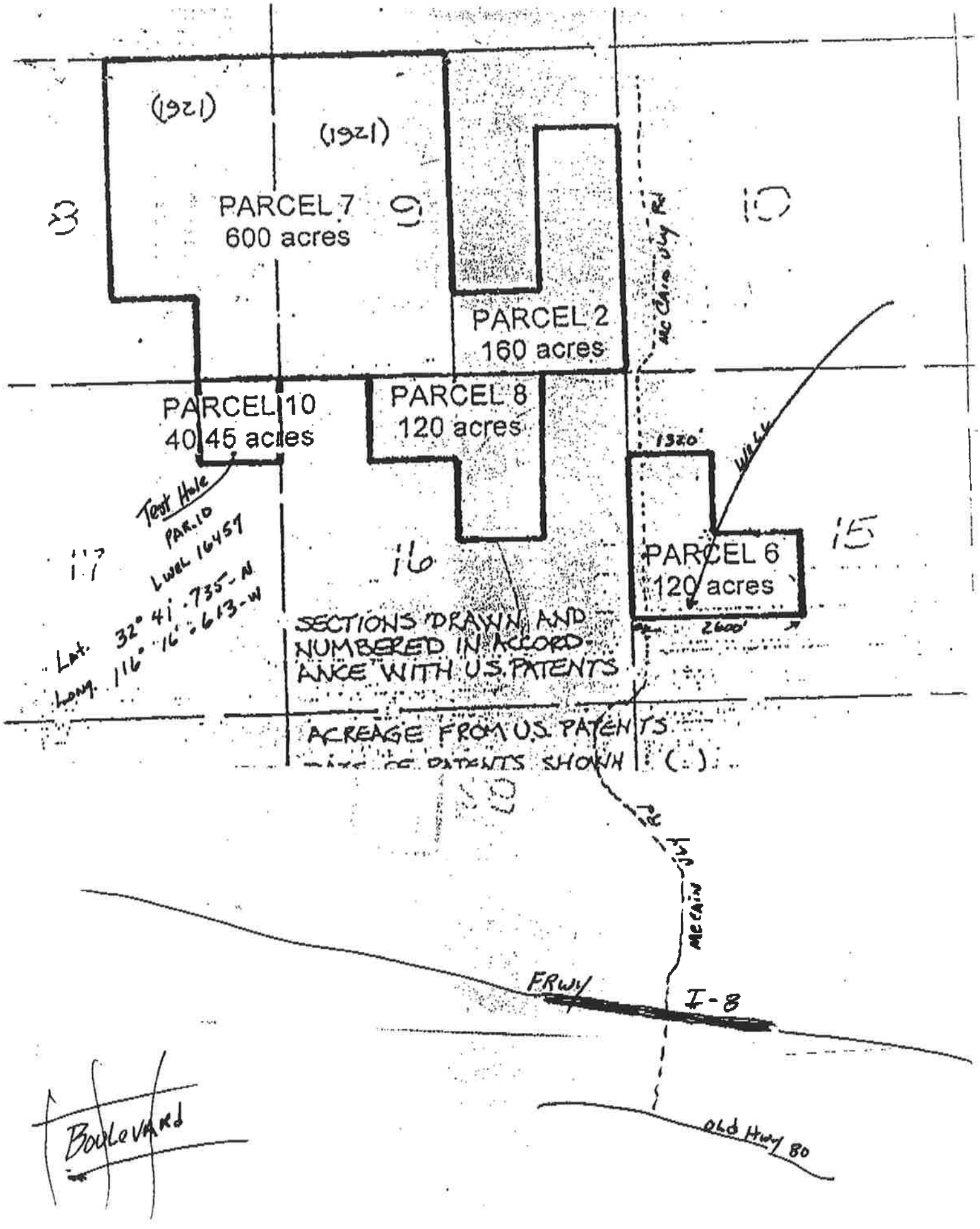
CERTIFICATION STATEMENT

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

NAME Fain Drilling & Pump Co. Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 12029 Old Castle Rd. CITY Valley Center, STATE Ca ZIP 92082
Signed Joe R. Fain 2/11/05
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED
C-57 LICENSE NUMBER 328287

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM


(1921)
(1921)
PARCEL 7
600 acres
PARCEL 2
160 acres
PARCEL 10
40.45 acres
PARCEL 8
120 acres
PARCEL 6
120 acres
1320'
2600'
Test Hole
PAR. 10
LWBL 16457
Lat. 32° 41' 735" N
Long. 116° 16' 613" W
SECTIONS DRAWN AND NUMBERED IN ACCORDANCE WITH U.S. PATENTS
ACREAGE FROM U.S. PATENTS
McCain Blvd
FRWY
I-8
Boulevard
Old Hwy 80

