Technical Report

Groundwater Usage Analysis of Antelope Valley Groundwater Basin Small Pumper Class

Prepared for

Los Angeles Superior Court

July 2015

Prepared by

GSI Water Solutions, Inc.

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Contents

Tables

Figures

Appendices

1. Executive Summary

Collection and analysis of groundwater use data were conducted to determine usage of the Antelope Valley Groundwater Basin Small Pumper Class members for calendar years 2011 and 2012. A randomly selected subset of volunteers from the overall Small Pumper Class was established for detailed interviews and data collection. Data collected from this subset allowed for calculation of groundwater use associated with 104 parcels on which there are 117 individual households. The groundwater usage for each Participating Class Member (PCM) was based on one or more types of data, as provided for the purposes of this evaluation, including electrical records associated with well pumping, flow meter records, generator usage, and irrigation schedules. Additionally, documentation of the year in which each property was improved (i.e., the year when a house was first built) is provided for all parcels and households.

Based on the data provided, approximately 75 percent of the surveyed PCM households used less than 2.5 acre-feet per year (AFY), and approximately 90 percent of the households used less than 5 AFY. For both 2011 and 2012, the analysis conducted as part of this evaluation determined that median groundwater use was approximately 1.2 AFY per household.

2. Introduction

As part of the Antelope Valley Groundwater Basin Adjudication, a determination of the historical groundwater use by members of the "Wood Class," also referred to herein as the Small Pumper Class, has been conducted. As described in this report, this effort involved collection of groundwater usage information for 2011 and 2012 from a randomly selected subset of Small Pumper Class members ("Participating Class Members" [PCMs]), evaluation of these data, and calculation of (a) individual groundwater use for each PCM and (b) groundwater use per household for each well operated by a PCM. As described in more detail below, the number of PCMs and the randomized process through which the PCMs were selected represent the typical annual quantity of pumping conducted by the overall Small Pumper Class.

This effort was commissioned by the Los Angeles Superior Court and administered by Mr. Michael McLachlan and Mr. Daniel O'Leary, the appointed Class Counsel for the Small Pumper Class. As set forth in court documents, the Small Pumper Class is defined as follows:

> 'All private (i.e., non-governmental) persons and entities that own real property within the Basin, as adjudicated, and that have been pumping less than 25 acre-feet per year on their property during any year from 1946 to the present. The Class excludes the defendants herein, any person, firm, trust, corporation, or other entity in which any defendant has a controlling interest or which is related to or affiliated with any of the defendants, and the representatives, heirs, affiliates, successors-in interest or assigns of any such excluded party. The Class also excludes all persons and entities that are shareholders in a mutual water company.' "

Small Pumper Class members (referred to as "Class Members" in this report) means individual members of the Small Pumper Class who meet the Class definition and where two or more Class Members reside in the same household, they will be treated as a single Class Member for purposes of this report.

A component of this effort was a determination that the PCMs were engaged in reasonable and beneficial use, a threshold requirement to establishing their overlying rights. During the course of this study, information was collected regarding the nature of groundwater use by each PCM. The vast majority of the PCMs used the produced

groundwater for basic domestic purposes, including indoor household uses, modest exterior landscaping uses, and occasional livestock watering uses. In limited instances, some PCMs were engaged in small-scale agricultural activities or other businesses that used groundwater for purposes beyond typical domestic needs. In the evaluations conducted as part of this study, groundwater use by the PCMs surveyed appeared consistent with the concepts of reasonable and beneficial use.

3. Methodology

In an effort to determine the amount of groundwater pumped by the Small Pumper Class during 2011 and 2012, groundwater use information was collected from a randomly selected subset of Class Members. The subset, referred to in this report as the PCM, was randomly selected, as described in Section 3.1, from the Small Pumper Class database as developed by Class Counsel. Each of the PCMs in the database was determined to have pumped groundwater from their property and met all the criteria for inclusion in the Class. A map illustrating the location of the PCM properties is provided as Figure 1.

To calculate the typical water use of the overall Class, data associated with groundwater pumping were collected directly from the PCMs. An illustration of the process employed in this effort is provided as Figure 2.

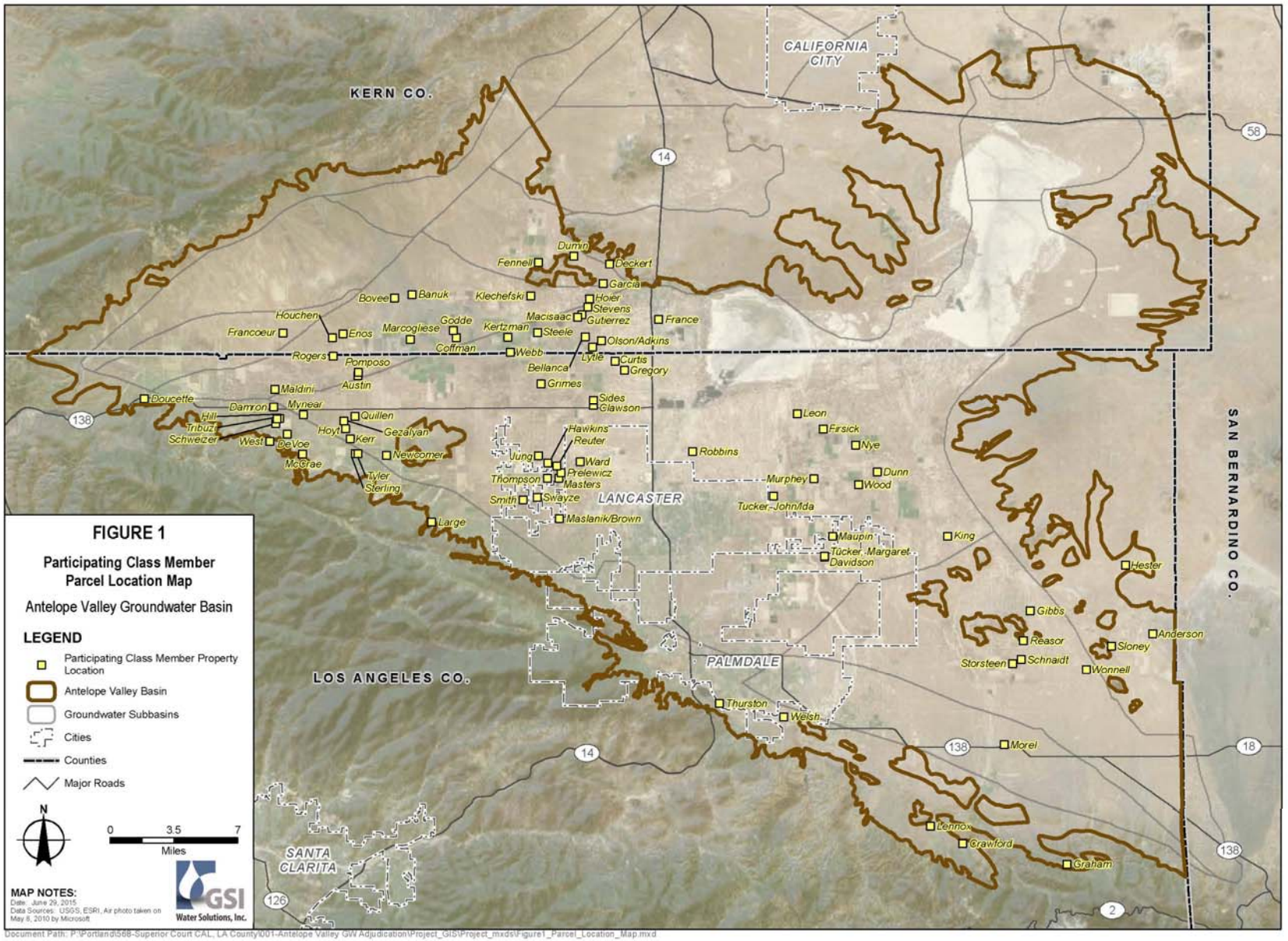
3.1 Selection of Participating Class Members

The Small Pumper Class database as prepared by Class Counsel contains, among other data types, names, addresses, parcel information, and responses to the June 26, 2009 request for information that was sent to all Class Members. There are 3,459 Class Members identified in this database. A total of 217 responses (6.3 percent) were returned to Class Counsel from this initial request.

To identify a subset of individual Class Members from the Small Pumper Class that were willing to participate in this data collection effort without introducing selection bias, four separate mailing efforts were conducted using random selections from the overall Small Pumper Class database. Each mailing effort consisted of a randomly selected[1] group of Class Members from the Class database. The first mailing was sent to a randomly selected set of 400 Class Members, plus Class Plaintiff, Mr. Richard Wood. This list was prepared in January of 2013 and the mailing was conducted by Class Counsel. Based on the relatively limited responses from the first mailing, a second set of 300 randomly selected Class Members was prepared in early June of 2013 and a corresponding mailing was conducted by Class Counsel. Again, because of a relatively limited number of respondents, a third set of 200 randomly selected Class Members was prepared in mid-June of 2013 and a corresponding mailing was conducted. Finally, a fourth mailing was conducted in July of 2013, which included all Class Members that responded to the original 2009 mailing, exclusive of Class Members that were included in the previous three mailings. The final mailing was not based on a randomized selection from the Wood Class database, but was essentially random because the respondents to the original (June 2009) class mailing were not influenced and were not specifically selected by Class Counsel or the preparer of this report. Collectively, more than 100 Class Members responded to these mailings and it was this subset of the Small Pumper Class that was used for this survey.

During the course of data collection and evaluation, several of the Class Members that responded as willing to participate were subsequently removed from the survey because (a) they were determined to not qualify as Class Members because their property was determined to be outside of the basin boundary or to have an annual groundwater use greater than 25 AFY, (b) they later chose to opt out of the Small Pumper Class, or (c) they had insufficient data to allow calculation of their groundwater use. The final PCM list included 104 parcels owned by 86 Class Members, and included 117 separate households.

[1] The random selection process was conducted by using the random number function ["RAND()"] included in the Microsoft Excel software package. This function was used to establish a randomized number in each row of the Small Pumper Class database. The database then was sorted on these random numbers and the first 400 Class Members were selected for the targeted mailing requesting participation.


