Transcript Exhibit(s)

Docket #(s): W-03718A-07-0687

Exhibit # : S1, A1-A22

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Arizona Corporation Commission
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AUG 25 2008
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ORIGINAL

MEMORANDUM

30

TO: Docket Control

FROM: Ernest G. Johnson
Director
Utilities Division

DATE: July 17, 2008

RE: SAHUARITA WATER COMPANY - APPLICATION FOR AN EXTENSION OF ITS CERTIFICATE OF CONVENIENCE AND NECESSITY TO PROVIDE WATER SERVICE IN UNINCORPORATED AREAS PIMA COUNTY, ARIZONA (DOCKET NO. W-03718A-07-0687)

Attached is the Staff Report for the above referenced application. Staff is recommending approval of the application with conditions.

EGJ:VW:red

Originator: Vicki Wallace

Arizona Corporation Commission
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JUL 17 2008
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EXHIBIT
S-1

Service List for: Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687

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STAFF REPORT
UTILITIES DIVISION
ARIZONA CORPORATION COMMISSION

SAUARITA WATER COMPANY, L.L.C.

DOCKET NO. W-03718A-07-0687

APPLICATION FOR AN EXTENSION OF ITS
CERTIFICATE OF CONVENIENCE & NECESSITY
TO PROVIDE WATER SERVICE TO
UNINCORPORATED AREAS IN PIMA COUNTY, ARIZONA

JULY 17, 2008

STAFF ACKOWLEDGEMENT

The Staff Report for Sahuarita Water Company, L.L.C. (Docket No. W-03718A-07-0687) was the responsibility of the Staff members listed below. Vicki Wallace was responsible for the review and analyses of the Company's application. Dorothy Hains was responsible for the engineering and technical analysis.

Vicki Wallace
Executive Consultant II

Dorothy Hains
Utilities Engineer

EXECUTIVE SUMMARY
SAHUARITA WATER COMPANY, L.L.C.
DOCKET NO. W-03718A-07-0687

On December 14, 2007, Sahuarita Water Company, L.L.C. ("SWC" or "Company"), a certificated Arizona public service corporation, filed an application with the Arizona Corporation Commission ("ACC" or "Commission") requesting approval for an extension of its existing Certificate of Convenience and Necessity ("CC&N") to provide water service to additional areas within Pima County, Arizona. On May 2, 2008, SWC filed an amended application requesting an Opinion and Order: (1) transferring the CC&N currently held in the name of Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C.; and (2) granting SWC an extension to the existing CC&N thereby authorizing SWC to provide water service to include additional areas within Pima County, Arizona.

SWC is an Arizona limited liability corporation, authorized by the ACC to provide water service within portions of Pima County, Arizona. By this application, SWC is seeking to extend its current approximate five (5) square mile CC&N to include an additional 5,322 acres (approximately seven (7) square miles in size) located southwest of the Company's existing CC&N.

Staff concludes that the existing SWC system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N, and the described plant will provide the Company with sufficient capacity to serve the requested extension area. Staff further concludes that it is reasonable to assume that SWC will develop additional capacity as needed to meet future growth in the requested extension area.

Staff concludes that the Company's estimates of the initial five year period expenditures of $16,533,375 are reasonable and appropriate for this project. However, approval of this CC&N application does not imply any particular future treatment for rate base. No "used and useful" determination of the proposed plant in service was made, and no conclusions should be inferred for future rate making or rate base purposes.

Staff recommends that the Commission approve the SWC's request to transfer its CC&N from Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C., and for an extension of its Certificate of Convenience and Necessity in portions of Pima County to provide water service, subject to compliance with the following conditions:

1. To require the SWC to charge its existing rates and charges in the proposed extension area.

2. To require SWC to docket as a compliance item in this case within two years of the effective date of an order in this proceeding copies of the Approval to Construct for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

3. That the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's Designation of Assured Water Supply has been modified to include this new extension area.

4. To require that off-site infrastructure for new connections be funded through hook-up fees and not off-site facilities agreements.

Staff further recommends that the Commission's decision granting this extension of its Certificate of Convenience and Necessity to the SWC be considered null and void after due process without further order from the Commission should SWC fail to meet conditions 2 and 3 within the time specified.