9

Fully operational
old well
no info
Probably 5-10 GPM
Shallow

APPENDIX C

CUMULATIVE WATER QUANTITY IMPACTS ANALYSIS

ROUGH ACRES RANCH WATER PRODUCTION AREA

MCCAIN VALLEY, EAST SAN DIEGO COUNTY, CALIFORNIA

Table 1

Estimated Groundwater Demand - Rough Acres Ranch Water Production Area

Land Use Scenario	Land Use	Quantity	Water Demand per Unit (afy)	Total Demand (afy)
Existing Conditions	Single Family Residential	7	0.5	3.5
	Cattle/Livestock Free-Range Grazing (100 head)	1	2.13	2.13
	Poultry (500 hens)	1	0.11	0.11
	Total Water Demand (Existing Conditions)			5.74
Existing Conditions Plus 9-Month Construction at 50 gpm	Single Family Residential	7	0.5	3.5
	Cattle/Livestock Free-Range Grazing (100 head)	1	2.13	2.13
	Poultry (500 hens)	1	0.11	0.11
	Project 9-month Construction (50 gpm)	1	60	60
	Total Water Demand (Existing Conditions Plus 9-Month Construction at 50 gpm)			65.74
Existing Conditions Plus 9-Month Construction at 100 gpm	Single Family Residential	7	0.5	3.5
	Cattle/Livestock Free-Range Grazing (100 head)	1	2.13	2.13
	Poultry (500 hens)	1	0.11	0.11
	Project 9-month Construction (50 gpm)	1	120	120
	Total Water Demand (Existing Conditions Plus 9-Month Construction at 100 gpm)			125.74

Note: afy - acre feet per year; gpm - gallons per minute

Table 2
Groundwater in Storage Calculation - Effects of Pumping at 50 GPM
Rough Acres Ranch Water Production Area

Hydrogeologic Unit	Area (acres)	Specific Yield (%)	Saturated Thickness (ft)	GW in Storage (af)
Fractured Rock	502	0.10%	500	251
Residuum	502	5%	10	251
Alluvium	250	10%	20	500
Total				**1002**

Change in Groundwater in Storage (50 gpm)

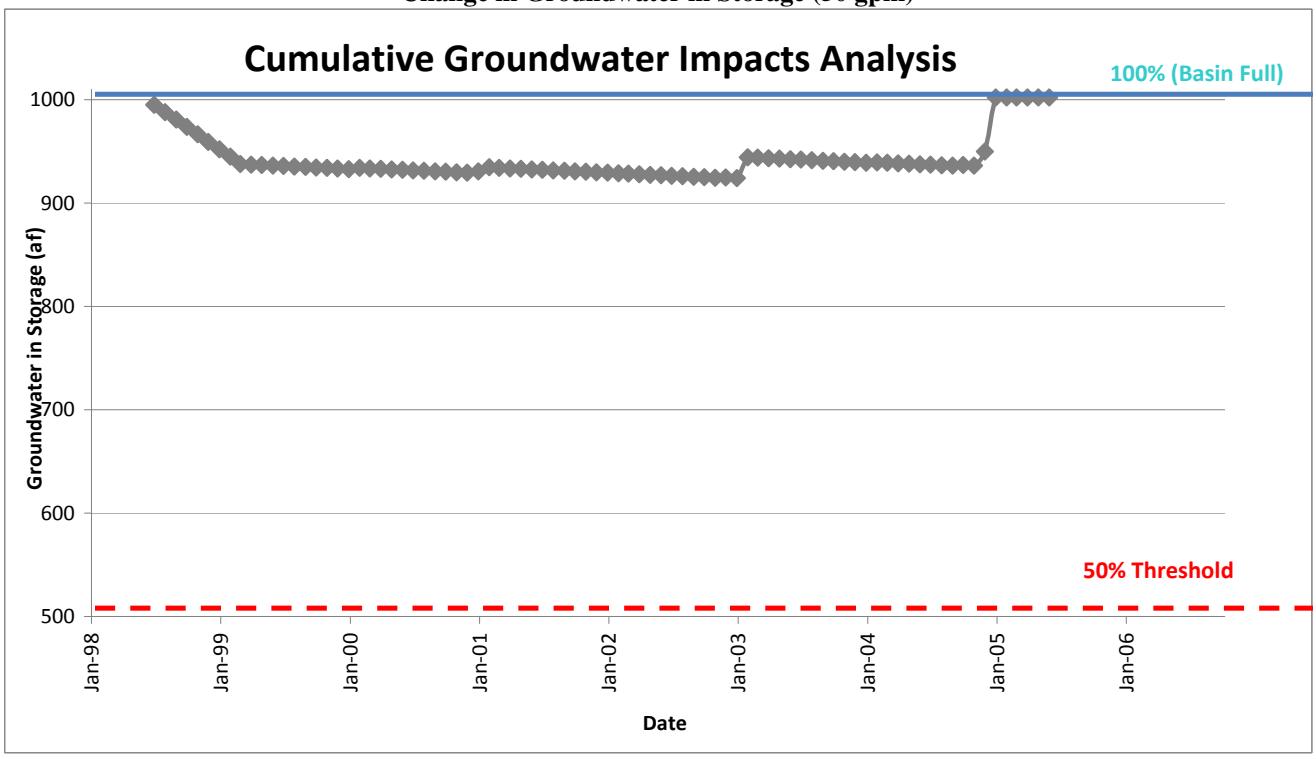


Table 3
Groundwater in Storage Calculation - Effects of Pumping at 100 GPM
Rough Acres Ranch Water Production Area