CALIFORNIA CITY
KERN CO.
SAN BERNARDINO CO.
LOS ANGELES CO.
LANCASTER
PALMDALE
SANTA CLARITA
Dumm
Fennell
Deckert
Garcia
Bovee
Banuk
Klechefski
Hoier
Stevens
Houchen
Macisaac
Gutierrez
France
Francoeur
Enos
Marcogliese
Godde
Kertzman
Steele
Olson/Adkins
Coffman
Webb
Rogers
Pomposo
Lytle
Curtis
Gregory
Bellanca
Austin
Grimes
Maldini
Doucette
Damron
Mynear
Sides
Glawson
Hill
Quillen
Tribuz
Hoyt
Gezalyan
Schweizer
West
Kerr
DeVoe
Newcomer
McCrae
Tyler
Sterling
Hawkins
Reuter
Vung
Ward
Prelewicz
Thompson
Masters
Smith
Swayze
Maslanik/Brown
Large
Robbins
Leon
Firsick
Nye
Murphey
Dunn
Wood
Tucker-John/Ida
Maupin
King
Tucker, Margaret
Davidson
Hester
Gibbs
Reasor
Anderson
Sloney
Storsteen
Schnaidt
Wonnell
Thurston
Welsh
Morel
Lennox
Crawford
Graham
58
14
138
126
18
2
FIGURE 1
Participating Class Member Parcel Location Map
Antelope Valley Groundwater Basin
LEGEND
Participating Class Member Property Location
Antelope Valley Basin
Groundwater Subbasins
Cities
Counties
Major Roads
N
0
3.5
7
Miles
MAP NOTES:
Date: June 29, 2015
Data Sources: USGS, ESRI, Air photo taken on May 8, 2010 by Microsoft
GSI Water Solutions, Inc.
Document Path: P:\Portland\568-Superior Court CAL, LA County\001-Antelope Valley GW Adjudication\Project_GIS\Project_mxds\Figure1_Parcel_Location_Map.mxd

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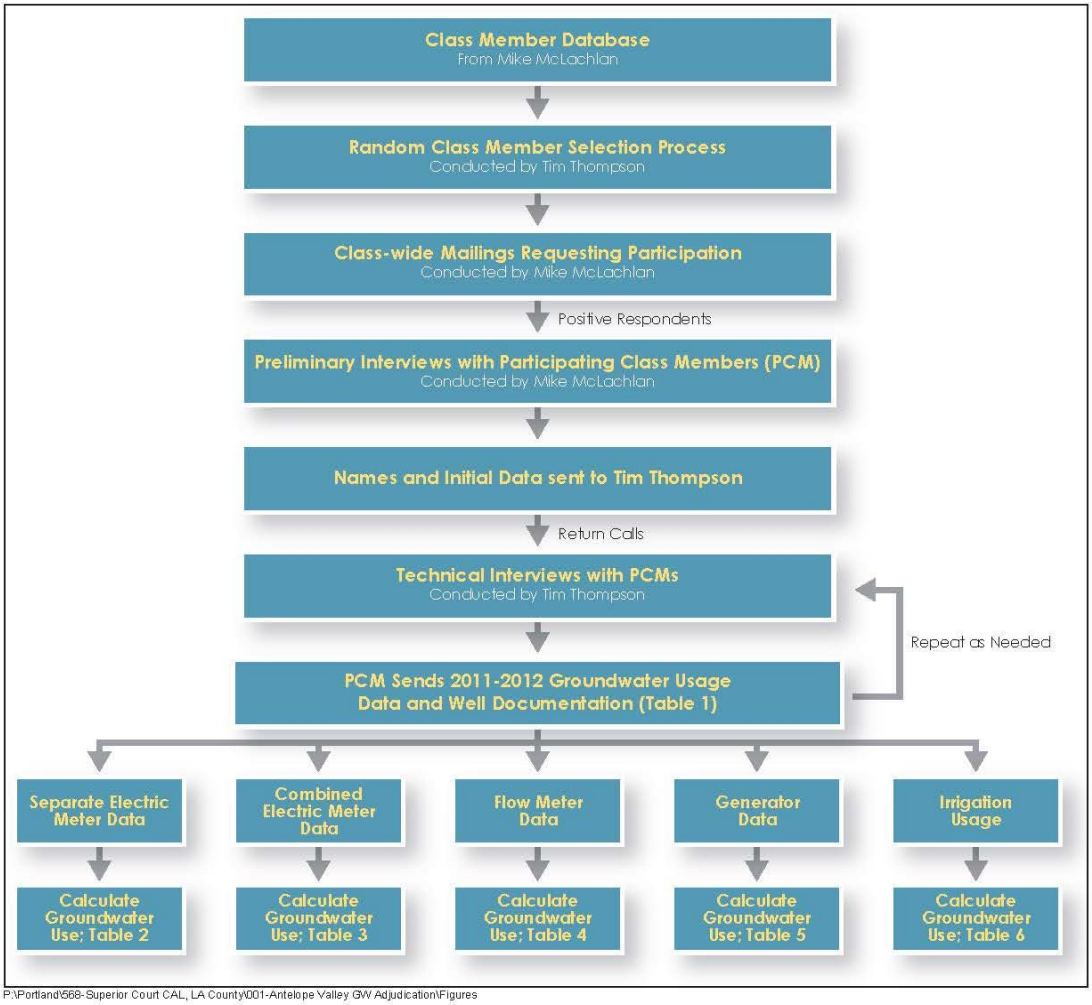

3.2 Interviews of Participating Class Members

All Class Members that responded affirmatively to the mailings requesting participation initially were contacted by Class Counsel and informed of the nature of the adjudication proceedings, composition and structure of the Small Pumper Class, and need for documentation of their groundwater use. Upon determination that each PCM was qualified as a Class Member, Class Counsel forwarded contact information and any documentation provided by the PCM to Mr. Tim Thompson, court-appointed expert, for the purposes of this survey.

For each identified Class Member that responded as willing to participate, an interview was conducted regarding their groundwater use. During these interviews, the Class Member was asked to provide documentation of their groundwater use in 2011 and 2012, along with data regarding their water well, pumping facilities, and land use. Data provided by the PCMs typically were sent to Class Counsel, and then forwarded to Mr. Thompson. In some

cases, the PCMs provided data via e-mail directly to Mr. Thompson. All data sent to Mr. Thompson were subsequently forwarded to Class Counsel.

Information provided by Class Members regarding each PCM's groundwater use for the calendar years 2011 and 2012 included some or all of the following:

- Southern California Edison (SCE) electrical records
- Flow meter records (if available)
- Information regarding whether the electrical meter on the parcel supplied electricity to just the well or to the house and well combined.
- Size (acres) and number the parcels served by the well
- Outdoor irrigation practices, presence of livestock
- Class Member's estimate of groundwater use (if available)
- Number of households on the Class Member's parcel(s)
- Number of people living on parcel(s) during 2011 and 2012
- Well construction date, depth, and documentation (if known)
- Depth to groundwater and date of measurement (if known)
- Pump size (horsepower [hp]), age, setting depth, and make/model (if known)
- Configuration of water system (presence of storage tank, pressure tank, booster pump, etc.)
- Size of house and other appurtenant information
- SCE hydraulic test results (if available)
- For properties with agricultural activity, information about irrigation practices

These data were used to calculate the amount of groundwater pumped at each Class Member's parcel. Data provided by Class Members that were used in this study are included in this report and are summarized in Table 1 (this table is located at back of this report). All documentation as provided is included as Appendix A, organized in files for each PCM. Because none of the parcels in the class, by definition, are connected to any municipal water source (such as the City of Palmdale, City of Lancaster, or Rosamond Community Services District), each Class Member has no other recourse to obtain a water supply, except to install water wells and pump groundwater.

Several Class Members were part of multi-parcel arrangements that shared a single water well system[2] ; these are identified as users that had wells used for water supply to more than one parcel (see Table 1, in the column titled "Number of Parcels Served by Well"). In cases where there were multiple parcels receiving water from a single well, the names and addresses of the other parcels and owners are provided in the individual folders for each PCM in Appendix A.

Additionally, based on data collected from the individual PCMs, there are also several instances where more than one distinct household existed on a given parcel. The total number of households associated with each PCM's water usage is identified in Table 1, in the column titled "Number of Households on Parcel(s)."

[2] The Class Members with multiple parcels served by a single well are: Bellanca, Dunn, Gutierrez, Houchen, Jung, Lytle, Rogers, Schweitzer, Stevens, and Webb. Data for all parcel owners in each group, including name, address, Assessor's Parcel Number, and property size (acres), are provided in the Class Members documents in Appendix A.

3.3 Documentation of Year each PCM Property was Improved

Property history data were obtained from tax assessor data to determine the year in which each PCM's parcel was improved (i.e., when the house was built). These dates are provided on Table 1 in column entitled "Year House Built". In cases where specific dates of property improvements were not available using the tax assessor records, signed declarations were obtained from those PCM's. Both the tax assessor documents and declarations are included in the individual PCM document folders provided in Appendix A.

3.4 Calculation of Water Usage for each Participating Class Member

Calculation of the 2011 and 2012 groundwater usage for each PCM was conducted using one or more methods based on the type(s) of data provided by each PCM. The types of data employed for groundwater use determination for each PCM included one or more of the following:

- Electrical records
- Flow meter data
- Generator or solar power usage
- Crop irrigation

The list of PCMs and their basic information are provided in Table 1. The results of calculations of 2011 and 2012 groundwater usage are reported by the type of data used (electrical data, flow meter data, generator/solar data, or irrigation data) and are provided in Tables 2, 3, 4, 5, and 6 (these tables are located at back of this report). Of the 86 PCMs that provided data for this report, there were 117 associated households. Two of the PCMs did not occupy their parcels during 2011 and 2012, and, therefore, had zero groundwater use[3]. These PCMs, which had pumped groundwater during previous years, were retained for the survey because they represent a valid, randomly-selected category of Class Members.

3.4.1 Electrical Meter Data

Electrical meter records are the most common form of documentation provided by PCMs for groundwater pumped during 2011 and 2012. Many of the PCMs have a dedicated electrical meter that tracks electrical usage associated only with groundwater well pump power demand – these are referred to in this report as "separate meter records." Electrical meters for many other PCMs include both groundwater well power demand and household power demand tracked through a single electrical meter – these are referred to in this report as "combined meter records." Appendix B includes tabular documentation of the electrical meter data provided for all PCMs. As described below, appropriate factors and pumping system information were applied to each type of meter record to convert these electrical energy usage data to groundwater use.

PCMs were requested to send their 2011 and 2012 electrical usage documentation directly to Class Counsel. These data were sent either as: (a) monthly SCE invoices or (b) SCE Statement of Account summaries. For several Class Members, challenges with obtaining and providing correct datasets for this analysis necessitated a request to the Court to approve a subpoena to SCE requesting direct delivery of electrical records to Class Counsel. This

[3] Class Member Klechefski reported that her property historically had been operated as a rental, but has been vacant and unused since approximately 2007. Similarly, Class Member Quillen reported that his property also had been vacant for many years and the power to the well has been turned off.

subpoena was approved by the Court on October 25, 2013. The data were subsequently provided for use in this study on December 23, 2013, and are attached as Appendix C.

3.4.1.1 Conversion of Electricity Usage to Acre-feet

A primary method used in this effort to determine PCM groundwater use was the conversion of electricity used for groundwater production (in units of kilowatt-hours [kWh]) to AF of water. Equation 1 shows the formula used to convert electrical energy into the mechanical energy used to lift water, which equates to a volume of water pumped for a given amount of electric energy consumed.

$$Water\ Pumped(acre-feet) = \frac{Facility\ Efficiency(\%) * Electric\ Use(kWh)}{1.024 * Total\ Displacement\ Head(ft)} \quad [Equation\ 1]^4$$

The comparison of energy required to lift an AF of water a distance of 1 foot (325,851 gallons times 8.3454 pounds per gallon times 1 foot, or 2,719,357 foot-pounds) divided by the energy equivalent of one kWh of power (when expressed in equivalent units = 2,655,223 foot-pounds) yields the conversion factor of 1.024 kWh to AF per foot. The equation indicates that a water pumping system operating at 100 percent efficiency requires 1.024 kWh per AF for each foot of lift. This equation has been used as part of other investigations to determine groundwater use based on electrical power usage[5]. The two site-specific values required to conduct this calculation for the purposes of this evaluation are the total displacement head (TDH) and the pumping system efficiency (called Facility Efficiency in Equation 1). TDH and pumping system efficiency are discussed in Sections 3.4.1.2 and 3.4.1.3, respectively.

3.4.1.2 Determination of Total Displacement Head

For each PCM using electrical records as the data source documenting their groundwater pumpage, calculation of TDH was required. TDH is the total distance water is lifted by the well pump plus any pressure tank system head that must be overcome (converted to equivalent feet of water). TDH was calculated by determining the depth to groundwater at each user's well and adding any additional pressure tank system head[6]. The depth-to-groundwater was calculated from the difference between the land elevations at the Class Member's well location from the corresponding groundwater elevation. Groundwater elevations were determined from a groundwater elevation map (Figure 3), prepared by GSI from publicly available water level data from the wells monitored by the U.S. Geological Survey (USGS)[7]. The groundwater elevation map was prepared from water levels measured in March 2012. Comparison of 2011 and 2012 data was conducted and the limited water level difference during these years allowed for the use of a single map to characterize groundwater elevations for 2011 and 2012.

