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ORIGINAL EXCEPTION

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Arizona Corporation Commission

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BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE APPLICATION ) DOCKET NO. W-01580A-04-0672
OF TONTO VILLAGE WATER COMPANY, )
INC. FOR A RATE INCREASE. ) EXCEPTIONS TO THE PROPOSED ORDER

COMES NOW, TONTO VILLAGE WATER COMPANY, INC., by and through its counsel undersigned, pursuant to the Arizona Corporation Commission Memorandum dated July 11, 2008, and hereby submits the following Exceptions to the Recommendations of the Administrative Law Judge for the grounds and reasons presented herein:

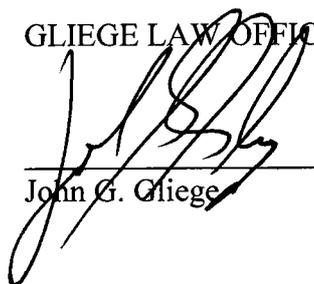
- 1. The Hydrology Report (attached as Exhibit A) indicates that a new well is not needed, but in lieu of that, further development of the existing well is needed.
2. Tonto Village Water Company is not on the Water Infrastructure Finance Authority ("WIFA") list for monies until the year of 2009. Therefore, no money will be available until that time, and the improvements to the existing well, as indicated by the attached Hydrology Report from Chuck M. Dickens (see Exhibit A), can be started but not necessarily completed without the funding from WIFA.

It is respectfully requested that exceptions be granted allowing TONTO VILLAGE WATER COMPANY, INC to further develop their existing well in lieu of initiating a new well. Further, TONTO

1 VILLAGE WATER COMPANY, INC requests an exception to the December 2008 deadline as  
2 financing will not be available until 2009 from WIFA.

3 RESPECTFULLY SUBMITTED this 17<sup>th</sup> day of July, 2008.

4 GLIEGE LAW OFFICES, PLLC

5  
6   
7 John G. Gliege

8 Original and thirteen (13) copies of the foregoing  
9 Mailed this 17<sup>th</sup> day of July, 2008 to:

10 Docket Control Center  
11 Arizona Corporation Commission  
12 1200 W. Washington Street  
13 Phoenix, AZ 85007

14 Copies of the foregoing  
15 Mailed this 17<sup>th</sup> day of July, 2008 to:

16 Ron and Rebecca Standage  
17 Tonto Village Water Company  
18 PO Box 9116  
19 Mesa, AZ 85214-9116

20 Tonto Village DWID  
21 HC7, Box 363  
22 Payson, AZ 85541

23 Janice Alward, Chief Counsel  
24 Legal Division, ACC  
25 1200 W. Washington St.  
26 Phoenix, AZ 85007

27 Ernest G. Johnson, Director  
28 Utilities Division, ACC  
29 1200 W. Washington  
Phoenix, AZ 85007

**EXHIBIT A:**

**Tonto Village Water Company**

***Evaluation of Wellfield, Water Demands, &  
Hydrogeologic Conditions***

**Northern Gila County, Arizona**

Prepared by

Chuck M. Dickens, Consulting Hydrogeologists

July 7, 2008

**CHUCK M. DICKENS**  
**CONSULTING HYDROGEOLOGIST**



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July 7<sup>th</sup>, 2008

Tonto Village Water Company  
Attn: Mr. Ronald Standage  
C/O: Standage & Associates, Ltd.  
409 S. El Dorado Road  
Mesa, Arizona 85202

Re: Consulting Report – Tonto Village Water Company: Evaluation of Wellfield  
Capacity, Water Demands, & Hydrogeologic Conditions.

Dear Ron:

Enclosed are five copies of my report for the Tonto Village Water Company. As stated in my report, in order to readily meet the extreme peak day water demands which occur over summer week-ends and holidays, it is recommended that you consider increasing the water supply capacity of your wellfield by installing a higher capacity pump unit in well no. 3. Well no. 3 is the deepest of the three supply wells and is currently equipped with a 14 to 15 gpm capacity pump unit. Installation of a minimum 35 gpm pump unit would more than double the production capacity of well no. 3 and increase the overall wellfield capacity to about 60 gpm ( 85,000 gpd ). It is my opinion, based on the available data I reviewed, that construction of a new well is not warranted at this time.

I would also consider increasing the storage volume within your water system to at least 80,000 gallons. This volume would be approximately equivalent to two days of average daily water demand during the peak use month of June. An additional 25,000 gallon storage tank placed at the well no. 3 site would effectively increase the overall tank storage volume to about 80,000 gallons.

If you have any questions or wish further discussion of the interpretations, conclusions, and/or recommendations presented in the report please contact me.

Respectfully submitted,

Chuck M. Dickens

**CHUCK M. DICKENS**  
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**TONTO VILLAGE WATER COMPANY**

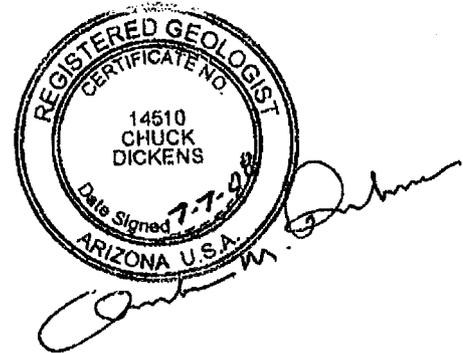
*Evaluation of Wellfield, Water Demands,  
& Hydrogeologic Conditions*

**Northern Gila County, Arizona**

**Prepared for**

**Tonto Village Water Company**

**Mr. Ron Standage**



**July 7<sup>th</sup>, 2008**

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*( Including tabulated data & monthly data graphs )*

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## ***EXECUTIVE SUMMARY***

This report presents an overview of the Tonto Village Water Company; including wellfield construction details and current pumping capacity, current average and peak water demands of customers, and recommendations for increasing the pumping capacity of the water company wellfield. The Tonto Village Water Company is located in northern Gila County, approximately 15 miles east of Payson, two miles west of Kohls Ranch resort, and about one mile west of State Highway 260 ( Figure 1 ). The water company currently serves about 190 single family residential units within the Tonto Village development.

The water company system includes three supply wells with a combined production capacity of about 39 to 40 gallons per minute ( gpm ) or about 56,000 to 57,600 gallons per day ( gpd ). The system includes a total tank storage volume approaching 58,000 gallons, including both storage and pressure tanks.

Over the past three years ( 2005, 2006, & 2007 ) the annual water demand of water system customers has ranged from about 7.27 to 9.64 million gallons per year. These volumes equate to about 22.3 to 29.6 acre feet per year. Overall average daily demand has ranged from about 20,000 to 26,500 gpd. Assuming 190 customers, the overall average demand per residential unit has recently ranged from about 105 to 140 gpd.

The peak water use month has consistently been June. Water use in June over the past three years has ranged from 1.12 to upwards of 1.23 million gallons per month. These monthly volumes equate to daily volumes of 37,500 to 41,000 gpd. Assuming 190 customers, the average water use per customer during the peak month of June has ranged from about 197 to 216 gpd.

The *peak day* water use is typically assumed to approach about twice ( 2x ) the average daily demand. Assuming an average daily demand during the peak month of June of 37,500 to 41,000 gpd, the peak day demand would be expected to approach 75,000 to 82,000 gpd. The peak day demand could occur over a period of several days, typically over summer week-ends / holidays. Assuming 190 customers the peak day demand per residential unit was computed to range from about 393 to 432 gpd.

The water company wellfield should be capable of meeting the peak day water demand. Assuming a peak day water demand ranging from 75,000 to 82,000 gpd, the current wellfield pumping capacity of 56,000 to 57,600 gpd must be increased. The production capacity of the wellfield should be increased from the current pumping capacity of 39 to 40 gpm to at least a pumping capacity approaching 60 gpm ( 86,400 gpd ). Based on review of available data, it is recommended that the production capacity of the wellfield be increased by installation of a higher capacity pump unit in well no. 3. Increasing the pumping capacity of well no. 3 from the current rate of 14 to 15 gpm to 35 gpm would increase the overall wellfield capacity to about 60 gpm.



It is my opinion, based on available data, that it is not necessary or warranted to consider construction of a new well at this time.

In addition, it is recommended that the volume of available storage be increased from the current volume of 58,000 gallons to at least 80,000 gallons. A 25,000 gallon storage tank would increase the storage volume to 83,000 gallons. It is my experience, in recently working with ADEQ, that a minimum potable storage volume equivalent to 400 gallons per residential customer is typically preferred for rural isolated water companies. Assuming 200 customers would equate to a required storage volume of 80,000 gallons. A storage volume of at least 80,000 gallons would also approach two days of average water use during the peak month (June) for the Tonto Village development.