Hydrogeologic Unit	Area (acres)	Specific Yield (%)	Saturated Thickness (ft)	GW in Storage (af)
Fractured Rock	502	0.10%	500	251
Residuum	502	5%	10	251
Alluvium	250	10%	20	500
Total				**1002**

Change in Groundwater in Storage (100 gpm)

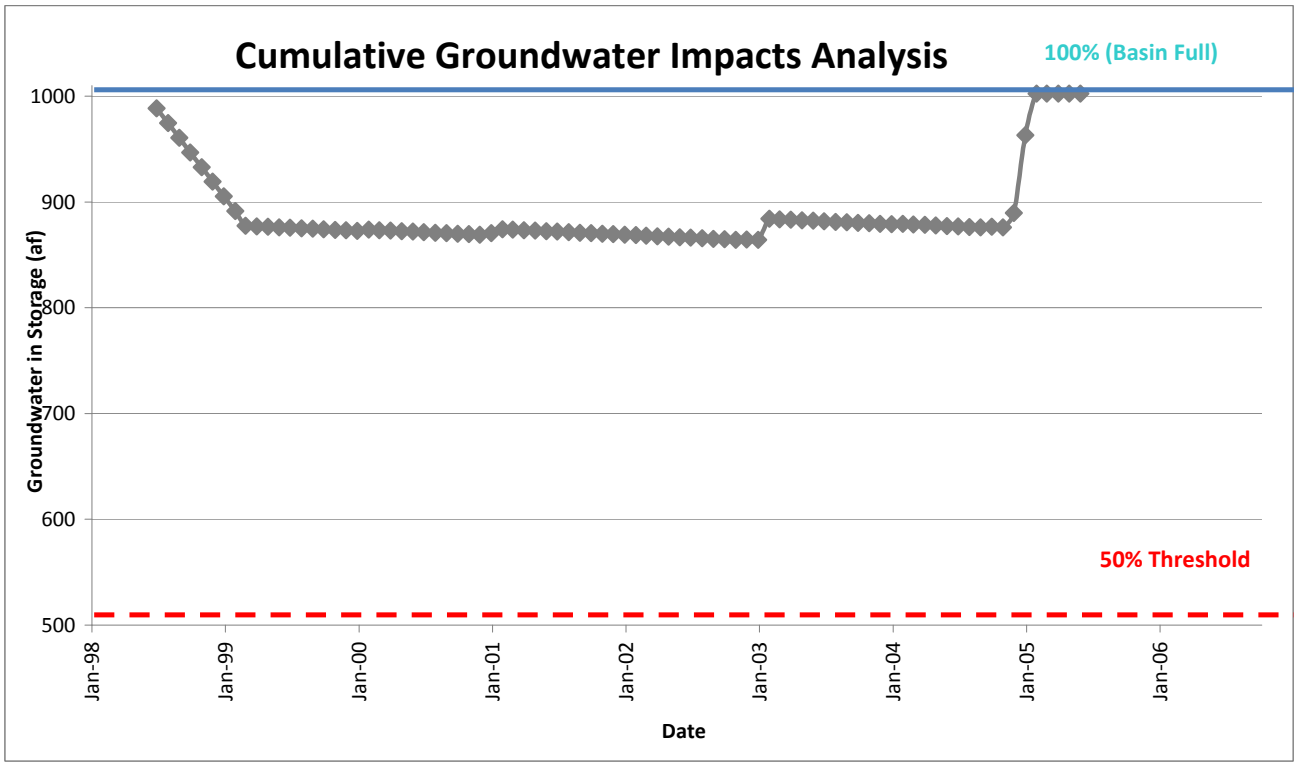


Table 4
Groundwater in Storage Calculation - Effects of Pumping at 400 GPM
Rough Acres Ranch Water Production Area

Hydrogeologic Unit	Area (acres)	Specific Yield (%)	Saturated Thickness (ft)	GW in Storage (af)
Fractured Rock	502	0.10%	500	251
Residuum	502	5%	10	251
Alluvium	250	10%	20	500
Total				**1002**

Change in Groundwater in Storage (400 gpm)