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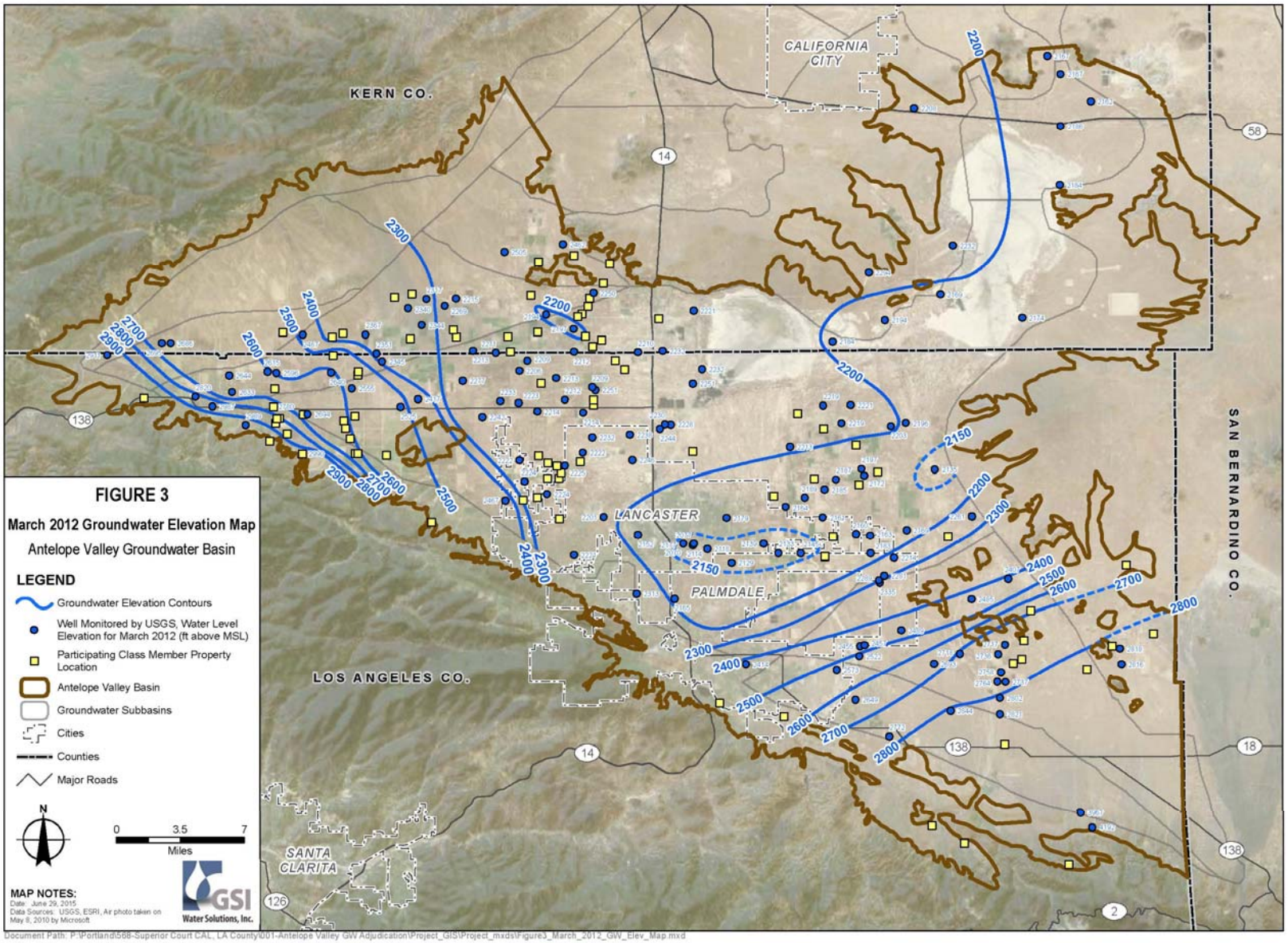
[4] Definition of terms in equation: Total Displacement Head is defined in Section 3.4.1.2; Facility Efficiency is defined in Section 3.4.1.3; Electrical Use is from data provided by PCMs (included as Appendix B).

[5] References:
Peacock, Bill, Tulare County Farm Advisor. 1996. Energy and Cost Required to Lift or Pressurize Water, University of California Cooperative Extension, Tulare County Pub. IG6-96.
Diamond, J. and A. Williamson. 1983. A Summary of Groundwater Pumpage in the Central Valley, California, US Geological Survey Water Resources Investigation Report 83-4037.
Southern California Edison. 2012. Pump Testing and Hydraulic Services Manual, 37 pp. (see Appendix D).

[6] Consistent with household systems nationwide, and corroborated as part of the interview process, Class Members' well systems are constructed with pressure tanks that typically are maintained with 60 pounds per square inch (psi) of pressure. At a conversion factor of 2.31 feet of head per psi, an additional 138 feet of head (60 psi times 2.31 psi/ft = 138 ft) was added to the total lift when associated with the electrical usage.

[7] USGS well data Web site: http://maps.waterdata.usgs.gov/mapper/index.html


KERN CO.
CALIFORNIA CITY
LANCASTER
PALMDALE
LOS ANGELES CO.
SAN BERNARDINO CO.
SANTA CLARITA
FIGURE 3
March 2012 Groundwater Elevation Map
Antelope Valley Groundwater Basin
LEGEND
Groundwater Elevation Contours
Well Monitored by USGS, Water Level Elevation for March 2012 (ft above MSL)
Participating Class Member Property Location
Antelope Valley Basin
Groundwater Subbasins
Cities
Counties
Major Roads
N
0 3.5 7
Miles
MAP NOTES:
Date: June 29, 2015
Data Sources: USGS, ESRI, Air photo taken on May 8, 2010 by Microsoft
GSI Water Solutions, Inc.
Document Path: P:\Portland\568-Superior Court CAL, LA County\001-Antelope Valley GW Adjudication\Project_GIS\Project_mxds\Figure3_March_2012_GW_Elev_Map.mxd

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The additional pumping head associated with pumping drawdown and friction loss in the pump column and conveyance piping was considered small in relation to the other input data for the conversion calculation, and was not separately calculated. Additionally, these added amounts of TDH would be inherent in the efficiency factor derived from available PCM data, as described below. Land surface elevations at each PCM well were obtained from Google Earth by evaluating each specific PCM parcel.

In almost all cases, each Class Member's well system included a pressure tank, which is a common water system component that ensures normal water pressure is present at faucets and other household fixtures. The additional electrical power required to develop and maintain the pressure typically is included on the same electrical meter as the main well pump and constitutes a significant component of the electricity usage. During interviews with PCMs, two exceptions were identified in which the electrical meter that monitored usage from the well pumping system did not include the associated pressure tank demand; these were at the properties of Mr. Wood and Mr. Webb. In these cases, the TDH associated with the electrical usage tracked on the separate well electrical meter was only the magnitude of the lift from the water table to land surface; the electricity usage associated additional head required for the pressure tank was tracked on a different electrical meter. The displacement head associated with pressure tanks is included in Tables 2 and 3.

3.4.1.3 Determination of Pumping System Efficiency

As part of the calculation that converts electrical usage data to groundwater pumped, determination of pumping system efficiency is required. Pumping system efficiency is determined by the respective efficiencies of the two primary components of the well pump system: the well pump and well motor. Efficiency factors used for this survey are estimated on the basis of data collected from PCMs, comparison with typical pumping system efficiencies as documented in previous investigations and as provided by pump manufacturers.

SCE provides a well testing service to its customers that includes conducting field testing on wells and pumping systems and determination of pumping system efficiency. The primary purpose of this service is to provide system improvement recommendations to the well owner to help maximize pumping efficiencies. This hydraulic testing service is provided primarily to municipal and large agricultural pumpers, although in limited cases is provided for smaller pumpers upon request. During the course of this survey, it was discovered that three PCMs previously had these SCE hydraulic tests conducted (Mr. Jung, Mr. Wood and Mr. Marcogliese). The efficiencies determined by SCE as part of these tests are provided in Table 7.

In addition to these sources of information regarding pumping system efficiency, there are also three PCMs (Mr. Dunn, Mr. Marcogliese, and Mr. Bellanca) that have both flow meter and electrical meter data associated with their groundwater pumping. By evaluating these datasets in tandem (i.e., comparing the total water produced based on flow meter records against the water use determined from electrical meter records for the corresponding 2-year period), the pumping system efficiency factor used in the electricity-to-AF conversion was calculated. The detailed calculations of the water use from the flow meter records and also from the electrical meter records for these PCMs are provided in Appendix A. The results of these calculations for the associated PCM's are provided in Table 7.

Another consideration in estimation of pumping system efficiency is the size (hp) of the motor. Based on industry data as reported by pump manufacturers[8] and by Edison[9], efficiencies are typically lower for pumping systems that have smaller hp motors, systems that use submersible pumps (which is the case for almost all of the PCM's), and for older systems because efficiencies decrease over time as a result of pump degradation, equipment wear, and accumulation of system obstructions. Table 8 provides a summary of the pump hp ratings for PCMs surveyed as part of this current effort. From these data, it is evident that most pumping systems are smaller than 3 hp, and many

[8] See Grundfos SP Manual at (http://us.grundfos.com/content/gpu/en_US/products/find-product/sp/_jcr_content/tabbedpanel/brochures/download_list/downloads/download/file/file.res/L-SP-PG-001.pdf) , see Figure 2.

[9] Southern California Edison. 2012. Pump Testing and Hydraulic Services Manual, 37 pp. (see Appendix D)

are smaller than 2 hp. Additionally, based upon data provided by PCM's regarding date of pump replacement, most are 5 to 15 years old and several are even older.

The Edison manual shows water systems using 3-5 hp pumps have pumping system efficiencies of 38 to 50%, depending on the age and level of maintenance[9]. Grundfos, a leading manufacturer of submersible pumps, reports efficiencies for its domestic well pump and motor combinations of 5 hp and less range from 26% to 40%[8]. Because most PCM pumping systems are many years old (and therefore of lower than original efficiency) and are less than 5 hp, the pumping system efficiency will be in the lower portion of the 26 to 40% range.

In consideration of the predominantly smaller hp pumps used by the PCM's of this evaluation, industry-based efficiency data, the potential for moderately to highly worn equipment, and the efficiency results provided in Table 7, an efficiency factor of 30% is selected as the typical pumping system efficiency for this evaluation. This efficiency factor is used for the conversion calculation for all PCMs that provided electricity data as documentation of their groundwater use.

Table 7. Pumping System Efficiencies and Associated Pump Horsepower for Participating Class Members.

Participating Class Member Name	Pumping System Efficiency (%)	Pump Horsepower (HP)	Efficiency Calculation Method
Bellanca[1]	14	3.5	Comparison of Flow meter and Electrical Records
Dunn[2]	29	3	
Marcogliese (before new pump)[3]	23.7	30	Edison Hydraulic Test report
Marcogliese (After new pump)[3]	46	30	
Jung[4]	21.4	5	
Wood[5]	43.2	5	

Notes:

1 See Appendix A, Bellanca documents

2 See Appendix A, Dunn documents

3 See Appendix A, Marcogliese documents

4 See Appendix A, Jung documents

5 See Appendix A, Wood documents

Table 8. Reported Well Pump Horsepower Ratings for Participating Class Members.