In summary, it is my recommendation that the water company consider increasing the tank storage volume to at least 80,000 gallons and increasing the production capacity of the wellfield to about 60 gpm. Based on available data, these modifications to the system should allow the water company to meet the extreme peak water demands of customers that periodically occur over summer week-ends and / or holiday periods.



## INTRODUCTION

This report has been prepared to provide an overview of hydrogeologic conditions in the vicinity of the Tonto Village Water Company and to summarize available data / information concerning construction details and operating history for the three supply wells currently operated by the water company. This report also presents suggestions / recommendations for increasing the overall water production capacity of the water company's wellfield.

The Tonto Village Water Company ( the water company ) is located in northern Gila County approximately 15 miles east of Payson, two miles west of Kohls Ranch and one mile west of State Highway 260 ( Figure 1 ). The water company currently serves approximately 190 single family residential units. The water system includes three supply wells and approximately 58,000 gallons of storage ( including both storage and pressure tanks ). The water company commenced serving customers in about 1957, during the early phases of the Tonto Village development.

It is my understanding that *occasionally* the water system will not meet current extreme - peak demands of the Tonto Village customers. It is further my understanding that these extreme peak demands occur on week-ends / holidays during the summer months when full or nearly full occupancy of residential units occurs. Due to seasonal and/or week-end occupancy of many of the residential units, the typical mid-week water demand is considerably lower than the extreme peak demands that occur on summer week-ends and or holidays.

The peak month water demand routinely occurs in June of each year. Over the past three years ( reporting years of 2005, 2006, 2007 ), the *average daily demand* of water company customers during June has ranged from about 37,500 to 41,000 gallons per day ( gpd ). This equates to an average of about 197 to 216 gpd per residential unit.

The peak day demand of residential customers is typically assumed to approach approximately twice ( 2x ) the average day demand. As such, the peak day demand of water company customers in June would be expected to range from about 75,000 to 82,000 gpd. The peak day demand for individual customers would be computed to range from about 395 to 432 gpd per residential unit.

The water company wellfield should be capable of meeting the peak day demand (82,000 gallons). This would equate to a minimum wellfield capacity of about 57 gpm ( assuming the wellfield operating 24 hours per day ). Available data indicate that the current capacity of the wellfield ( based on pump unit capacities ) is approximately 39 to 40 gpm (56,000 - 57,600 gpd). Although this production capacity is sufficient to meet average daily water demands even during June, the current pumping capacity would not be sufficient to meet extreme peak day demands occurring over several days during the summer months.



## OVERVIEW OF WATER SYSTEM

The Tonto Village Water Company is located in northern Gila County within portions of Township 11 north and Range 11 ½ east - sections 5 and 8 and Township 11 north and Range 12 east - sections 19 and 30 ( Figures 1, 2, & 3 ). The water company boundaries encompass approximately 80.65 acres ( Figure 3 ).

The water company system currently includes three active supply wells, several storage and pressure tanks, and a network of underground piping to convey pumped groundwater from the wells to the storage tanks and then on to residential customers. The water system includes disinfection ( chlorination ) prior to delivery to customers. A schematic illustrating water system components is presented on Figure 4.

### Wellfield Construction Details & Pump Unit Capacities

#### *Well No. 1 ( ADWR 55-627909 )*

Well no. 1 is the most easterly of the three supply wells ( Figure 2 ). Well no. 1 was reportedly constructed in 1957 to a depth of 223 feet. The well was completed with 8 inch diameter steel production casing to a depth of 223 feet. Information provided by the water company indicates that the pumping capacity of the current pump unit installed in well no. 1 is about nine (9) gpm. Pertinent data / information concerning construction details for well no.1, provided by the water company and obtained from the Arizona Department of Water Resources ( ADWR ) 55 well registry database, are presented in Appendix A.

#### *Well No. 2 ( ADWR 55-627911 )*

Well No. 2 is located near the middle of the water company system ( Figure 2 ). Well no. 2 was reportedly constructed in 1971 to a depth of 260 feet. However, this depth may refer to the cased depth, as the drillers log for the well provided by the water company indicates that the well was actually drilled to a depth of 300 feet. The production casing for the well is reported to be 5 inch diameter steel casing. The depth setting of the casing is not known. Information provided by the water company indicates that the pumping capacity of the current pump unit installed in the well is approximately 16 gpm. Pertinent data / information concerning construction details for well no. 2 are presented in Appendix A.

#### *Well No. 3 ( ADWR 55-516995 )*

Well no. 3 is the most westerly of the three supply wells ( Figure 2 ). Well no. 3 was constructed in 1987. The well was cased ( production casing ) with 5 inch pvc casing to a depth of 340 feet. Information provided by the water company and recent test data provided by Aero Drilling indicate that the pumping capacity of the current 1-1/2 hp



pump unit installed in the well is about 14 to 15 gpm. Pertinent data / information concerning construction details for well no.3 are presented in Appendix A.

### **Storage Tanks & Pressure Tanks**

The water system currently includes three storage tanks; one at each of the three well sites ( Figure 4 ). The combined capacity of the three storage tanks is 54,000 gallons. Pressure tanks are also located at each well site. Total capacity of the pressure tanks is approximately 4,000 gallons.

A summary of tank facilities at each well site is presented below.

- Well Site No. 1: 10,000 gallon storage tank & 1,000 gallon pressure tank
- Well Site No. 2: 34,000 gallon storage tank & 2,000 gallon pressure tank(s)
- Well Site No. 3: 10,000 gallon storage tank & 1,000 gallon pressure tank

### **Summary**

The water system includes three supply wells with a current combined pumping capacity of about 39 to 40 gpm. The water system includes three storage tanks with a combined total volume of about 54,000 gallons and associated pressure tanks with a combined storage volume of about 4,000 gallons.

### **HYDROGEOLOGIC CONDITIONS**

The Tonto Village Water Company is located along the Mogollon Rim in northern Gila County. Precipitation along the rim and specifically in the project area is quite high at about 25 inches per year. The highest precipitation in Arizona typically occurs along portions of the Mogollon Rim. The area in the vicinity of the Tonto Village is drained by Thompson Draw wash which flows to the east - southeast and eventually discharges to Tonto Creek ( Figure 1 ).

Groundwater beneath the Tonto Village Water Company occurs within Paleozoic age sedimentary rock formations. These rock units appear to consist predominately of limestone and may correlate with the Martin Formation or the Redwall Limestone. Geologic references in the area include the following.

- Geologic Map of Gila County; prepared by the Arizona Bureau of Geology ( now identified as the Arizona Geological Survey ), dated 1959.



- Mineral Resources Potential Map, Hells Gate Road less Area; prepared by the U.S. Geological Survey ( Clay Conway ), Map 1644-A, dated 1983.

The thickness of these sedimentary rock units beneath the water company area is not known. At some depth below the sedimentary rock formations , granitic rock ( hydrologic bedrock ) occurs. Approximately one mile south of the water company, Pre-Cambrian age granitic rock outcrops at the surface. Figure 2 illustrates the location of the approximate surface contact between the sedimentary rock formations and the older granitic rock.

The deepest of the three Water company supply wells ( well no. 3 ) was drilled to a depth of 340 feet and did not encounter the granitic bedrock. Well no. 3 was completed in limestone.

A thin veneer of alluvium may also occur along the Thompson Draw drainage. However, the maximum thickness of the alluvium would be expected to be less that 10 to 20 feet and would not be a potential aquifer zone in the water company area.

Several private wells are located within about 1-1/2 to 3 miles southeast of the water company, as shown on Figure 2. These wells are all completed within and derive groundwater from the granitic bedrock that underlies the immediate water company area at some unknown depth. Groundwater occurs within the granitic bedrock within and along fractures. Previous test pumping of these private wells have indicated that the long term sustainable capacity of the wells is highly variable ranging from about 10 to upwards of 80 gpm. These wells were tested pumped for periods of one day to one week. These wells were studied as part of a hydrogeologic investigation ( 2000 thru 2005 ) conducted for the proposed Wood Canyon Ranch project located on 134 acres south of State Highway 260 and along the east side of Thompson Draw wash ( *Consulting Report – Chuck M. Dickens, Consulting Hydrogeologist, September 15, 2005, Hydrogeologic Evaluation & Water Supply Development, Wood Canyon Ranch Project* ). The proposed Wood Canyon Ranch property is located immediately south of the Thompson Draw Unit One development. To date, the Wood Canyon Ranch project has not commenced development. Several test wells were drilled and test pumped as part of the Wood Canyon Ranch project. The locations of these wells are shown on Figure 2 and identified as wells 55-583338; 55-583339; 55-575642; and 55-208117.