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INTRODUCTION

On December 14, 2007, Sahuarita Water Company, L.L.C. ("SWC" or "Company"), a certificated Arizona public service corporation, filed an application with the Arizona Corporation Commission ("ACC" or "Commission") requesting approval for an extension of its existing Certificate of Convenience and Necessity ("CC&N") to provide water service to additional areas within Pima County, Arizona. On May 2, 2008, SWC filed an amended application requesting an Opinion and Order: (1) transferring the CC&N currently held in the name of Rancho Sahuarita Water Company, L.L.C. ("RSWC") to Sahuarita Water Company, L.L.C.; and (2) granting SWC an extension to the existing CC&N thereby authorizing SWC to provide water service to include additional areas within Pima County, Arizona. The amended application also deleted the request to extend its CC&N to include 112 acres to serve the Sahuarita Unified School District ("SUSD") as SWC had learned since filing the original application that SUSD facilities were located within the boundaries of SWC's existing CC&N.

On January 14, 2008, the ACC Utilities Division ("Staff") filed an Insufficiency Letter indicating that the Company's application did not meet the sufficiency requirements of the Arizona Administrative Code ("A.A.C.") R14-2-402. Staff sent additional data requests to the Company on January 31, 2008. On March 13, 2008, the Company filed its response to the first sufficiency letter. On April 9, 2008, Staff filed a Second Insufficiency Letter listing additional deficiencies to be cured for administrative purposes. On April 25, 2008, the Company filed its response providing additional information to address the deficiencies. On May 27, 2008, Staff filed a Sufficiency Letter indicating that the application had met the sufficiency requirements of the A.A.C.

On May 30, 2008, a Procedural Order was issued setting the matter for hearing on August 7, 2008.

BACKGROUND

SWC is an Arizona limited liability company and is in good standing with the Commission's Corporations Division. On December 20, 1995, in Decision No. 59431, the Commission granted Interchange Water Company ("IWC"), an Arizona corporation, a CC&N to provide water service within portions of Pima County. The water service area therein certificated included the then contemplated master-planned community of Rancho Sahuarita, which has since become a reality. On November 2, 1999, in Decision No. 62032, the Commission authorized RSWC, an Arizona limited liability Company, to acquire the water system assets and then existing CC&N of IWC.

On October 15, and October 18, 2007, respectively, RSWC filed Articles of Amendment with the Commission's Corporations Division for Rancho Sahuarita Water Company, L.L.C. in which RSWC indicated that Mission Peaks 4000, LLC ("Mission Peaks 4000"), a Nevada limited liability company, had acquired a 20 percent or greater membership interest in RSWC and that its name was being changed to Sahuarita Water Company, L.L.C. SWC currently serves

approximately a five square mile area with approximately 4,250 customers located in the Rancho Sahuarita and Rancho Resort residential communities.

By this application and amended application, SWC is seeking to extend its current CC&N to include an additional 5,322 acres (approximately seven square miles in size) to provide water service to approximately 20,300 additional customers. The requested extension area is located southwest of the Company's existing CC&N near the Town of Sahuarita in southwest Pima County and is non-contiguous to the existing service area. The Company estimates that 2,204 new customers will be served in the requested area by the end of the fifth year. Exhibit 1 is the legal description and map of the proposed extension area.

THE NAME/OWNERSHIP CHANGE

The change in name from RSWC to SWC was occasioned by requests for water service which RSWC had received from several owners of real property near to the exterior boundaries of its existing CC&N. Each of the three entities requesting service are located outside of the boundaries of the Rancho Sahuarita master-planned community but within the general vicinity of the Town of Sahuarita, and the owners of Sahuarita Water thus concluded the name change would be appropriate to reflect a more regional presence.

RSWC was initially owned by Sharpe & Associates, Inc. and Interchange Opportunity Fund, L.L.L.P. As indicated above, Mission Peaks 4000, L.L.C. acquired a share of the Company in 2007. With the filing of the Amended Articles of Organization and the name change, SWC's current ownership percentages are as follows: Sharpe & Associates, Inc., 2/3 percent (.667); Mission Peaks 4000, L.L.C., 33 1/3 percent (33.333), and Interchange Opportunity Fund, L.L.L.P., 66 percent (66.00). Both limited liability companies are in good standing with the ACC Corporations Division. Interchange Opportunity Fund, a limited liability limited partnership, is filed and up-to-date with the Arizona Secretary of State's Office; and the agent/owners listed are David S. Cutler, CPA, and Sharpe & Associates, Inc.