Pump Power (HP)	Number of Occurrences
Not Reported	22
≤1	14
1 - 2	31
2 - 3	11
3 - 5	15
5 - 10	3
>10	1

3.4.1.4 Calculation of Well Pumpage for Separate Electrical Meter Data

For the PCMs that provided electrical meter data from separate electrical meters, TDH and efficiency factor information, as described above, was used to convert the kWh of annual electricity usage to AF of annual groundwater use. The results of these calculations are provided in Table 2. All associated documents provided by the PCMs are provided in Appendix A.

3.4.1.5 Calculation of Well Pumpage for Combined Electrical Meter Data

To determine the percentage of electricity used for pumping by PCMs that submitted combined electrical meter records, it was first necessary to estimate the portion of electrical use associated with groundwater pumping. There were three methods by which this separation of well pumping versus domestic electrical use was evaluated.

1. **Household to Well Electrical Data Categorization**. This method involved the comparison of electrical meter data from 11 PCMs that provided both separate well pumping meter data and their domestic household meter data for 2011 and 2012. Four types of water use classifications were established on the basis of these available pairs of data and the corresponding types of water usage from the associated well:

    a. Exclusively Domestic Use (little or no outdoor/landscaping water use)

    b. Domestic with Moderate Landscaping Use

    c. Domestic with Heavy Landscaping Use

    d. Agriculture Use

    Exclusively Domestic Use and Domestic with Moderate Landscaping Use categories were evaluated and determined to have a percentage of energy used for pumping that corresponds to the number of people using the well. For these categories of PCMs with separate meters, the well electrical use associated with groundwater pumping was based on the percentages derived above and the number of people served.

    A relationship between energy used for pumping and the number of people using the well did not exist for the Domestic with Heavy Landscaping Use and Agriculture Use categories because percentages of total electrical use for irrigation pumping by these PCMs were substantially larger. For these categories, the groundwater pumping electrical use was based on the percentage of separate well meter electrical usage relative to household electrical usage, and did not include a factor associated with the number of people served.

2. **Average of Residential Electrical Usage.** A number of PCMs provided electrical records for household-only use, which excludes well electrical data (data provided in Appendix B). The simple average of household-only electrical data provided by these PCMs is 7,213 kWh/yr for 2011 and 7,574 kWh/yr for 2012. For this method, it is assumed that the difference between average household-only meter readings and the average of combined meter readings was energy used for pumping. The resulting groundwater pumping electrical usage then was used to calculate the groundwater pumping in the same manner (using Equation 1) as from the PCM data for separate electrical meters.

3. **Kern County Residential Usage.** Total Kern County residential electricity usage was reported by the California Energy Commission at 2,133 and 2,254 million kWh[10] for 2011 and 2012, respectively. Total

[10]Data from the California Energy Commission Almanac at http://www.ecdms.energy.ca.gov/elecbycounty.aspx

energy consumption in Kern County was divided by the number of housing units in Kern County, 288,342[11]. The result is an average per-household use of 7,397 kWh in 2011 and 7,818 kWh in 2012. For this method, the amount of electrical usage for groundwater pumping for each PCM that provided combined electrical usage data was the total combined electrical usage minus the average Kern County residential usage amount. The resulting groundwater pumping electrical usage then was used to calculate the groundwater pumping in the same manner (using Equation 1) as from the PCM data for separate electrical meters.

As shown in Table 9, the 'Average of Residential Electrical Usage' and 'Kern County Residential Usage' methods provide AFY/Household values that are similar; however, these methods do not account for the variety of beneficial uses that were reported during the course of the survey. A small portion of PCMs that provided combined meter data used water for running small commercial operations, livestock, or watering hundreds of trees. Thus, the arithmetic average water use derived from the 'Household to Well Electrical Data Categorization' method is slightly higher.

Table 9. Comparison of Different Calculation Methods for Well Pumpage for PCMs with Combined Electrical Meter Data

Combined Meter Calculation Method	2011 AFY/Household	2012 AFY/Household
Household to Well Electrical Data Categorization	2.1	2.2
Average of Residential Electrical Usage[1]	1.6	1.6
Kern County Residential Usage[2]	1.4	1.4

Notes:

1.Calculation uses average total displacement head for combined meter PCMs of 301 feet

2.Data taken from the California Energy Commission Almanac at: http://www.ecdms.energy.ca.gov/elecbycounty.aspx and from United States Census

Average of Residential Electrical Usage and Kern County Residential Usage methods provide similar AFY/Household values; however, they do not provide the same degree of confidence as the Household to Well Electrical Data Categorization method. The 'Average of Residential Electrical Usage' and the 'Kern County Residential Usage' methods are simple averages that result in a single mean for all PCMs that provided combined meter data and do not use well and household water usage specific parameters. The 'Household to Well Electrical Data Categorization' method provides the most reliable means to estimate AFY/Household for PCMs that provided combined meter electrical data because this method includes household and well-specific parameters for each PCM in the calculation that were collected during the survey. Additionally, the 'Household to Well Electrical Data Categorization' method provides an indicator of how much each household pumped, rather than the single averages based on broad datasets as represented in the other methods. Furthermore, the higher AFY/Household determined in the 'Household to Well Electrical Data Categorization' method is consistent with the likelihood of somewhat greater groundwater usage for the Small Pumper Class parcels compared to the typical users represented by the data from the other methods, which are mostly from city-served parcels in suburban or urban areas. For these reasons, the 'Household to Well Electrical Data Categorization' method was used to calculate groundwater use for PCMs that submitted combined electrical meter data (Table 3).

[11] Data from the U.S. Census at http://quickfacts.census.gov/qfd/states/06/06029.html

3.4.2 Flow Meter Data

Flow meter data were provided as documentation of groundwater use at four PCM wells (Banuk, Bellanca, Dunn, and Marcogliese). The data provided, in most cases, were monthly flow meter readings. These data and the associated calculations are included in the Class Members' data folders in Appendix A. The 2011 and 2012 groundwater use and associated PCM information are provided in Table 4.

3.4.3 Generator Data

Water usage for four participating Class Members was calculated using generator usage, solar-power usage or fuel tank tracking (Table 5). Supporting calculations for each of these PCMs are provided in Appendix A.

3.4.4 Crop Irrigation Data

Water use by one of the Class Members was estimated by calculating the volume of applied water used for irrigation of crops and estimated domestic use. The estimate of applied water for irrigation was determined from records of typical irrigation season, daily duration, and flow rate; the domestic use was estimated by the PCM. These data and the associated calculations are included in the Class Member data folders in Appendix A. The 2011 and 2012 groundwater use and associated PCM information are provided in Table 6.

4. Results and Discussion

The results of these calculations, provided in Table 1 per household for each PCM, are illustrated below in histograms and cumulative percentage graphs for each year (Figure 4). Table 10 provides a summary of the results showing the frequency of AFY for each of a series of ranges. The histograms show the percentage of households in this random survey have water use in a range of zero to 15.4 AFY/household. Cumulative percentage graphs also are provided to illustrate the frequency of different amounts of groundwater use by the PCMs. From these results, it is evident that approximately 75 percent of the surveyed PCM households used less than 2.5 AFY, and approximately 90 percent of the households used less than 5 AFY.

Because the results are not normally-distributed (i.e., they do not conform to what is commonly referred to as a 'bell curve' shape when plotted), calculating a simple 'average' of the data does not accurately represent the quantity of groundwater usage for a typical PCM household. To determine the PCM groundwater usage in a manner that accurately represents all PCMs, the 'median' value was calculated from the AFY per household results for both 2011 and 2012 (Table 11). The median value is the value where half of the values are greater than this value and half of the values are less than this value. For 2011 and for 2012, the analysis conducted as part of this evaluation determined that median groundwater use was approximately 1.2 AFY per household.

Table 10. Result from PCMs Surveyed in this Project Showing Frequency of AFY/Household Values as Number of Occurrences and Cumulative Percentage for 2011 and 2012.

AFY/Household	2011 AFY/HH Frequency	2011 AFY/HH Cumulative %	2012 AFY/HH Frequency	2012 AFY/HH Cumulative %
0	2	2	2	2
0 - 0.1	4	5	5	6
0.1 - 0.5	24	26	22	25
0.5 - 1	22	44	16	38
1 - 1.5	23	64	23	58
1.5 - 2	3	67	9	66
2 - 2.5	11	76	9	74
2.5 - 3	4	79	5	78
3 - 4	8	86	6	83
4 - 5	4	90	7	89
5 - 8	7	96	9	97
8 - 12	4	99	3	99
12+	1	100	1	100

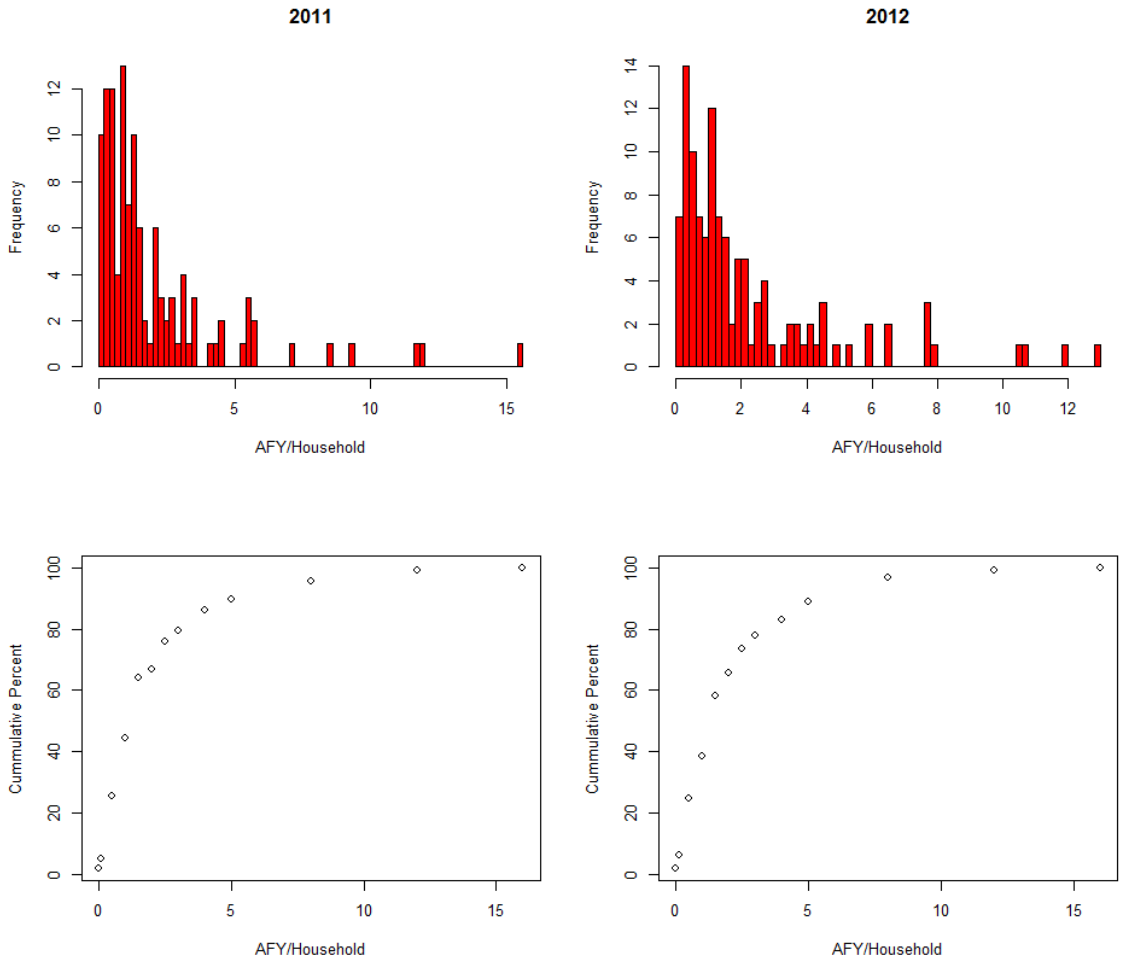

Figure 4. Histogram and Cumulative Percentages of AFY/Household for 2011 and 2012

Also, provided in Table 11, are the upper and lower 95 percent confidence endpoints. These confidence endpoints (calculated using the "R" statistical package[12]) indicate that there is a 95 percent probability that if another random set of Class Members had usage data determined for a given year in the same manner as discussed in this report, the median AFY/Household would be within these endpoint values. In other words, the data allow for a 95 percent confidence that the overall Small Pumper Class water usage is represented within these confidence endpoints. In consideration of the methods of selecting the PCMs and the data collected, these results provide a reliable representation of overall Small Pumper Class typical groundwater usage.