Well 55-600882 ( see Figure 2 ) provides potable water to the Thompson Draw Unit one development. This well has provided potable water to 38 cabins within the development since 1955. The well is completed to a depth of 255 feet and produces groundwater from the fractured granite. Test pumping of the well in 2003 ( 3 -day test ) confirmed that the sustainable yield of the well was about 14 gpm ( 20,000 gpd ). Typical average daily water use within the Thompson Draw Unit One development is about 5,000 gallons. Week-end and holiday peak demands in the summer can approach 15,000 gpd, which approaches about 400 gpd per cabin site.



As previously discussed, groundwater beneath the Tonto Village area occurs within predominately limestone formation(s). South and southeast of the Tonto Village area several private wells are completed within and produce groundwater from granitic rock. In both of these different geologic rock types ( limestone & granite ) the occurrence and movement of groundwater is along fractures dissecting the rock. Groundwater occurrence and movement within the limestone rock type may also be along solution features.

The depth to groundwater ( static – non-pumping level ) ranges from about 160 to upwards of 200 feet in the Tonto Village Water Company wells. These water level depths equate to water level elevations of slightly less than about 5,600 feet above mean sea level (msl). The depths to water in the private wells located south of highway 260 and about 1-1/2 to 3 miles southeast of the Tonto Village Water Company range from about 15 to 40 feet. These water level depths equate to groundwater level elevations ranging from about 5,520 to 5,585 feet above msl.

The higher groundwater level elevations at the water company wells indicate that groundwater flow is probably to the south-southeast and towards the lower groundwater level elevations exhibited by the private wells located south of State Highway 260.

## **CURRENT CUSTOMERS & WATER DEMANDS**

### **Number of Customers**

The water company currently serves approximately 190 single family residential customers located in the Tonto Village development. A majority of the residents within the Tonto Village are seasonal occupants. The potential number of future residential customers is expected to increase to an eventual maximum of about 200.

### **Water Demands**

Current water demands within Tonto Village have been based on water use data provided by the water company for the most recent three years of 2005, 2006, and 2007. Demand data provided by the water company is presented both in tabular and bar graph format. Demand data for each of the most recent three years, including monthly and annual totals is presented in Appendix B. The demand data includes metered pumpage volumes for each of the three supply wells.

The total annual water use for the three most recent years has ranged from about 7.27 to 9.64 million gallons ( 22.3 to 29.6 acre feet per year ). The highest monthly water use consistently occurs in June of each year. The lowest use typically occurs in the winter months of November thru February.



### ***Overall Average Demands***

On an overall annual basis the water company provides an average of approximately 20,000 to 26,500 gpd to customers within the Tonto Village development. Assuming 190 customers the average water delivery per customer has recently ( 2005 thru 2007 ) ranged from about 105 to 140 gpd.

The average daily total water delivery during the peak use month of June ( assuming the most recent – highest June use volume ) was computed to approach 41,000 gpd. Assuming 190 customers the average use per customer during the peak use month was computed to approach 216 gpd.

### ***Peak Demands***

A review of the demand data indicate that the highest use month is consistently June. Over the past three years the highest water use for the month of June actually occurred in year 2005 at approximately 1.23 million gallons. Water use in June of 2006 and 2007 was nearly 10 percent less than in June of 2005.

The *peak day* demand is typically assumed to approach about twice ( 2x ) the average day demand. Using the June 2005 thru 2007 water use volumes, the peak day demand would approach 75,000 to 82,000 gpd ( 41,000 x 2 ) for the entire water system or about 393 to 432 gpd per residential unit ( 82,000 / 190 customers ). The peak day demand could occur over a period of several days.

The peak day demand values estimated for the Tonto Village customers compares quite well with the metered peak day demand values for the nearby Thompson Draw Unit One development. Historic data has indicated that the peak day demand for the Thompson Draw Unit One residential units has approached 400 gpd. This compares quite well with the range of peak day values ( 393 to 432 gpd ) estimated for the Tonto Village residents.

## **WATER SYSTEM REQUIREMENTS**

### **Tank Storage**

The primary function of storage facilities is to be capable of meeting short term *peak hour* demand and to provide emergency storage equivalent to at least two days of average water use. Two days of average water use during the peak month ( June ) would range from about 75,000 to 82,000 gallons. As previously discussed, the total volume of storage tanks within the water system is 58,000 gallons, of which 4,000 gallons reflects pressure tanks. As indicated, an additional storage volume of at least 25,000 gallons would be required to attain an available storage volume equivalent to at least two days of average water use during the peak month.



The ADEQ, in a recent meeting concerning a proposed new subdivision project in the Heber area, requested a storage tank volume equivalent to 400 gallons for each residential unit to be served potable water by a public water system. Using a factor of 400 gallons per residential unit, the required storage tank volume for the Tonto Village Water Company should approach 80,000 gallons ( 200 customers x 400 gal ).

### **Wellfield Capacity**

The system wellfield should be capable of meeting the peak day demand during the peak month. As previously discussed, the peak day demand during June of 2005 thru 2007 was computed to range from about 75,000 to 82,000 gpd. A daily volume of 75,000 to 82,000 gallons would require a minimum wellfield pumping rate of 52 to 57 gpm. The wellfield ( all three supply wells ) pumping at a combined rate of 52 to 57 gpm, for a continuous 24 hour period, would produce about 75,000 to 82,000 gallons, respectively. The pump units currently installed in the three water company supply wells exhibit a combined pumping rate of about 39 to 40 gpm or about 56,000 to 57,600 gpd.

The peak day demand could occur over a period of several consecutive days. Even with 58,000 gallons of starting storage and a wellfield producing 56,000 gpd, the current water system would not be capable of meeting peak day demand for more than about two consecutive days, as illustrated below.

- Three consecutive days of water demand @ 82,000 gpd = 246,000 gallons
- Three days of wellfield pumpage @ 56,000 gpd plus 58,000 gal of starting storage = 226,000 gallons

In order to meet the peak day demand in June, the production capacity of the water company's wellfield should be increased from the current capacity of about 39 to 40 gpm to a capacity approaching 60 gpm.

### **Summary**

It is my opinion, based on available data, that the water company water system should have tank storage capacity approaching a minimum of 80,000 to 85,000 gallons. This would require at least an additional 25,000 gallon storage tank. It is also my opinion that the pumping rate of the wellfield will need to be increased from the current 39 to 40 gpm to a rate approaching 60 gpm.

### **EVALUATION OF CURRENT WELL CAPACITIES**

Historic water levels and pumping test data have been utilized to evaluate the pumping capacity of the three water company supply wells. Most of the pumping test data is for test durations of a few hours to one day.



The three supply wells have been providing potable water to the Tonto Village customers for several decades. Most recently ( 2005 thru 2007 ), annual groundwater pumping has ranged from about 22 to 30 acre feet per year. A review of historic groundwater levels indicates very little change. If the wells had historically been pumped at a rate beyond the long term yield potential of the limestone aquifer system, historic water levels would have been expected to exhibit a declining trend. However, no historic decline trend in groundwater levels has occurred. A summary of historic available static water levels measured in each of the three supply wells is presented in Table 2.

Table 3 presents a summary of test pumping results for the three water company supply wells. As indicated in Table 3, each of the supply wells has been test pumped at least twice at rates ranging from about 15 to 25 gpm.

#### **Well No. 1**

Well no. 1 was initially test pumped in 1957 at a rate of 25 gpm for an unknown duration. The reported total drawdown ( water level decline ) during this test was limited to 10 feet. The static pre-pumping water level was reported at a depth of 178 feet and the final pumping level at a depth of 188 feet.

Well no. 1 was again test pumped in 1976 ( nearly 20 years later ) at a rate of 21 gpm for a period of 9.5 hours. Total drawdown during the test was reported at 13 feet. The static water level was 161 feet and the final pumping level was 174 feet.

The depth of well no. 1 is 223 feet and historic water levels have ranged from 161 to 178 feet. Historically the height of water in well no. 1 has ranged from a high of about 62 feet to a low of about 45 feet. Assuming the pump is installed to no deeper than 10 feet from the bottom of the well, the height of water above the pump would be expected to range from about 35 to 50 feet. Currently well no.1 has a pump unit that reportedly produces nine ( 9 ) gpm. Historic pumping test data, at rates of 21 to 25 gpm, would suggest that the total drawdown in well no. 1 at a pumping rate of 9 gpm is probably less than 10 feet. However, given that the well only contains about 35 to 50 feet of water above the pump (during non-pumping periods), it would not be recommended to increase the pumping rate of well no. 1 beyond the 9 gpm ( 13,000 gpd ) capacity of the current pump unit installed in the well.