In response to Staff's inquiry regarding any organizational and managerial structure changes resulted from the name change and/or ownership change, SWC advised that the organizational structure of SWC changed only in the sense that Mission Peaks 4000, L.L.C. acquired a minority membership interest. SWC further advised that the managerial structure did not change and that Sharpe and Associates, Inc. continued to be the Manager of SWC. Staff also inquired if Mission Peaks, L.L.C. had any previous experience operating a water or wastewater company and was advised that it did not and that in its status as a minority member, Mission Peaks, L.L.C. would not be directly involved in the day-to-day operations of SWC.

Mission Peaks 4000, L.L.C., a Nevada limited liability company, is in good standing with the ACC Corporations Division and is owned by American Nevada Company, L.L.C., Rancho Maria Colorado, L.L.C., ANC Arizona I, L.L.C., and Tucson 4000, L.L.C. American Nevada Company, L.L.C. is the managing partner for Mission Peaks, L.L.C. and was formed in 1974 as the real estate development arm of the Greenspun group of companies. America Nevada's

community developments are touted to be the most recognized in the Las Vegas valley setting high standards for land use, architectural design and engineering. American Nevada Company, L.L.C. is also in good standing with the ACC Corporations Division.

REQUESTS FOR SERVICE

SWC has received requests for services from Mission Peaks 4000, L.L.C. (part owner of SWC), Sahuarita Mission Partners, an Arizona general partnership, and the Arizona State Land Department.

The Mission Peaks 4000 development covers 4,228 acres that it owns and anticipates serving 15,000 residences. SWC indicates that this development, which will be referred to as Mission Peaks Master-Planned Community ("Mission Peaks"), will consist of: (1) 11,123 single-family units; (2) 2,371 active-adult units; (3) 1,506 multi-family units; and (4) an additional 1.1 million square feet of non-residential use, which will include commercial developments, recreation centers, places of worship, and a police and fire station. In addition, current plans contemplate one (1) high school, one (1) middle school, and two (2) elementary schools.

The Sahuarita Mission development covers 471 acres that it owns and anticipates serving 3,000 single-family residences. The Arizona Land Department currently contemplates a buildout density of 2,300 single-family units for the 634 acres that it owns.

SWC anticipates that development in the proposed CC&N extension area will occur in multiple phases over a thirty (30) year period of time. The applicant indicates that the overall development pattern projected for the entire proposed CC&N extension area will be conducted in three phases starting with the Mission Peaks 4000 development. This development will also be divided into three phases, the first of which is not anticipated to be completed until 2014.

During Staff's review, it was noted that none of the requested extension areas were contiguous to SWC's current CC&N, but that some of the extension area was contiguous to Las Quintas Serenas Water Company ("Las Quintas"). Staff asked SWC if any of the entities requesting service had contacted Las Quintas about providing water. The Company advised that the only entity requesting service from SWC whose property boundary was adjacent to Las Quintas was Mission Peaks. It was the Company's understanding that Mission Peaks spoke with the majority owner of Las Quintas approximately two years ago regarding the possibility of receiving water service, but that such contact did not result in any subsequent substantive discussions. Although it's not a current requirement of water companies, Staff asked if SWC had notified Las Quintas that SWC was requesting to serve the area. SWC responded that it did not notify Las Quintas itself. However, the prospect of SWC being the water provider to Mission Peaks and the other properties has been a matter of common knowledge in the Sahuarita/Green Valley area for more than a year, and it has been the subject of a number of newspaper articles discussing the proposed Mission Peaks development. Through its own research, Staff did find multiple articles about the Mission Peaks development and the provision

of water by SWC. Additionally, no other utility companies or individuals have filed to intervene in this docket.