[12] Determined using R statistical software and the simpleboot package. R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.URL http://www.R-project.org/ .

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Table 11. Median AFY/Household Values Including Analytical Results of 95% Confidence Intervals

Year	Median AFY/Household	95% confidence lower endpoint[1] (AFY/Household)	95% confidence upper endpoint[1] (AFY/Household)
2011	1.2	1.0	1.5
2012	1.2	1.0	1.6

Notes:
1 Determined using R statistical software and the boot package. one.boot() function was used to generate bootstrap samples and boot.ci was used to determine confidence intervals

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Tables

Table 1
Participating Class Members and Associated Property, Well, and Water Use Quantification

Participating Class Member Name	SP Number	Address	APN	Acreage	Number of Parcels Served by Well	Number of Households on Parcel(s)	Number of People served by Well	Year House Built [3]	Well Depth (ft)	Pump Depth (ft)	Pump (HP)	Owner Reported Depth to Water Table (year, if provided)	2011 Groundwater Use (AF)[1]	2012 Groundwater Use (AF)[1]	2011 AFY per Household (AF)[2]	2012 AFY per Household (AF)[2]	Basis for Quantification
Don Anderson	SP-826	25000 E Avenue P, Palmdale, CA 93591	3091014019	82.6	1	1	2	1926	200+	190	5	ND	0.51	0.49	0.51	0.49	See Table 2 - Separate Electrical Meter
Anthony Austin	SP-5122	50651 182 N St W., Lancaster, CA 93536	3257011004	5.3	1	1	2	1991	400	350	ND	ND	0.93	0.93	0.93	0.93	See Table 5 - Generator and Solar Data
Ron Banuk	SP-926	15259 W Rosamond Blvd, Rosamond, CA	358222164	39	1	1	2	2007	600	ND	ND	300	0.39	0.39	0.39	0.39	See Table 4 - Flow Meter Data
Don Bellanca	SP-994	5841 Cathy Ave., Rosamond	375113073	10	4	4	8	1988	300	170	3.5	190 (1987)	1.82	1.72	0.45	0.43	See Table 4 - Flow Meter Data
Gayle Bovee	SP-065	16271 Rosamond Blvd, Rosamond, CA	261114078	4.8	1	1	2	2007	620	ND	ND	425 (2007)	0.04	0.04	0.04	0.04	See Table 5 - Generator and Solar Data
Russ Clawson	SP-4872	5329 W Avenue C14, Lancaster, CA	3260014006	2.5	1	1	2	1956	ND	ND	2	ND	0.72	0.67	0.72	0.67	See Table 3 - Combined Electrical Meter
Judyth Coffman	SP-4477	12882 Gaskell Rd, Rosamond, CA	359323029	9.8	1	1	1	1985	485	350	5	ND	0.29	0.33	0.29	0.33	See Table 3 - Combined Electrical Meter
Tarali Crawford	SP-6519	28600 Devils Punchbowl Rd, Pearblossom	3060019042	6.5	1	1	4	1990	58	50	5	23 (2006)	4.15	4.22	4.15	4.22	See Table 3 - Combined Electrical Meter
George Curtis	SP-1458	4165 W Ave A-8, Lancaster, CA	3113003054	2.6	1	1	2	1953	ND	ND	ND	ND	0.87	0.89	0.87	0.89	See Table 3 - Combined Electrical Meter
Roger Damron	SP-1462	22929 W Ave D, Lancaster, CA	3278025036	10	1	1	2	1954	425	150	5	67 (2013)	5.63	5.39	5.63	5.39	See Table 3 - Combined Electrical Meter
Shirley Davidson	SP-4841	42612 70th St E, Palmdale, CA	3386017011	2.5	1	1	4	1932	ND	ND	2	ND	3.01	2.66	3.01	2.66	See Table 3 - Combined Electrical Meter
James Deckert	SP-1506	4921 45th Street West Rosamond, CA 93560	252231097	2.5	1	1	5	2005	240	160	0.75	80 (2005)	7.06	7.74	7.06	7.74	See Table 3 - Combined Electrical Meter
Gary DeVoe	Tiberi owned till 2010	22111 W Avenue E-7, Lancaster, CA	3279009046	4.88	1	1	2	1988	249	242	0.75	208 (2010)	2.33	2.13	2.33	2.13	See Table 3 - Combined Electrical Meter
Milton Doucette	SP-6616	29860 Lancaster Road, Lancaster, 93536	3275008011	5.1	1	1	4	1987	ND	ND	0.75	ND	3.17	3.68	3.17	3.68	See Table 3 - Combined Electrical Meter
Sherri Dumin	SP-1614	5352 65th St W, Rosamond, CA	252223391	1.25	1	1	3	1992	225	ND	1.5	ND	3.54	3.31	3.54	3.31	See Table 3 - Combined Electrical Meter
Jerry Dunn	SP-6779	9743 E Avenue G-10, Lancaster, CA	3374005017	4.8	3	3	6	1990	400	ND	3	170 (1984)	6.42	6.42	2.14	2.14	See Table 4 - Flow Meter Data
Mary Enos	SP-1690	19069 Gaskell Rd., Rosamond, CA	261242028	40	1	1	2	1987	ND	555	2	330 (2010)	1.20	1.17	1.20	1.17	See Table 3 - Combined Electrical Meter
Robert Fennell	SP-1760	8408 Sweetser Rd., Rosamond, CA	315081190	2.5	1	1	2	1995	200	ND	2	ND	1.32	1.40	1.32	1.40	See Table 3 - Combined Electrical Meter
Barbara Firsick	SP-5844	48157 70th Street East, Lancaster, CA 9535	3302015036	3	1	1	1	1983	238	ND	3	225 (1970)	5.59	5.99	5.59	5.99	See Table 2 - Separate Electrical Meter
Harry France	SP-203	1814 Kieth Ln Rosamond, CA 93560	473031201	0.68	1	2	3	1971	160	ND	1	80 (1971)	0.91	1.10	0.45	0.55	See Table 3 - Combined Electrical Meter
Charles Francoeur	SP-205	23500 Gaskell Rd, Rosamond (estimated address)	25446021	20	1	1	1	1990	460	ND	ND	ND	0.005	0.005	0.005	0.005	See Table 5 - Generator and Solar Data
Lou Garcia	SP-225	4938 Truman Rd, Rosamond, CA	252311055	2.5	1	1	1	1975	195	184	1.5	ND	0.57	0.43	0.57	0.43	See Table 3 - Combined Electrical Meter
Armen Gezalyan	SP-6247	48419 190th St W, Lancaster, CA	3238004018	19.5	1	1	2	2003	ND	260	7	160 (2002)	15.43	10.66	15.43	10.66	See Table 2 - Separate Electrical Meter
John Gibbs	SP-5085	18106 E Avenue O, Lake Los Angeles, CA	3076024003	5	1	1	2	1994	300	ND	2	ND	3.28	3.74	3.28	3.74	See Table 3 - Combined Electrical Meter
Jeff Godde	SP-1942	13104 Buckhorn Ave, Rosamond, CA	359332145	5	1	1	2	1990	400	ND	5	300 (2008)	0.84	0.87	0.84	0.87	See Table 3 - Combined Electrical Meter
John Graham	SP-240	20001 Big Pines Hwy, Valyermo, CA 93563	3063010028	9.4	1	1	2	1988	220	ND	2.5	ND	2.22	2.10	2.22	2.10	See Table 3 - Combined Electrical Meter
Jeanne Gregory	SP-2002	3653 W. Ave B, Lancaster, CA 93536	3115002014	3.6	1	1	1	1958	ND	ND	5	ND	0.53	0.57	0.53	0.57	See Table 3 - Combined Electrical Meter
Mike Grimes	SP-5999	50235 82nd St W, Lancaster, CA	3233004018	2.5	1	1	2	1990	440	330	1.75	ND	2.79	3.37	2.79	3.37	See Table 3 - Combined Electrical Meter
Cathy Gutierrez	SP-257	2113 60th St W, Rosamond	375103140	1	2	2	3	1936	230	ND	2	ND	1.87	1.26	0.93	0.63	See Table 3 - Combined Electrical Meter
Ron Hawkins	SP-6911	7878 W Avenue G, Lancaster, CA 93536-8621	3268017043	1.1	1	1	2	1990	250	ND	ND	ND	2.01	2.18	2.01	2.18	See Table 3 - Combined Electrical Meter

Table 1
Participating Class Members and Associated Property, Well, and Water Use Quantification Methods