#### **Well No. 2**

Pumping test data for well no. 2 were reported in 1971 and 1976. In 1971 the well was reportedly test pumped for a period of 24 hours at a rate of 20 gpm. Total drawdown was indicated to be 51 feet. The pre-pumping static water level depth was 196 feet and the final pumping level was 247 feet. In 1976 the well was test pumped at a rate of 21 gpm for a period of 9.5 hours. Total drawdown was reported at only two feet. The static water level depth was reported at 180 feet and the final pumping level at 182 feet.



As indicated, the two sets of pumping test data are not consistent.

The reported depth of well no. 2 is 260 feet. However, this may be the cased depth as the driller's original report on the well indicates that it was drilled to 300 feet ( see driller's report in Appendix A ).

The pump unit currently installed in the well has a pumping capacity of 16.1 gpm, based on information provided by water company staff. A pumping rate of 16.1 gpm equates to a maximum daily pumping volume of about 23,000 gallons.

Based on the significant inconsistency of the previous pumping test data, it is my recommendation that a higher capacity pump unit not be considered for well no. 2 until the well is re-test pumped to confirm drawdown criteria.

### **Well no. 3.**

Well no. 3 was test pumped in 1987 and in 2008. In 1987, following the construction of the well, the well was test pumped at a rate of 24 gpm for an unknown period. Total reported drawdown during the test was 7 feet. The static water level was reported at 183 feet and the final pumping level at 190 feet.

Well no. 3 was again test pumped in July 2, 2008 for a short term period of about two hours by Aero Drilling & Pumps, Inc. ( Aero Drilling ). The well was pumped at a rate of 15 gpm. Upon arrival at the well on July 2, the well was already operating but was immediately shut-off by Aero Drilling. Approximately one hour after the well was shut-down the well test commenced. The static level was reported at 192.5 feet and the final pumping level at 193 feet. These levels would suggest a total drawdown of only 0.5 feet. However, because the well had been pumping shortly before the start of the test, the static level of 192.5 feet probably does not reflect true static water level conditions. In mid-June of 2008 ( about two weeks earlier ) a static level of 181 feet was measured in the well by Aero Drilling. This higher level is probably more reflective of the actual static level. Assuming a static level of 181 feet and a stabilized pumping level of 193 feet the actual drawdown probably approaches 12 feet. The pumping level of 193 feet did not change the entire second hour of the test.

The depth of well no. 3 is 340 feet. A static water level of 181 feet indicates a total water height of about 160 feet. A stabilized pumping level of 193 feet at a pumping rate of 15 gpm indicates that the well could conservatively be pumped at a much higher rate. The pump unit currently installed in well no. 3 is a 1.5 hp single phase unit.

It is recommended that well no. 3 be equipped with either a 3 to 5 hp single phase pump unit that would allow a minimum pumping rate of 35 gpm against a total dynamic head of about 240 feet. A minimum 35 gpm pump unit installed in well no. 3 would increase the water company's wellfield capacity to at least 60 gpm.



It is recommended that Aero Drilling & Pumps be solicited to provide pump unit specification sheets ( pumping curves ) for optional single phase pump / motor units. Again, pump options should be capable of producing 35 gpm against a head of about 240 feet. The selected pump unit should be installed on at least 315 feet of two inch diameter column pipe. This depth setting would place the bottom of the pump unit at about 22 feet above the bottom of the well.

Well no. 3 is the only water company well registered as a non-exempt well. Well no. 1 and no. 2 are registered as exempt wells. The non-exempt status will allow the installation of a pump unit capable of producing 35 gpm or greater. The exempt status limits well no. 1 and no. 2 to pump units capable of producing 35 gpm or less.

### CONCLUSIONS & RECOMMENDATIONS

The current pumping capacity of the three water company supply wells totals about 39 to 40 gpm or about 56,000 to 57,600 gpd. This production capacity is sufficient to meet normal daily water use demands but is not sufficient to meet peak day demands which can occur over several days during the summer months. Peak day water use during summer week-ends and holidays might approach 80,000 gpd. In order to meet peak day summer water demands the water company wellfield should be capable of producing at least 60 gpm. This recommended pumping rate would require an increase of about 20 gpm over an above the current wellfield pumping rate of about 39 to 40 gpm.

In order to increase the wellfield pumping rate, it is recommended ( at this time ) that a 3 to 5 hp pump unit be installed in well no. 3. The pump unit should be capable of producing 35 gpm against a total head of 240 feet. A minimum 35 gpm pump unit installed in well no. 3 would increase the water company wellfield capacity to at least 60 gpm ( 86,400 gpd ).

It is recommended that Aero Drilling & Pump be solicited to provide pump unit specification sheets for optional single phase pump / motor units. Pump options should be capable of producing 35 gpm against a total head of about 240 feet.

In addition to increasing the pumping capacity of well no. 3, it is recommended that an additional 25,000 gallons ( minimum ) of storage ( tank ) be installed preferably at the well no. 3 well site. This would increase the storage capacity of the water system from 58,000 to 83,000 gallons which is essentially equivalent to two days of average water use during the peak month of June. A volume approaching 80,000 gallons would also be equivalent to about 400 gpd per residential unit ( 200 x 400 gpd ).

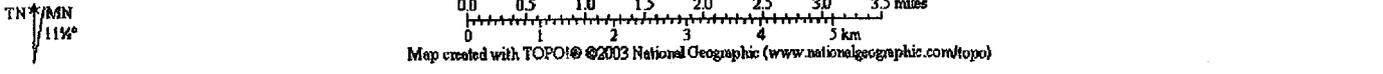
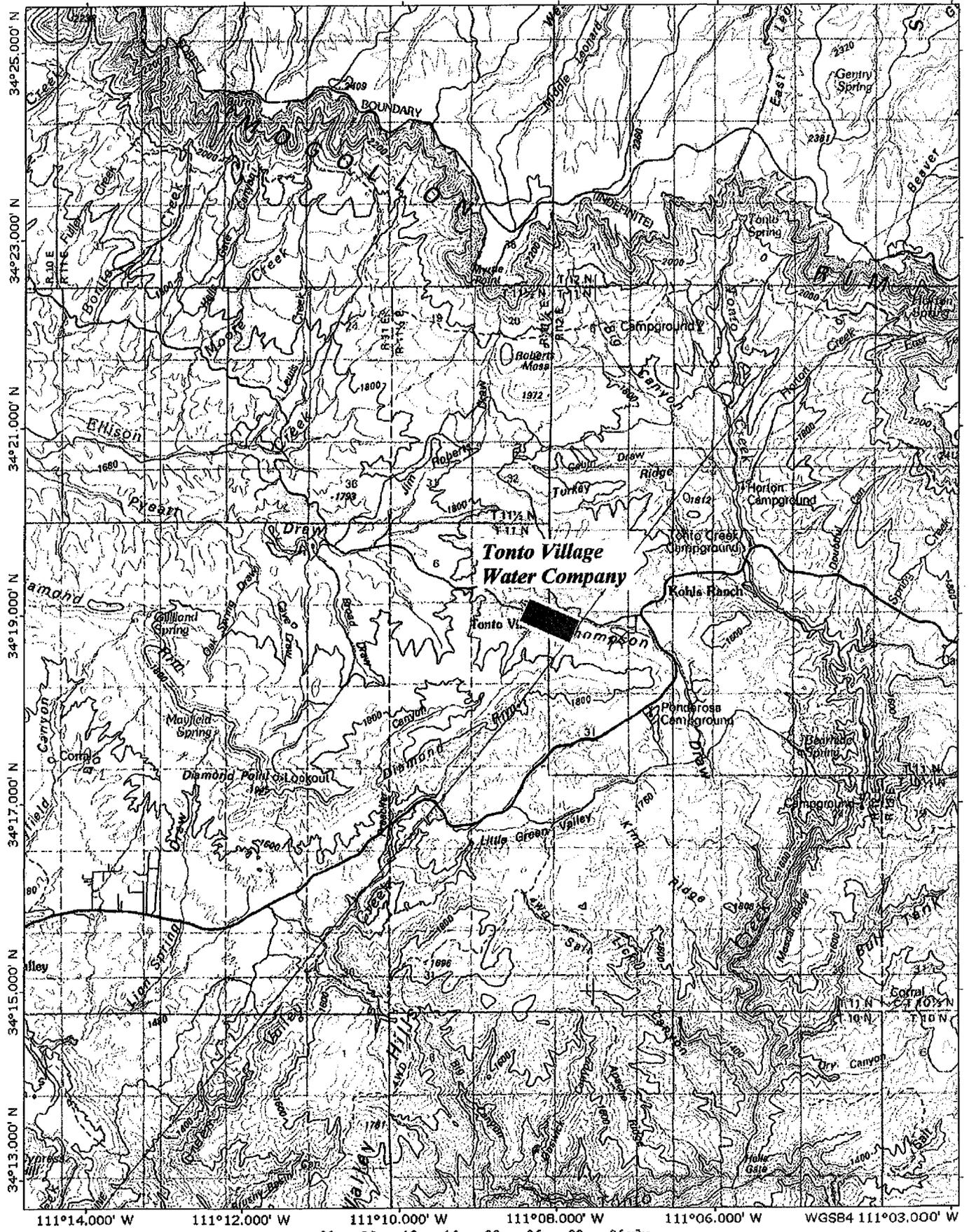
It is also recommended that the water company initiate a program of monitoring water levels in the three supply wells. Water levels should be monitored *at least* twice per year, once in early June and once in late December or early January of each year. Static non-pumping water levels should be measured in each well after the well has been shut-down for a period of at least 12 hours. Pumping levels should also be measured in each supply



well, preferably after the well has been pumped for at least a period of four hours. The water level measurements should be routinely recorded along with the date and time of measurements. It should also be noted how long the well has been shut-off or operated ( in hours ) prior to conducting the measurements.