FINANCE OF FACILITIES

The Company indicates that SWC will initially finance the required transmission and distribution facilities using a combination of funds in the form of main line extension agreements ("MXAs") and off-site facilities agreements (Advances in Aid of Construction ("AIAC") and Contributions in Aid of Construction ("CIAC")) with master developer(s) and/or subdivision developer(s) approved by the Commission's Utility Division and common equity. The Company indicates the reason that it will initially utilize MXA's and off-site facilities agreements for funding was due to the size of the project and the fact that no infrastructure currently exists within the CC&N extension area. The Company further indicates that once customers begin taking service, the Company will utilize hook-up fees as the main source of funding. The Company feels it is conceivable that at some point in the buildout of the existing CC&N and CC&N extension areas, SWC might conclude that it also would be appropriate to finance a portion of the water system capacity with long-term debt. At that point, SWC would seek and obtain Commission authorization before incurring any long-term debt. The Company further advised that depending on its financial situation at the time, SWC might consider common equity as a means of financing a portion of the overall transmission system.

In Decision No. 62032 (November 2, 1999), the Commission authorized the Company an Off-site Facilities Hook-up Fee Tariff. The tariff requires SWC to obtain a hook-up fee CIAC determined by meter size and number of connections. The amount collected is to be deposited into a trust account and used to finance the construction of off-site facilities. The hook-up fee tariff states that its purpose is "to equitably apportion the costs of off-site water facility development to serve the Company's Service Area among all new service connections in that area." It is Staff's position that a company cannot use a combination of off-site service agreements and hook-up fees for new infrastructure. In other words, once a company has an approved hook-up fee, that would be the method of funding new off-site infrastructure requirements for new connections in addition to investment by the Company if needed. Thus, Staff recommends that off-site infrastructure for new connections be funded through hook-up fees and not off-site facilities agreements.

THE WATER SYSTEM

Staff's Engineering Report which is attached as Exhibit 2 describes the existing and proposed water system in detail. The Company has one drinking water well with a production capacity of 1,620 gallons per minute ("GPM"), three storage tanks with combined capacity of 2,550,000 gallons, and five pressure tanks which serve the existing CC&N. Although the Company does not own the production well, the Company holds a 99 year lease agreement from the Town of Sahuarita who does own the well. Staff concludes that the existing SWC system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N.

To serve the requested extension area the Company proposes to install, within five years, new plant items including, but not limited to: (1) one new 1,500 GPM well; (2) three 600,000 gallon storage tanks; (3) one 2,500 GPM booster station; (4) one 1,700 GPM booster station; (5) one 2,300 GPM booster station; and (6) one 3,300 GPM booster station and transmission mains.

In response to Staff data requests, the Company submitted an Engineer's Report and Infrastructure Analysis prepared by Westland Resources, Inc., that included a description of the proposed new water system and estimated plant costs for the next five years (a summary of which is in Exhibit 2) that totaled $16,533,375. The Company does not expect to provide service in the requested extension area until late 2009.

Staff concludes that the plant items listed above will provide the Company with sufficient capacity to serve the requested extension area. Staff further concludes that it is reasonable to assume that SWC will develop additional capacity as needed to meet future growth in the requested extension area.

Staff concludes that the Company's estimates of the initial five year period expenditures of $16,533,375 are reasonable and appropriate for this project. However, approval of this CC&N application does not imply any particular future treatment for rate base. No "used and useful" determination of the proposed plant in service was made, and no conclusions should be inferred for future rate making or rate base purposes.

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY ("ADEQ") COMPLIANCE

Compliance Status

ADEQ regulates the water system under ADEQ Public Water System I.D. No. 10-312. ADEQ reported that it has determined that SWC is in compliance with ADEQ requirements and is currently delivering water that meets the water quality standards required by Arizona Administrative Code, Title 18, Chapter 4.[1]

Certificate of Approval to Construct

The Company has not submitted ADEQ or other authorized agency-issued permits, either Certificates of Approval to Construct ("ATC") or Certificates of Approval of Construction ("AOC"), for the plant items needed to serve the requested extension area. Staff recommends that the Company docket as a compliance item in this case within three years of the effective date of an Order in this proceeding copies of the ATCs for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

[1] Compliance status reports received from ADEQ on May 30, 2008.

ARIZONA DEPARTMENT OF WATER RESOURCES ("ADWR") COMPLIANCE

Compliance Status

SWC is located in the Tucson Active Management Area ("AMA"), as designated by ADWR. Staff received an ADWR compliance status report on June 23, 2008, and ADWR reported that it has determined that SWC is currently in compliance with departmental requirements governing water providers and/or community water systems.