Participating Class Member Name	SP Number	Address	APN	Acreage	Number of Parcels Served by Well	Number of Households on Parcel(s)	Number of People served by Well	Year House Built [3]	Well Depth (ft)	Pump Depth (ft)	Pump (HP)	Owner Reported Depth to Water Table (year, if provided)	2011 Groundwater Use (AF)[1]	2012 Groundwater Use (AF)[1]	2011 AFY per Household (AF)[2]	2012 AFY per Household (AF)[2]	Basis for Quantification
Dave Hester	SP-043	23305 E. Ave M, Lancaster, CA 93535	3338002021	103.5	1	1	2	1956	ND	ND	1.5	ND	0.06	0.06	0.06	0.06	See Table 5 - Generator and Solar Data
Wayne Hill	SP-2196	22853 W Avenue D 11, Lancaster, Ca 93536	3279007037	4.6	1	1	2	1990	450	ND	ND	ND	4.99	4.63	4.99	4.63	See Table 3 - Combined Electrical Meter
Richard Hoier	ND	5616 Rosamond Blvd, Rosamond, CA	37534145	1.1	1	1	2	1956	400	330	ND	ND	0.60	0.69	0.60	0.69	See Table 3 - Combined Electrical Meter
Zeneida Houchen	SP-2250	19738 Gaskell Rd, Rosamond	261213490	40.7	2	2	3	1990	500	450	3	300 (1996)	0.57	0.77	0.29	0.38	See Table 2 - Separate Electrical Meter
Edith Hoyt	SP-2278	18988 W Ave E, Lancaster, CA	3238010052	4.3	1	1	2	1988	320	220	1.25	ND	0.99	0.95	0.99	0.95	See Table 3 - Combined Electrical Meter
George Jung	SP-5514	47052 85th St W, Lancaster, CA	3219026007	2.5	4	4	6	1987	400	300	5	200 (2011)	5.13	7.43	1.28	1.86	See Table 2 - Separate Electrical Meter
David Kerr	SP-7744	18750 W Avenue E8, Lancaster, CA	3238011026	9.8	1	1	4	1988	320	300	2	160 (1995)	3.21	3.81	3.21	3.81	See Table 3 - Combined Electrical Meter
Eleonore Kertzman	SP-2474	767 100TH St W, Rosamond, CA	359032364	18.5	1	2	4	1986	380	ND	1.5	ND	1.86	1.78	0.93	0.89	See Table 3 - Combined Electrical Meter
RoseMarie King	SP-2508	13658 E Avenue K, Lancaster	3370017008	9.7	1	1	3	1947	ND	ND	ND	ND	1.77	1.25	1.77	1.25	See Table 2 - Separate Electrical Meter
Diane Klechefski	SP-343/2523	88 47 W Rosamond Blvd, Rosamond, CA	252331145	9.8	1	1	0	<1999	ND	ND	ND	ND	0.00	0.00	0.00	0.00	Zero Water Use in 2011-2012
Robert Large	SP-369	44320 Munz Ranch Road, Elizabeth Lake, CA	3224-032-035	3	1	1	2	1991	500	462	2	ND	0.22	0.22	0.22	0.22	See Table 5 - Generator and Solar Data
Patty/Charles Lennox	SP-377	12742 Le Page Ranch Rd, Pearblossom, CA 93553	3060015025	5	1	1	4	1985	175	ND	0.33	ND	5.69	5.99	5.69	5.99	See Table 3 - Combined Electrical Meter
Wanda Leon	SP-4830	5501 E Avenue D8, Lancaster, CA	3302002036	10.1	1	1	2	1947	800	ND	ND	ND	1.41	1.82	1.41	1.82	See Table 3 - Combined Electrical Meter
Lauri/Mike Lytle	SP-2794	368 55th St W, Rosamond, CA 93560	375150323	2.5	4	4	8	1989	ND	ND	ND	ND	3.46	4.16	0.86	1.04	See Table 2 - Separate Electrical Meter
Suzan Macisaac (new owner is Berton Robinson)	SP-2802	6276 Holiday Ave, Rosamond, CA 93560	375041043	2.5	1	1	2	<1999	400	220	1	163 (2007)	0.46	0.61	0.46	0.61	See Table 3 - Combined Electrical Meter
Henry Maldini	SP-6681	49626 230th St W, Lancaster 93536	3278027015	9.7	1	2	7	1987	283	265	3	199 (2005)	4.70	4.91	2.35	2.46	See Table 3 - Combined Electrical Meter
Jules Marcogliese	SP-2842	818 155th W, Rosamond 93560	359140241	10	1	1	2	1981	ND	500	30	ND	11.67	12.91	11.67	12.91	See Table 4 - Flow Meter Data
Peter Maslanik	2885	7238 W Ave J, Quartz Hill, CA	3203027021	2.3	1	1	2	2004	350	ND	0.5	ND	1.29	1.40	1.29	1.40	See Table 3 - Combined Electrical Meter
Donald Masters	SP-2893	7247 W Ave H, Lancaster, CA	3268020001	9.6	1	1	2	1988	355	ND	2	167 (2005)	1.12	1.37	1.12	1.37	See Table 3 - Combined Electrical Meter
Albert Maupin	SP-2910	7350 E. Ave K, Lancaster, CA 93535	3386012002	5	1	1	2	1944	280	ND	1.5	ND	0.12	0.09	0.12	0.09	See Table 2 - Separate Electrical Meter
Dave McCrae	SP-2947	47211 212 St W, Lancaster 93536	3240-001-027	9.9	1	1	2	2000	250	ND	0.75	75 (2011)	1.24	1.25	1.24	1.25	See Table 3 - Combined Electrical Meter
Martin Morel	SP-5276	16617 Pearblossom Hwy, Llano, CA 93544	3036011036	17	1	1	3	1960	385	ND	3	ND	1.74	1.78	1.74	1.78	See Table 3 - Combined Electrical Meter
Mary Murphey	SP-3135	6351 E Ave H, Lancaster, CA	3382009025	4.6	1	3	4	1916	ND	ND	2	ND	1.06	1.16	0.35	0.39	See Table 2 - Separate Electrical Meter
Gertrude Mynear	SP-5325	48999 212th St West, Lancaster, CA	3238023004	2.5	1	1	1	1988	312	ND	1.5	123 (1981)	0.29	0.26	0.29	0.26	See Table 3 - Combined Electrical Meter
Beverly Newcomer	SP-5482	47141 167th Street West, Lancaster, CA 93536	3236010004	3.3	1	1	2	1987	365	300	1.5	128 (1990)	1.12	1.05	1.12	1.05	See Table 3 - Combined Electrical Meter
Jim Nye	SP-6271	8690 East Ave F, Lancaster, CA 93535	3307016011	9.9	1	1	3	1987	338	160	1.5	ND	4.30	4.46	4.30	4.46	See Table 3 - Combined Electrical Meter
Glenn Olson/Deborah Adkins	SP-005	4995 Elder Ave, Rosamond, CA	375-122-01	5	1	1	3	1960	282	189	0.75	146 (2002)	3.19	2.84	3.19	2.84	See Table 3 - Combined Electrical Meter
Javier Pomposo	SP-6562	18325 W Ave B, Lancaster, CA	3257005016	2.1	1	1	5	2005	400	ND	3	267 (2012)	3.54	3.54	3.54	3.54	See Table 5 - Generator and Solar Data
Kristy Prelewicz (now Reuter)	SP-6280	46330 72nd St. W. Lancaster, CA	3268-019-037	5	1	1	3	1916	460	290	1.5	185 (2001)	0.55	0.64	0.55	0.64	See Table 3 - Combined Electrical Meter
James Quillen	SP-4823	18450 W Ave D, Lancaster, CA 93536	3238005028	10	1	1	0	<1999	700	ND	3	ND	0.00	0.00	0.00	0.00	Zero Water Use in 2011-2012

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Participating Class Members and Associated Property, Well, and Water Use Quantification Methods

Participating Class Member Name	SP Number	Address	APN	Acreage	Number of Parcels Served by Well	Number of Households on Parcel(s)	Number of People served by Well	Year House Built [3]	Well Depth (ft)	Pump Depth (ft)	Pump (HP)	Owner Reported Depth to Water Table (year, if provided)	2011 Groundwater Use (AF)[1]	2012 Groundwater Use (AF)[1]	2011 AFY per Household (AF)[2]	2012 AFY per Household (AF)[2]	Basis for Quantification
Wilma "Charlie" Reasor	SP-3477	38909 180th St. E, Palmdale, CA	3075004008	149	1	2	5	<1923	155	ND	2	73 (1982)	2.30	2.06	1.15	1.03	See Table 2 - Separate Electrical Meter
James Reuter	SP-540	7362 W Avenue G, Lancaster, CA	3268018037	9.8	1	1	2	1953	300	ND	1.5	ND	0.99	1.55	0.99	1.55	See Table 2 - Separate Electrical Meter
Richard Robbins	SP-4882	47229 Division St. Lancaster, Ca 93535	3137002014	2.5	1	1	2	1954	ND	ND	0.75	ND	1.41	1.58	1.41	1.58	See Table 3 - Combined Electrical Meter
Barbara Rogers	SP-5680	19620 W Ave A, Lancaster, CA	3256003006	5	2	2	2	1998	460	350	5	288 (1997)	10.84	12.80	5.42	6.40	See Table 3 - Combined Electrical Meter
Ted Schnaidt	SP-4968	17500 E Palmdale Blvd, Llano, CA 93544	3075011015	80	1	1	2	1952	395	200	10	78 (1950)	1.42	2.20	1.42	2.20	See Table 2 - Separate Electrical Meter
Jack Schweizer	SP-568 /SP-9663	22711 W Ave D-13, Lancaster, CA	3279007003	2.5	2	2	2	1991	500	ND	5, 5, 1	ND	4.17	9.12	2.08	4.56	See Table 2 - Separate Electrical Meter
Roger Sides	SP-584/585/3769	49540 55th St W., Lancaster, CA	3260023001	9	1	2	4	1928	325	218	3	155 (2009)	2.97	2.92	1.48	1.46	See Table 3 - Combined Electrical Meter
Willard 'Bud' Sloney	SP-3803	22510 E Ave Q, Palmdale, CA	3084010010	2.5	1	1	1	1957	425	ND	1	167 (2003)	0.42	0.40	0.42	0.40	See Table 3 - Combined Electrical Meter
Bill Smith	SP-7556	9220 W Avenue I, Lancaster 93536	3218033015	7	1	2	2	1929	300	ND	7.5	200	8.93	15.37	4.46	7.68	See Table 2 - Separate Electrical Meter
Toni Steele	SP-4530	8443, 8445 & 8459 Gaskell Rd, Rosamond, Ca 93560	374230126	9.6	1	3	4	<1950	ND	ND	ND	ND	0.57	0.67	0.19	0.22	See Table 2 - Separate Electrical Meter
Judith Sterling	SP-6217	18333 Lancaster Rd, Lancaster, CA	3240006021	17.5	1	2	2	1952	ND	ND	2	ND	5.15	5.80	2.58	2.90	See Table 3 - Combined Electrical Meter
Randy Stevens	SP-531	5719 Astoria Ave., Rosamond, 93560	37534206	2.5	3	3	6	1976	300	ND	5	171 (1976)	3.87	3.97	1.29	1.32	See Table 2 - Separate Electrical Meter
Linda Storsteen	SP-614	17171 E Ave R, Palmdale, CA 93550	3075013008	2.5	1	1	2	1957	ND	110	0.75	90 (2010)	2.73	3.70	2.73	3.70	See Table 3 - Combined Electrical Meter
Edmund Swayze	SP-153	45235 85th St West, Lancaster	3219124091	1.25	1	1	1	1934	300	ND	ND	ND	0.29	0.29	0.29	0.29	See Table 5 - Generator and Solar Data
Mark Thompson	SP-4024	46118 80th St West, Lancaster, CA 93536	3268019022	1.1	1	1	3	1991	320	300	1.5	160 (1990)	2.62	2.73	2.62	2.73	See Table 3 - Combined Electrical Meter
John Thurston	SP-631	36300 Sierra Hwy, Palmdale, CA 93550	3053010027	13.7	1	2	2	2004	187	ND	1	30 (2012)	1.47	2.02	0.74	1.01	See Table 2 - Separate Electrical Meter
James Tribuzi	SP-643	48721 W 227th St, Lancaster, CA 93536	3279007015	2.4	1	1	2	1973	ND	ND	ND	ND	0.53	1.20	0.53	1.20	See Table 3 - Combined Electrical Meter
John/Ida Tucker	ND	4211 E Avenue I, Lancaster, 93535	3154016025	5	1	1	2	1954	370	ND	1.5	220 (2010)	0.34	0.36	0.34	0.36	See Table 3 - Combined Electrical Meter
Margaret Tucker	SP-4837	42658 70th St E, Palmdale, CA	3386017010	2.1	1	1	2	1950	ND	ND	1.5	ND	0.40	0.40	0.40	0.40	See Table 3 - Combined Electrical Meter
Charles Tyler	SP-8285	18245 Lancaster Rd, Lancaster	3240006037	8.5	1	1	2	1983	385	ND	5	180	11.87	11.87	11.87	11.87	See Table 6 - Crop Irrigation Data
James Ward	SP-5751	6107 W Ave G, Lancaster, CA	3268013007	2.2	1	1	2	1979	200	ND	1.5	112 (2088)	2.41	2.76	2.41	2.76	See Table 3 - Combined Electrical Meter
George Webb	SP-668/4251	9937 W Ave A, Rosamond, CA	374020469	8.3	2	3	3	<1953	600	ND	5	230 (2008)	3.25	3.32	1.08	1.11	See Table 2 - Separate Electrical Meter
Michael/Patricia Welsh	SP-670	35720 47th St. E, Palmdale, CA 93552	3051011033	3.1	1	1	2	1993	ND	ND	ND	ND	1.75	1.52	1.75	1.52	See Table 3 - Combined Electrical Meter
Leslie West	SP-4269	23008 Lancaster Rd, Lancaster	3279012009	40	1	1	2	1991	350	ND	ND	ND	0.80	0.76	0.80	0.76	See Table 3 - Combined Electrical Meter
Karen Wonnell	SP-4352	21115 E Avenue R-6, Palmdale, CA	3084017014	5.1	1	1	2	1987	305	283	3	233 (2009)	9.32	10.52	9.32	10.52	See Table 2 - Separate Electrical Meter
Richard Wood	SP-4914	45763 N. 90 Street East, Lancaster, CA	3374024020	10.1	1	1	2	<1948	385	295	5	198 (2007)	3.11	3.51	3.11	3.51	See Table 2 - Separate Electrical Meter