Routine seasonal monitoring of water levels will provide data required to further evaluate the response of the aquifer system to the required pumping of the water company supply wells and to local recharge.

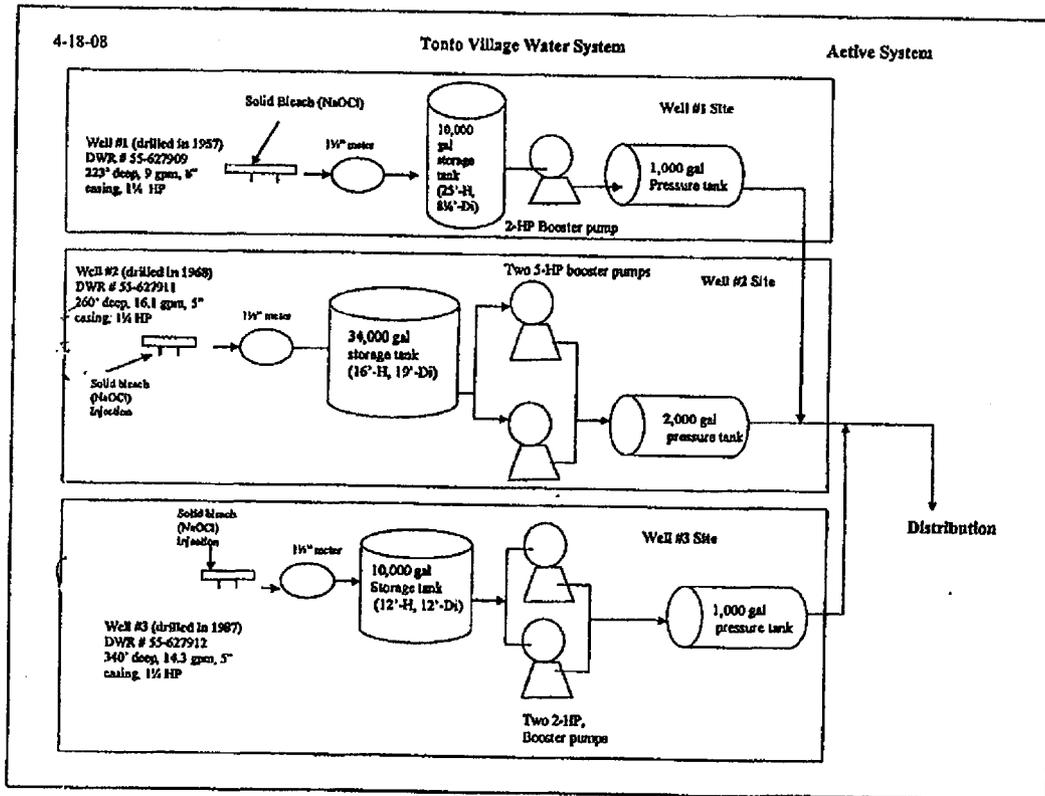




**FIGURE 1. REGIONAL LOCATION MAP**







**FIGURE 4.**

**TONTO VILLAGE WATER COMPANY  
WATER SYSTEM SCHEMATIC**

*Note: Schematic dated April 2008. Provided by Water Co. staff - June 2008.*

**TABLE 1**

**TONTO VILLAGE WATER COMPANY**

**SUPPLY WELL INFORMATION**

<b>Well Identification</b>	<b>Well No. 1</b>	<b>Well No. 2</b>	<b>Well No. 3</b>
<b>Registration Number ( ADWR Issued )</b>	55-627909	55-627911	55-516995
<b>Year Drilled</b>	1957	1971	1987
<b>Total Well Depth - feet</b>	223	260	340
<b>Surface Casing ( Diameter )</b>	12	NR	6
<b>Production Casing Diameter - inches</b>	8	5	5
<b>Production Casing Depth- feet</b>	223		340
<b>Current Pump Unit Capacity - gpm</b>	9	18.1	14.3
<b>Static Water Level - ft ( when constructed )</b>	178	196	175

Note: Well information obtained from ADWR 55 well registry data base & from water company staff.

**STORAGE TANK INFORMATION**

- Well Site No. 1:** 10,000 gal storage tank & 1,000 gal pressure tank
- Well Site No. 2:** 34,000 gal storage tank & 2,000 gal pressure tank
- Well Site No. 3:** 10,000 gal storage tank & 1,000 gal pressure tank



**TABLE 2**

**TONTO VILLAGE WATER COMPANY  
HISTORIC GROUNDWATER LEVELS**

Well Identification	Date of Measurement	Depth to Water - feet
<i>Well no. 1</i>	July 1957	178
	May 1976	161 to 164
	June 2008	164
<i>Well no. 2</i>	April 1971	196
	May 1976	180
	June 2008	191
<i>Well no. 3</i>	April 1987	175
	Aug. 1988	183
	June 2008	181

**Note:** All water levels refer to non-pumping static levels.

Water level data obtained from ADWR 55 well registry database and from data provided by water company staff.



**TABLE 3**

**TONTO VILLAGE WATER COMPANY**

**SUMMARY OF WELL PUMPING TESTS**

Well Number	Test Date	Duration of Pumping (hours)	Pumping Rate (gpm)	Static Level (feet)	Pumping Level (feet)	Total Drawdown (feet)
<b>No. 1</b>	1957	unknown	25	178	188	10
	1976	9.5	21	161	174	13
<b>No. 2</b>	1971	24	20	196	247	51
	1976	9.5	21	180	182	2
<b>No. 3</b>	1988	unknown	24	183	190	7
	2008	2	15	192.5 181	193 193	0.5 12

**Note:** Historic well pumping test data for well no. 1 and no. 2 provided by water company staff. Data for well no. 3 for year 1988 was obtained from drillers completion report obtained from ADWR 55 well registry data base. Well No. 3 test data for 2008 provided by Aero Drilling.

The static water level prior to the start of the 2008 pumping test was measured by Aero Drilling staff to be 192.5 feet. However, this may not reflect actual static level as the pump unit had been operated shortly before the start of the pumping test. In mid-June a couple of weeks before the July 2008 pumping test the static level was measured at 181 feet.



**APPENDIX A**

**TONTO VILLAGE WATER COMPANY**

***WELL COMPLETION REPORTS & DRILLERS LOGS***

***SUPPLY WELL NOS. 1, 2, & 3***

No. 1

DEPARTMENT OF WATER RESOURCES  
99 EAST VIRGINIA AVENUE  
PHOENIX, ARIZONA 85004

**REGISTRATION OF EXISTING WELLS**

READ INSTRUCTIONS ON BACK OF THIS FORM BEFORE COMPLETING  
PRINT OR TYPE - FILE IN DUPLICATE

REGISTRATION FEE (CHECK ONE)	
EXEMPT WELL (NO CHARGE)	<input checked="" type="checkbox"/> 82
NON-EXEMPT WELL - \$10.00	<input type="checkbox"/>

ARIZONA  
DEPT OF

JUN -9 P1:41

WATER  
RESOURCES

07

FOR OFFICE USE ONLY

REGISTRATION NO. BE- 627909

FILE NO. AC(11-11 1/2) 8 area

FILED 6-9-82 AT 1:41 P

(DATE) (TIME)

INA \_\_\_\_\_

AMA \_\_\_\_\_

1. Name of Registrant: Douglas H. Standage and Standage Ventures, Inc., a corporation, doing business as Tonto Village Water Company, a partnership, a public utility  
811 South Miller, Mesa, Arizona 85204  
(Address) (City) (State) (Zip)