Notes:
ND = No Data
1. Value calculated using Equation 1 (see text section 3.4.1.1)
2. Value calculated as 2011 (or 2012) Groundwater Use divided by Number of Households on Parcel(s)
3. Documentation of ownership and year house built for PCM's with more than one household are provided in Appendix A

Table 2
Participating Class Members with Separate Electrical Meter Data and Parameters Used to Calculate Water Use

Class Member	Indoor/Outdoor/Livestock	Beneficial Uses	Number Parcels Fed by Well	Number Households Fed by Well	2011 Electrical Usage (Kwh)	2012 Electrical Usage (Kwh)	Source of Edison Electrical Data	2011 -2012 Groundwater Level (ft MSL)	Wellhead Elevation (ft MSL)	2011-2012 Depth to Groundwater (ft)[7]	Pressure Tank Head (ft)	Total Displacement Head (ft)[8]	Calculated kWh per Acre-foot	2011 Groundwater Use (AFY)[10]	2012 Groundwater Use (AFY)[9]
Anderson	small diam pipe to irrigation trees; hand carry water to cabin; no interior plumbing	Domestic, indoor and landscaping	1	1	421	401	Statement of Account	2,820	2,922	102	138	240	819	0.51	0.49
Firsick	50 trees; 2 large lawn areas; several out-buildings	Domestic, indoor and landscaping	1	1	4,825	5,177	Statement of Account	2,220	2,335	115	138	253	864	5.59	5.99
Gezalyan	many fruit trees, few pines/eucalyptus	Domestic, indoor and landscaping; Agriculture	1	1	14,484	10,007	Statement of Account	2,675	2,812	137	138	275	939	15.43	10.66
Houchen, Z	No landscaping use	Domestic, indoor only	2	2	917	1,236	Statement of Account	2,450	2,783	333	138	471	1,608	0.57	0.77
Jung[1]	few trees only	Domestic, indoor and minor landscaping	4	4	5,740	8,321	Monthly Bills	2,220	2,410	190	138	328	1,120	5.13	7.43
King	Few trees only, not irrigated	Domestic, indoor only	1	1	2,387	1,680	Statement of Account	2,250	2,506	256	138	394	1,345	1.77	1.25
Lytle	few trees, no lawn, few chickens and horses	Domestic, indoor and minor landscaping and livestock	4	4	3,576	4,298	Statement of Account	2,210	2,375	165	138	303	1,034	3.46	4.16
Maupin	few tress/bushes; no livestock	Domestic, indoor and landscaping	1	1	185	138	Statement of Account	2,150	2,455	305	138	443	1,512	0.12	0.09
Murphey	waters pine trees daily	Domestic, indoor and landscaping	1	3	1,132	1,245	Statement of Account	2,200	2,376	176	138	314	1,072	1.06	1.16
Reasor[2]	just a few trees	Domestic, indoor and landscaping	1	2	1,238	1,110	Statement of Account	2,720	2,740	20	138	158	539	2.30	2.06
Reuter	few trees,not watered	Domestic, indoor only	1	1	1,030	1,609	Statement of Account	2,225	2,392	167	138	305	1,041	0.99	1.55
Schnaidt	orchard, trees, lawn, chicken farm	Domestic, indoor and landscaping; agriculture, chicken farm	1	1	960	1,487	Statement of Account	2,750	2,810	60	138	198	676	1.42	2.20
Schweitzer	orchard, trees	Domestic, indoor and landscaping; agriculture	2	2	2,872	6,288	Statement of Account	2,850	2,914	64	138	202	689	4.17	9.12
Smith	2 acres pistachio trees 5 acres wine grapes (drip irrigation)	Domestic, indoor and landscaping; agriculture; residential pool	1	2	8,320	14,321	Monthly Bills	2,300	2,435	135	138	273	932	8.93	15.37
Steele	few horses	Domestic, indoor and landscaping; livestock	1	3	660	779	Monthly Bills	2,225	2,427	202	138	340	1,161	0.57	0.67
Stevens, R	minor landscaping	Domestic, indoor and landscaping; no livestock	3	3	4,204	4,311	Monthly Bills	2,200	2,380	180	138	318	1,085	3.87	3.97
Thurston[3]	10 horses, chickens/goats, 200 pistacio trees (on drip irr); residential swimming pool	Domestic, indoor and landscaping; livestock	1	2	4,291	5,182	Statement of Account	2,500	2,838	338	138	476	1,625	1.47	2.02
Webb[4]	4 horses, goats/pigs; small lawn, small orchard, few trees, pool	Domestic, indoor and landscaping; livestock	2	3	2,906	2,970	Statement of Account	2,200	2,462	262	0	262	894	3.25	3.32
Wonnell[5]	lots of animals, dog pools, spinkler use	Domestic, indoor and landscaping; livestock	1	2	11,807	13,321	Subpoena	2,800	2,907	233	138	371	1,266	9.32	10.52
Wood[6]	trees, flood irrigated	Domestic, indoor and landscaping	1	1	2,449	2,767	Monthly Bills	2,170	2,401	231	0	231	788	3.11	3.51

Notes:
[1]Edison hydraulic test available
[2]2 houses on one parcel
[3]Separate meter includes well and barn e usage; subtracted barn light usage from annual eletrcial usage (65 watt *10 bulbs * 8 hrs per day = 5.2 kWh/day =1900 kWh/yr)
[4]SCE meter does NOT include pressure tank booster pump usage
[5]Wonnell depth to water from 2009 Drillers report
[6]SCE meter does NOT include pressure tank booster pump usage; Edison hydraulic test available
[7]Depth to Groundwater calculated from Wellhead Elevation minus 2011-2012 Groundwater Level from groundwater level contour map (Figure 3)
[8]TDH is sum of depth to water table plus added lift to pump into pressure tank at 60 pounds per square inch
[9] Value calculated using Equation 1 (see text section 3.4.1.1)

Table 3
Participating Class Members with Combined Electrical Meter Data and Parameters Used to Calculate Water Use