2. File and/or Control Number under previous groundwater law:  
None \_\_\_\_\_ 35- \_\_\_\_\_ None \_\_\_\_\_  
(File Number) (Control Number)

3. a. The well is located within the NE 1/4 NE 1/4 NE 1/4, Section 8,  
of Township 11 North N/S, Range 11 1/2 East E/W, G & SRB & M, in the  
County of Gila. These are estimates only based on the homestead entry survey map received by the homesteader.  
b. If in a subdivision: Name of subdivision Tonto Village  
Tract A  
Lot No. \_\_\_\_\_, Address \_\_\_\_\_

4. The principal use(s) of water (Examples: irrigation - stockwater - domestic - municipal - industrial)  
domestic

5. If for irrigation use, number of acres irrigated from well less than one acre.

6. Owner of land on which well is located. If same as Item 1, check this box   
\_\_\_\_\_  
(Address) (City) (State) (Zip)

7. Well data (If data not available, write N/A)

a. Depth of Well 223 feet

b. Diameter of casing 8 inches

c. Depth of casing 223 feet

d. Type of casing Steel

e. Maximum pump capacity 25 gallons per minute.

f. Depth to water 178 feet below land surface.

g. Date well completed App. July 15, 1957-- first used June 30, 1959  
(Month) (Day) (Year)

8. The place(s) of use of water. If same as Item 3, check this box  & Tonto Village 2 &  
1/4 1/4 1/4, Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_  
1/4 1/4 1/4, Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_

Attach additional sheet if necessary.

Tonto Village Water Company

9. DATE June 8, 1982 SIGNATURE OF REGISTRANT By Douglas H. Standage  
Partner

No. 1

**Thomas C. Wheat** WELL DRILLING  
ROTARY AND CABLE TOOLS  
LICENSE NO. 15357  
PHOENIX, ARIZONA

44 NORTH 34TH AVENUE

YELLOWSTONE 7-6425

Mr. H. S. Standage  
Tempe, Arizona

200' of 8" hole @ \$6.00 per. ft. ----	\$1,200.00
23' of 8" hole @ \$5.50 per. ft.-----	\$ 126.50
5ft. of 12" casing in No. 1 well	
@ \$4.00 per ft. -----	\$ 20.00
Perforating 40 ft. of casing @ 50¢ per ft.	20.00
 Total Due -----	<hr/> \$1,366.50

- 0' to 170' - Congl. & large boulders
- 170' to 200' " & small boulders
- 200' to 220' " sand & gravel
- 220' to 223' hard conglomerate

Total depth of well 223' from surface  
 Total length of casing 223'6"  
 Water level 178 ft. from surface.  
 Well tested 25 g.p.m. at 138' from surface..

*Paid 6 - 28th. 1957*

*T. Wheat*

DEPARTMENT OF WATER RESOURCES  
 99 EAST VIRGINIA AVENUE  
 PHOENIX, ARIZONA 85004

No. 2

**REGISTRATION OF EXISTING WELLS**

READ INSTRUCTIONS ON BACK OF THIS FORM BEFORE COMPLETING  
 PRINT OR TYPE - FILE IN DUPLICATE

07

**REGISTRATION FEE (CHECK ONE)**

EXEMPT WELL (NO CHARGE)

NON-EXEMPT WELL - \$10.00

ARIZONA DEPT OF WATER RESOURCES

FOR OFFICE USE ONLY

REGISTRATION NO. 627911

FILE NO. A(11-12)30

FILED P1:426-9-82 AT 1:42p

(DATE) (TIME)

1. Name of Registrant: Douglas H. Standage and Standage Ventures, Inc., a corporation, doing business as Tonto Village Water Company, a partnership, a public utility

811 South Miller, Mesa, Arizona 85204

(Address) (City) (State) (Zip)

2. File and/or Control Number under previous groundwater law:

A(11-11)5 cbb D 35-26445

(File Number) (Control Number)

3. a. The well is located within the NE  $\frac{1}{4}$  NW  $\frac{1}{4}$  NW  $\frac{1}{4}$ , Section 30, of Township 11 North N/S, Range 12 East E/W, G & SRB & M, in the County of Gila. These are estimates only based on the homestead entry survey map received by the homesteader.

b. If in a subdivision: Name of subdivision Tonto Village, Lot No. 39, Address \_\_\_\_\_

4. The principal use(s) of water (Examples: irrigation - stockwater - domestic - municipal - industrial) Domestic

5. If for irrigation use, number of acres irrigated from well None

6. Owner of land on which well is located. If same as Item 1, check this box

\_\_\_\_\_

(Address) (City) (State) (Zip)

7. Well data (If data not available, write N/A)

a. Depth of Well 260 feet

b. Diameter of casing 5 inches

c. Depth of casing 52 feet

d. Type of casing Steel

e. Maximum pump capacity No pump is installed/ presently gallons per minute.

f. Depth to water 190 feet below land surface.

g. Date well completed Jan 14, 1974

(Month) (Day) (Year)

8. The place(s) of use of water. If same as Item 3, check this box . not used presently

$\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$ , Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_

$\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$ , Section \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_

use is intended on subdivisions of Tonto Village, Tonto Village 2 & Tonto Village 3.

Attach additional sheet if necessary.

9. DATE June 8, 1982 SIGNATURE OF REGISTRANT By Douglas H. Standage  
 Partner

C. V. ODOM  
P. O. BOX 353  
PAYSON, ARIZONA 85547

No. 2

D. H. Standage

Log on well # 2

Well completed April 1, 1971

40 Ft. of 5 5/8 " blank casing installed, cemented top 20 ft.

0-8 Ft. alluvial

8-196 Ft. Redwall lime

196-300 Ft. Martin lime

268 Ft. well produced first water.

Pump out :

2 H.P. pump set at 265 ft. (submersible)

Static level at 196 ft.

After 2 hrs. of pumping, pull down to 247 ft. 20 gpm

After 24 hrs. pumping, water level remained at 247 ft. 20 gpm

After pump turn off, water recharged to 196 ft.

*C. V. Odom*

STATE OF ARIZONA  
DEPARTMENT OF WATER RESOURCES  
99 EAST VIRGINIA AVENUE  
PHOENIX, ARIZONA 85004

Uo. 3

WELL DRILLER REPORT

This report should be prepared by the driller in all detail and filed with the Department within 30 days following completion of the well.

1. Owner D.H. Standage & Standage  
Name  
811 S. Miller Mesa, Az. 85204  
Mailing Address
2. Driller Aero Drilling & Pumps, Inc.  
Name  
P.O. Box 499 Payson, Az. 85547  
Mailing Address
3. Location of well: T 11N R 11E Sec 5 SW SW SE
4. Permit No. \_\_\_\_\_  
(if issued)



DESCRIPTION OF WELL

5. Total depth of hole 340 ft.
6. Type of casing Steel & PVC
7. Diameter and length of casing Stl. 6 in. from 0' to 20', PVC 5 in from 0' to 340'.
8. Method of sealing at reduction points Adapter
9. Perforated from 160' to 180', from 220' to 240', from 300' to 340'.
10. Size of cuts 1/4" holes Number of cuts per foot 20
11. If screen was installed: Length N/A ft. Diam \_\_\_\_\_ in. Type \_\_\_\_\_
12. Method of construction Drilled  
drilled, dug, driven, bored, jetted, etc.
13. Date started 4/1/87  
Month Day Year
14. Date completed 4/2/87  
Month Day Year
15. Depth to water 175 ft. (If flowing well, so state.)
16. Describe point from which depth measurements were made, and give sea-level elevation if available \_\_\_\_\_ surface
17. If flowing well, state method of flow regulation: N/A
18. Remarks: Grouted steel casing.

DO NOT WRITE IN THIS SPACE  
OFFICE RECORD  
REG. # 55-516995  
File # A(11-11 1/2)5 dcc  
Entered **ENTERED APR 22 1987**

MICROFILMED





DEPARTMENT OF WATER RESOURCES  
99 East Virginia  
Phoenix, Arizona 85004  
Registration

55-516995

A(11-11½)5 dcc

No. 3

File No. \_\_\_\_\_

COMPLETION REPORT

1. Per A.R.S. §45-600, the Completion Report to be filed with the Department within 30 days after installation of pump equipment by the registered well owner.
2. Drawdown of the water level for a non-flowing well should be measured in feet after not less than 4 hours of continuous operation and while still in operation and for a flowing well the shut-in pressure should be measured in feet above the land or in pounds per square inch at the land surface.
3. The static groundwater level should be measured in feet from the land surface immediately prior to the well capacity test.
4. The tested pumping capacity of the well in gallons per minute for a non-flowing well should be determined by measuring the discharge of the pump after continuous operation for at least 4 hours and for a flowing well by measuring the natural flow at the land surface.