Participating Class Member Name	SP Number	Indoor/Outdoor/Livestock	Beneficial Uses	2011 Electrical Usage (kWh)	2012 Electrical Usage (kWh)	Source of Edison Electrical Data	% kWh of total use for well	2011 Adjusted KWh	2012 Adjusted KWh	2011 -2012 Groundwater Level (ft MSL)	Wellhead Elevation (ft MSL)	Depth to Groundwater (ft) [2]	Pressure Tank Head (ft)	Total Displacement Head (ft) [3]	2011 Groundwater Use (AFY)[4]	2012 Groundwater Use (AFY)[4]	2011 AFY per Household	2012 AFY per Household
Clawson	SP-4872	few trees/bushes; residential swimming pool; no livestock	Domestic, indoor mainly	5,388	5,067	Statement of Account	0.13	711	669	2,225	2,378	153	138	291	0.72	0.67	0.72	0.67
Coffman	SP-4477	many dogs, runs kennel business.	Domestic, indoor only, kennel	6,579	7,499	Statement of Account	0.07	434	495	2,250	2,551	301	138	439	0.29	0.33	0.29	0.33
Crawford	SP-6519	few trees, no lawn, no livestock	Domestic, indoor and landscaping; no livestock	8,634	8,775	Statement of Account	0.26	2,279	2,317	ND	4,214	23	138	161	4.15	4.22	4.15	4.22
Curtis	SP-1458	Few Palm trees only	Domestic, indoor only	6,276	6,466	Statement of Account	0.13	828	854	2,210	2,352	142	138	280	0.87	0.89	0.87	0.89
Damron	SP-1462	12 cattle, 2 horses, mule, chickens, few trees	Domestic, indoor and landscaping; livestock	15,260	14,594	Subpoena	0.26	3,940	3,768	2,780	2,847	67	138	205	5.63	5.39	5.63	5.39
Davidson	SP-4841	a few trees, some grass, no livestock	Domestic, indoor and landscaping	17,217	15,238	Statement of Account	0.26	4,545	4,023	2,175	2,480	305	138	443	3.01	2.66	3.01	2.66
Deckert	SP-1506	no landscaping; no livestock	Domestic, indoor only	15,036	16,483	Subpoena	0.33	4,962	5,439	2,400	2,468	68	138	206	7.06	7.74	7.06	7.74
Devoe	was Triberi in 2012	few trees and bushes; no lawn, no livestock	Domestic, indoor mainly	13,458	12,268	Monthly Bills	0.13	1,776	1,619	2,850	2,935	85	138	223	2.33	2.13	2.33	2.13
Doucette	SP-6616	2 horses (20-30 gal/day)	Domestic	10,180	11,813	Subpoena	0.26	2,688	3,119	2,950	3,060	110	138	248	3.17	3.68	3.17	3.68
Dumin	SP-1614	40 pine trees on drip, no lawn, no livestock	Domestic, indoor and landscaping	9,735	9,094	Statement of Account	0.39	3,770	3,522	2,400	2,574	174	138	312	3.54	3.31	3.54	3.31
Enos	SP-1690	just small front yard, trees, flowerbeds	Domestic, indoor and minor landscaping	14,374	14,092	Subpoena	0.13	1,897	1,860	2,400	2,727	327	138	465	1.20	1.17	1.20	1.17
Fennell	SP-1760	small lawn, bushes; water 3x per week; no livestock	Domestic, indoor and landscaping	10,671	11,345	Statement of Account	0.13	1,409	1,498	2,450	2,625	175	138	313	1.32	1.40	1.32	1.40
France	SP-203	few trees	Domestic, indoor and landscaping	4,057	4,911	Statement of Account	0.20	803	972	2,200	2,322	122	138	260	0.91	1.10	0.45	0.55
Garcia	SP-225	couple of trees only	Domestic, indoor only	9,943	7,438	Statement of Account	0.07	656	491	2,250	2,448	198	138	336	0.57	0.43	0.57	0.43
Gibbs	SP-5085	a few trees, small lawn, few chickens	Domestic, indoor and landscaping	12,112	13,816	Subpoena	0.13	1,599	1,824	2,680	2,675	5	138	143	3.28	3.74	3.28	3.74
Godde	SP-1942	Windbreak trees	Domestic, indoor and minor landscaping	9,644	9,940	Subpoena	0.13	1,273	1,312	2,250	2,555	305	138	443	0.84	0.87	0.84	0.87
Graham	SP-240	2 horses	Domestic, indoor and minor landscaping, livestock	10,792	10,230	Subpoena	0.13	1,425	1,350	ND	5,262	50	138	188	2.22	2.10	2.22	2.10
Gregory	SP-2002	just trees	Domestic, indoor and landscaping	7,740	8,433	Statement of Account	0.07	511	557	2,200	2,347	147	138	285	0.53	0.57	0.53	0.57
Grimes	SP-5999	100 trees, small lawn	Domestic, indoor and landscaping	10,067	12,151	Subpoena	0.33	3,322	4,010	2,220	2,431	211	138	349	2.79	3.37	2.79	3.37
Gutierrez	SP-257	few trees, small lawn, no livestock	Domestic, indoor and landscaping	10,245	6,885	Subpoena	0.20	2,029	1,363	2,200	2,380	180	138	318	1.87	1.26	0.93	0.63
Hawkins	SP-6911	200 roses/shrubs; 5,000 ft2 lawn	Domestic, indoor and landscaping	8,388	9,117	Statement of Account	0.26	2,166	2,354	2,225	2,403	178	138	316	2.01	2.18	2.01	2.18
Hill	SP-2196	65 olive trees	Domestic, indoor and landscaping	12,689	11,786	Subpoena	0.33	4,187	3,889	2,800	2,908	108	138	246	4.99	4.63	4.99	4.63
Hoier	ND	No landscaping use	Domestic, indoor only	4,490	5,193	Statement of Account	0.13	593	685	2,250	2,402	152	138	290	0.60	0.69	0.60	0.69
Hoyt	SP-2278	dog kennel, no garden or crops	Livestock	8,191	7,797	Statement of Account	0.13	1,081	1,029	2,650	2,831	181	138	319	0.99	0.95	0.99	0.95
Kerr	SP-7744	small lawn, 48k gal pool, 420 fruit trees; 400 in pots	Domestic, indoor and landscaping, residential pool	11,069	13,136	Statement of Account	0.33	3,653	4,335	2,650	2,845	195	138	333	3.21	3.81	3.21	3.81
Kertzman (Parsons)	SP-2474	small lawn, 2 cows in 2011-12	Domestic, indoor and minor landscaping, livestock	9,590	9,171	Statement of Account	0.26	2,532	2,421	2,200	2,460	260	138	398	1.86	1.78	0.93	0.89
Lennox	SP-377	few trees, no lawn, no livestock	Domestic, indoor and minor landscaping	11,839	12,463	Statement of Account	0.26	3,125	3,290	ND	3,980	23	138	161	5.69	5.99	5.69	5.99
Leon	SP-4830	few trees, no lawn, no livestock	Domestic, indoor only	8,291	10,683	Subpoena	0.13	1,094	1,410	2,225	2,314	89	138	227	1.41	1.82	1.41	1.82
Macisaac	SP-2802	few trees, no lawn, no livestock	Domestic, indoor and landscaping	3,860	5,081	Statement of Account	0.13	510	671	2,200	2,384	184	138	322	0.46	0.61	0.46	0.61
Maldini	SP-6681	20 trees/windbreak, few chickens and dogs	Domestic, indoor and landscaping	15,544	16,268	Statement of Account	0.33	5,130	5,368	2,625	2,807	182	138	320	4.70	4.91	2.35	2.46
Maslanik/Brown	2885	2 horses only	Domestic, indoor only, and livestock	9,294	10,080	Statement of Account	0.13	1,227	1,331	2,225	2,365	140	138	278	1.29	1.40	1.29	1.40
Masters	SP-2893	trees, small lawn, 0.5 acre pasture; 4-5 sheep	Domestic, indoor and landscaping, livestock	8,715	10,690	Statement of Account	0.13	1,150	1,411	2,225	2,388	163	138	301	1.12	1.37	1.12	1.37
McCrae	SP-2947	10 trees on patio	Domestic, indoor and landscaping	6,827	6,871	Statement of Account	0.13	901	907	2,990	3,065	75	138	213	1.24	1.25	1.24	1.25
Morel	SP-5276	few trees only, no livestock	Domestic, indoor and minor landscaping	13,125	13,453	Statement of Account	0.20	2,599	2,664	2,850	3,150	300	138	438	1.74	1.78	1.74	1.78
Mynear	SP-5325	none	Domestic, indoor only	4,165	3,704	Statement of Account	0.07	275	244	2,700	2,842	142	138	280	0.29	0.26	0.29	0.26
Newcomer	SP-5482	30+ trees ('not irrigated'), shallow swimming pool	Domestic, indoor and minor landscaping	10,646	9,968	Statement of Account	0.13	1,405	1,316	2,560	2,789	229	138	367	1.12	1.05	1.12	1.05
Nye	SP-6271	2 horses, pets, lawn and outdoor irrigation	Domestic, indoor and landscaping, livestock	11,145	11,564	Statement of Account	0.39	4,316	4,479	2,200	2,356	156	138	294	4.30	4.46	4.30	4.46
Olson/Adkins	SP-005	80 trees	Domestic, indoor and landscaping	10,173	9,033	Subpoena	0.33	3,357	2,981	2,200	2,370	170	138	308	3.19	2.84	3.19	2.84
Prelewicz	SP-6280	no landscaping, no livestock	Domestic, indoor only	2,860	3,327	Statement of Account	0.20	566	659	2,225	2,389	164	138	302	0.55	0.64	0.55	0.64
Robbins	SP-4882	very little outside irrigation	Domestic, indoor primarily	8,202	9,177	Statement of Account	0.13	1,083	1,211	2,230	2,317	87	138	225	1.41	1.58	1.41	1.58
Rogers[1]	SP-5680	35 fruit/nut trees, 1,000+ pines; 6 horses	Domestic, indoor and landscaping; livestock	15,831	18,705	Subpoena and Wind Generator	0.75	11,873	14,029	2,520	2,702	182	139	321	10.84	12.80	5.42	6.40
Sides	SP-584/585/3769	few trees and bushes	Domestic, indoor and landscaping	10,243	10,091	Statement of Account	0.26	2,704	2,664	2,250	2,379	129	138	267	2.97	2.92	1.48	1.46
Sloney	SP-3803	few trees, not watered much	Domestic, indoor and minor landscaping	4,788	4,597	Statement of Account	0.07	316	303	2,800	2,883	83	138	221	0.42	0.40	0.42	0.40
Sterling	SP-6217	35 trees/orchard, and a garden; swimming pool	Domestic, indoor and landscaping; no livestock	19,080	21,473	Statement of Account	0.33	6,296	7,086	2,650	2,870	220	138	358	5.15	5.80	5.15	5.80
Storsteen	SP-614	horses, goats , minor landscaping	Domestic, indoor and landscaping; livestock; dog kennel	13,251	17,986	Statement of Account	0.13	1,749	2,374	2,760	2,810	50	138	188	2.73	3.70	2.73	3.70
Thompson	SP-4024	just a few trees	Domestic, indoor and minor landscaping	14,142	14,724	Statement of Account	0.20	2,800	2,915	2,225	2,400	175	138	313	2.62	2.73	2.62	2.73
Tribuzi	SP-643	just a few trees	Domestic, indoor and landscaping	2,713	6,163	Statement of Account	0.13	358	814	2,825	2,886	61	138	199	0.53	1.20	0.53	1.20
Tucker (John/Ida)	ND	7 horses	Domestic, indoor and minor landscaping; livestock	6,129	6,495	Statement of Account	0.07	405	429	2,175	2,386	211	138	349	0.34	0.36	0.34	0.36
Tucker (Margaret)	SP-4837	no irrigation nor livestock	Domestic, indoor only	4,681	4,756	Statement of Account	0.13	618	628	2,160	2,480	320	138	458	0.40	0.40	0.40	0.40
Ward	SP-5751	100 pine trees, no livestock	Domestic, indoor and landscaping; no livestock	6,832	7,814	Statement of Account	0.33	2,255	2,579	2,225	2,361	136	138	274	2.41	2.76	2.41	2.76
Welsh	SP-670	no irrigation nor livestock	Domestic, indoor only	22,706	19,779	Subpoena	0.13	2,997	2,611	2,560	2,925	365	138	503	1.75	1.52	1.75	1.52
West	SP-4269	few trees/bushes; no livestock	Domestic, indoor and minor landscaping	7,167	6,874	Subpoena	0.13	946	907	3,000	3,210	210	138	348	0.80	0.76	0.80	0.76

Notes: ND = No Data

[1] Wind Generator kWh added to SCE-delivered power.

[2] Depth to Groundwater calculated from Wellhead Elevation minus 2011-2012 Groundwater Level from groundwater level contour map (Figure 3)

[3] TDH is sum of depth to water table plus added lift to pump into pressure tank at 60 pounds per square inch

[4] Value calculated using Equation 1 (see text section 3.4.1.1)

Table 4
Participating Class Members with Flow Meter Data

Participating Class Member Name	SP Number	Indoor/Outdoor/Livestock	Beneficial Uses	2011 Groundwater Use (AFY)[3]	2012 Groundwater Use (AFY)[3]
Banuk[1]	SP-926	Indoor use mainly; small garden and a few trees	Domestic, indoor and minor landscaping; no livestock; no lawn	0.39	0.39
Bellanca	SP-994	100 trees, veg garden	Domestic, indoor and landscaping	1.82	1.72
Dunn	SP-6779	Several hundred pistachio trees; only watered once per year	Domestic, indoor and landscaping; Agriculture	6.42	6.42
Marcogliese[2]	SP-2842	Many trees, large pond, livestock	Domestic, indoor and minor landscaping and livestock	11.67	12.91

Notes:

[1]Solar-powered pump; see Appendix A, Banuk Documents

[2]Edison Hydraulic Test Data available

[3] Calculations provided in each Participating Class Member's documents in Appendix A

Table 5
Participating Class Members with Generator or Solar Data and Parameters Used to Calculate Water Use

Participating Class Member Name	SP Number	Indoor/Outdoor/Livestock	Beneficial Uses	Owner Reported Depth to Water Table (year, if provided)	Water Use Calculation Method	Well Depth (ft)	Pump Depth (ft)	Pump (HP)	2011 Groundwater Use (AFY)[7]	2012 Groundwater Use (AFY)[7]
Austin[1]	SP-5122	120 trees and shrubs, no livestock	Domestic, indoor and landscaping	ND	Generator Usage	400	350	ND	0.93	0.93
Bovee[2]	SP-065	No outside irrigation	Domestic, indoor only	425 (2007)	Generator Usage; tracking of tank filling	620	ND	ND	0.04	0.04
Francoeur	SP-205	Property only occupied "couple days per week"	Domestic, indoor only	ND	User Estimate	460	ND	ND	0.005	0.005
Hester[3]	SP-043	Few trees only	Domestic, indoor mainly; 3 or 4 trees	ND	Generator Usage; tracking of tank filling	ND	ND	1.5	0.06	0.06
Large[4]	SP-369	No irrigation nor livestock	Domestic, indoor and minor landscaping	ND	User Estimate	500	462	2	0.22	0.22
Pomposo[5]	SP-6562	None	Domestic, indoor only	267 (2012)	User Estimate	400	ND	3	3.54	3.54
Swayze[6]	SP-153	Minor landscaping, few trees/grapes, occasional horses	Domestic, indoor and landscaping	ND	Propane Generator	300	ND	ND	0.29	0.29

Notes:
[1]Solar-powered pump
[2]Diesel generator-powered pump.
[3]See Appendix A, Hester Documents
[4]Detailed analysis provided by Mr. Large
[5]Uses combo of solar and generator.
[6]Details provided by Mr Swayze, see see Appendix A, Swayze Documents
[7] Calculations provided in each Participating Class Member's documents in Appendix A

Table 6
Participating Class Member with Crop Irrigation

Participating Class Member Name	SP Number	Indoor/Outdoor/Livestock	Beneficial Uses	Owner Reported Depth to Water Table (year, if provided)	Basis for Quantification	2011 Groundwater Use (AFY)[1]	2012 Groundwater Use (AFY)[1]
Tyler	SP-8285	1,800 peach trees in 2011-12 on 6 acres, plus 0.25 acres pumpkins	Domestic, indoor and landscaping; agriculture (6 ac peaches), residential pool	180	Flow limited irrigation emitters and conservative estimate of domestic use	11.87	11.87

[1] Calculations provided in each Participating Class Member's documents in Appendix A