LOCATION OF THE WELL:

11N	11½E	5	SW	SW	SE
Township	Range	Section	¼	¼	¼

EQUIPMENT INSTALLED:

Kind of pump Submersible  
Turbine, centrifugal, etc.

Kind of power Electric H.P. Rating of Motor 2  
Electric, natural gas, gasoline, etc.

Pumping Capacity 24 Date installed 8/24/88  
Gallons per minute

WELL TEST:

Test pumping capacity 24 Date Well Tested 8/24/88  
Gallons per minute

Method of Discharge Measurement Bucket & stopwatch  
Weir, orifice, current meter, etc.

Static Groundwater Level 183 ft. Drawdown 7 ft.

Total Pumping Lift 190 ft. Drawdown N/A lbs  
(Flowing Well)

I HEREBY CERTIFY that the above statements are true to the best of my knowledge and belief.

DATE 9/6, 19 88

Langley H. Sturgeon  
Signature  
811 South Miller  
Address  
Phoenix, Ariz. State 85204 Zip

**APPENDIX B**

**TONTO VILLAGE WATER COMPANY**

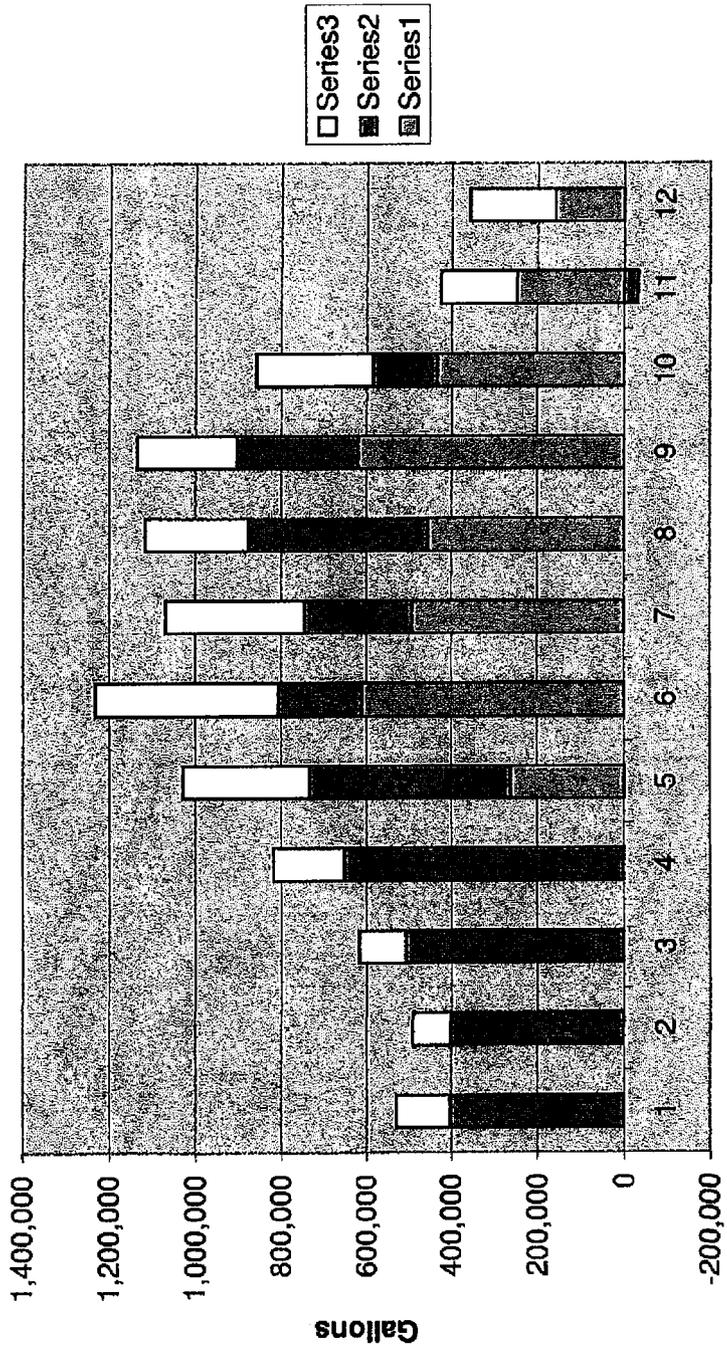
***WATER DEMAND DATA – YEARS 2005, 2006, & 2007***

## Tonto Village Water Company Water Pumped by Month

	2005				2006				2007			
	Well #1	Well #2	Well #3	Total	Well #1	Well #2	Well #3	Total	Well #1	Well #2	Well #3	Total
Jan	0	401,850	125,590	527,440	193,590	42,260	181,430	417,280	219,800	32,710	306,010	558,520
Feb	0	400,670	87,890	488,560	198,180	79,530	245,430	523,140	0	212,920	60,210	273,130
Mar	0	504,900	112,600	617,500	85,960	145,440	217,190	448,590	0	317,260	243,040	560,300
Apr	0	651,770	165,730	817,500	318,730	97,160	162,870	578,760	0	212,460	308,520	520,980
May	261,680	472,240	295,550	1,029,470	319,660	286,820	271,230	877,710	0	333,130	448,430	781,560
Jun	609,100	197,340	425,660	1,232,100	207,720	553,300	359,390	1,120,410	0	595,940	531,350	1,127,290
Jul	490,080	254,792	324,648	1,069,520	55,570	276,780	374,600	706,950	3,600	417,580	491,610	912,790
Aug	453,920	423,008	240,502	1,117,430	12,700	329,710	249,730	592,140	213,600	141,630	541,480	896,710
Sep	619,000	284,600	231,810	1,135,410	62,660	252,380	282,820	597,860	227,000	28,350	345,750	601,100
Oct	432,100	151,430	275,810	859,340	180,990	13,550	278,520	473,060	156,500	130,740	225,070	512,310
Nov	247,300	-33,550	176,810	390,560	175,040	10	286,100	461,150	221,900	13,870	276,150	511,920
Dec	159,200	-10	198,060	357,250	196,560	20,530	260,660	477,750	262,200	41,330	321,470	625,000
Total	3,272,380	3,709,040	2,660,660	9,642,080	2,007,360	2,097,470	3,169,970	7,274,800	1,304,600	2,477,920	4,099,090	7,881,610
Annual Totals:												

In all graphs, Series 1 is well #1, Series 2 is well #2, and Series 3 is well #3.

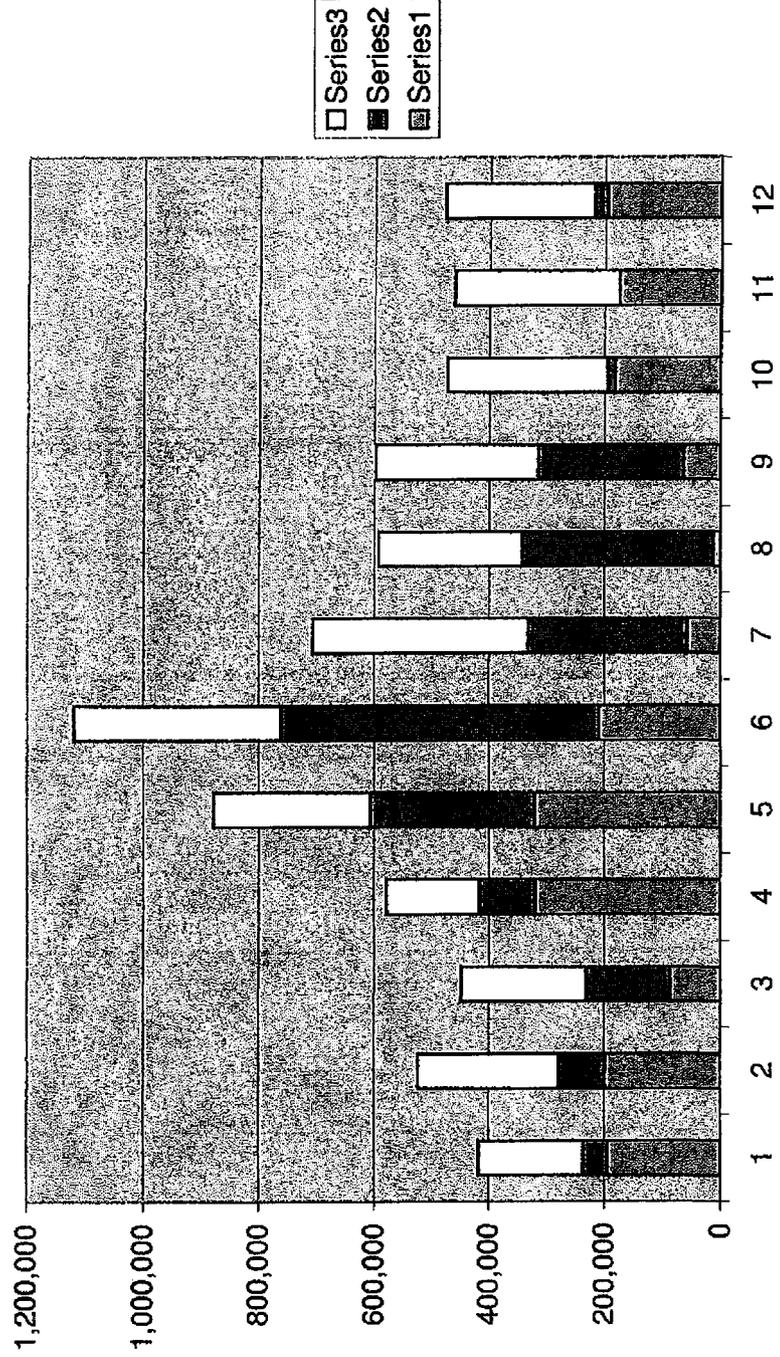
2005



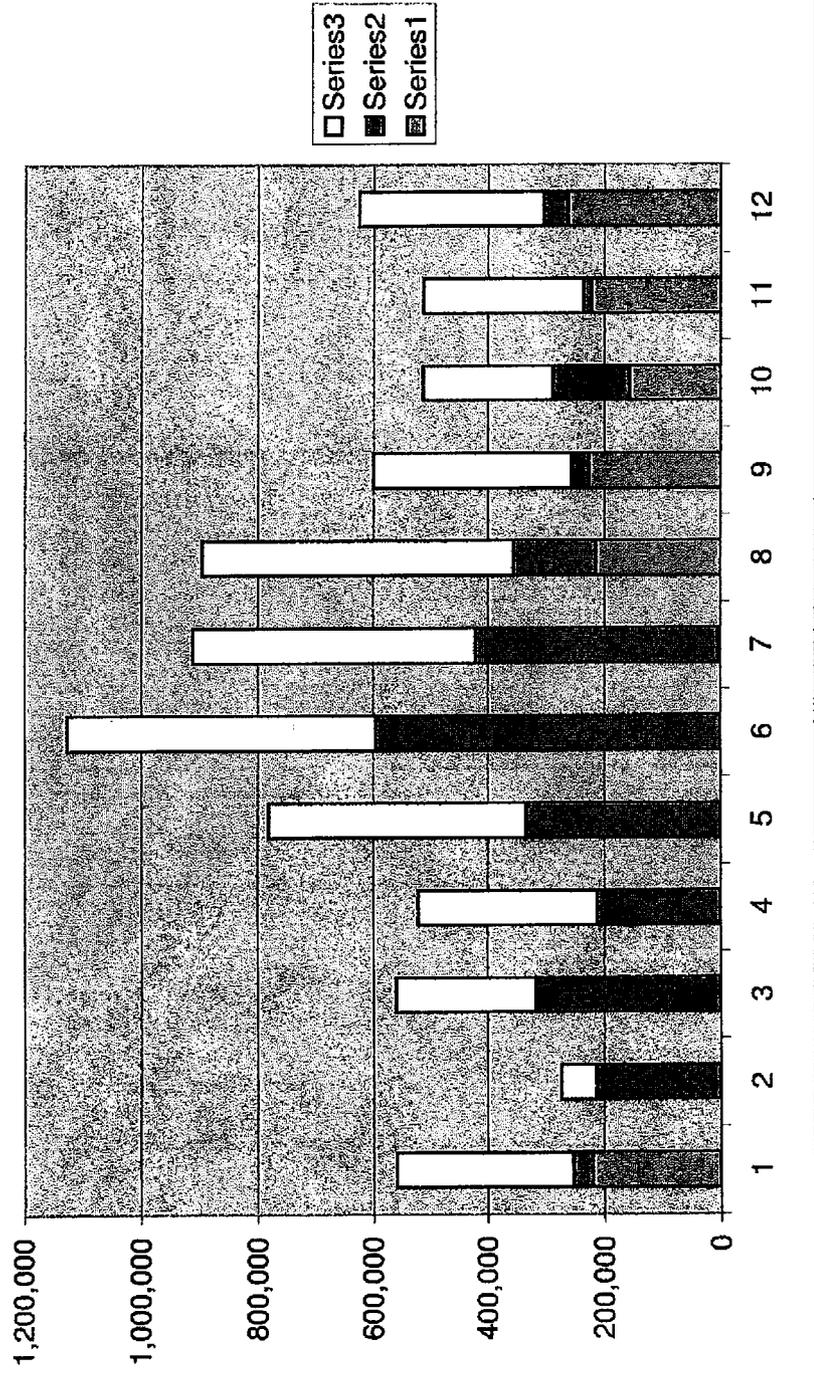
Month

Series3  
Series2  
Series1

2006



2007



**APPENDIX C**

**TONTO VILLAGE WATER COMPANY**

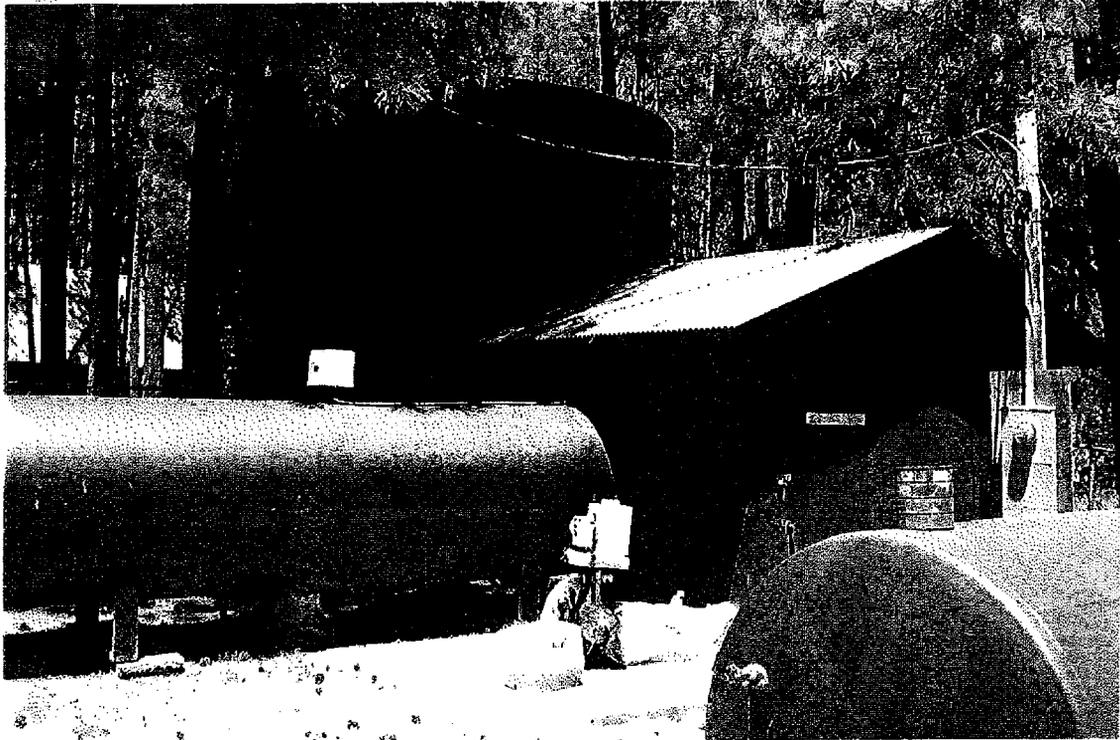
***PHOTOS OF WELL SITES – NOS. 1, 2, & 3***



## **TONTO VILLAGE WATER COMPANY**

### **WELL SITE No. 1**

- Well in center of photo
- Pressure Tank to left of well ( 1,000 gal )
- *Not shown* – Storage tank ( 10,000 gal capacity )



## **TONTO VILLAGE WATER COMPANY**

### **WELL SITE No. 2**

- Well in center of photo
- Pressure Tank adjacent to well ( 2,000 gal capacity )
- Storage Tank inbackground ( 34,000 gal capacity )



## **TONTO VILLAGE WATER COMPANY**

### **WELL SITE No. 3**

- Well to the left
- Pressure Tank – middle
- Storage Tank to the right ( 10,000 gal capacity )