Designation of Assured Water Supply ("DAWS")

In its application, SWC indicates that it currently has a Designation of Assured Water Supply from ADWR of 4,700 annual acre feet, and it submitted an application to ADWR on November 23, 2007, to modify the Designation of Assured Water Supply, by way of an increase, to reflect its ability to fully provide the projected water demand at buildout in both the existing and proposed CC&N extension areas for the statutorily-prescribed 100 years. Accompanying that request was an Assured Water Supply Hydrology Report for SWC that was prepared by Brown and Caldwell, an engineering and hydrology consultant firm. SWC received an insufficiency letter from ADWR on April 1, 2008, and a response to the insufficiency letter was sent to ADWR by SWC on July 7, 2008. SWC asserts the hydrology analysis in the above-referenced report demonstrates the physical availability of 10,983 acre feet of local groundwater for both the existing CC&N and the proposed CC&N extension areas of SWC at buildout for the requisite 100 year period.

Staff recommends that the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's DAWS has been modified to include this new extension area.

ACC COMPLIANCE

According to the Utilities Division Compliance Section, the Company has no delinquent ACC compliance item.

WASTEWATER PROVIDER

According to the Company, wastewater service in the requested extension area will be provided by either Pima County Wastewater Management or the Town of Sahuarita. The Company advised that a determination had not yet been made between those two (2) jurisdictional entities as to which would be the provider of wastewater services.

CURTAILMENT PLAN TARIFF AND CROSS CONNECTION TARIFF

In Decision No. 65464, (December 19, 2002) the Commission approved a Curtailment Plan Tariff for SWC. SWC also has a Cross Connection Tariff in place.

PROPOSED RATES

SWC has proposed to extend service to the extension property at its tariffed rates.

CITY OR COUNTY FRANCHISE/PERMIT

The Town of Sahuarita does not issue franchises. A permit is obtained from the Town each time a project enters into the property, roads, or alley ways of Sahuarita. All extensions of the SWC's facilities under the proposed CC&N extension would occur within unincorporated areas of Pima County. SWC currently has a Public Utility License Agreement between Pima County and SWC that pertains to SWC's use of public rights-of-way within the municipal boundaries.

RECOMMENDATIONS

Staff recommends that the Commission approve SWC's request to transfer its CC&N from Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C., and for an extension of its Certificate of Convenience and Necessity in a portion of Pima County to provide water service, subject to compliance with the following conditions:

1. To require the SWC to charge its existing rates and charges in the proposed extension area.

2. To require SWC to docket as a compliance item in this case within three years of the effective date of an order in this proceeding copies of the Approval to Construct for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

3. That the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's DAWS has been modified to include this new extension area.

4. To require that off-site infrastructure for new connections be funded through hook-up fees and not off-site facilities agreements.

Staff further recommends that the Commission's decision granting this extension of its Certificate of Convenience and Necessity to the SWC be considered null and void after due

process without further order from the Commission should SWC fail to meet conditions 2 and 3 within the time specified.

EXHIBIT 1

MEMORANDUM

TO: Vicki Wallace
Chief, Consumer Services & Special Projects
Utilities Division

FROM: Barb Wells
Information Technology Specialist
Utilities Division

THRU: Del Smith
Engineering Supervisor
Utilities Division

DATE: April 1, 2008

RE: **SAHUARITA WATER COMPANY, LLC (DOCKET NO. W-03718A-07-0687)**

The area requested by Sahuarita Water Company, LLC (Sahuarita) for an extension has been plotted using a combination of the legal description filed with the original application (for the acreage referred to as Sahuarita Mission Partners, LLC) and an amended legal description (for the acreages referred to as Mission Peaks 4000, LLC and Arizona State Land Department). The amended legal description has been docketed. The legal description that was submitted for Sahuarita Unified School District in the original application has been omitted from the extension request since this area falls within the area already certificated to Sahuarita.

The attached legal description is complete and correct and should be used in place of the original description submitted with the application.

Also attached are copies of the maps for your files.

:bsw

Attachments

cc: Mr. Lawrence Robertson
Ms. Deb Person (Hand Carried)
Ms. Dorothy Hains

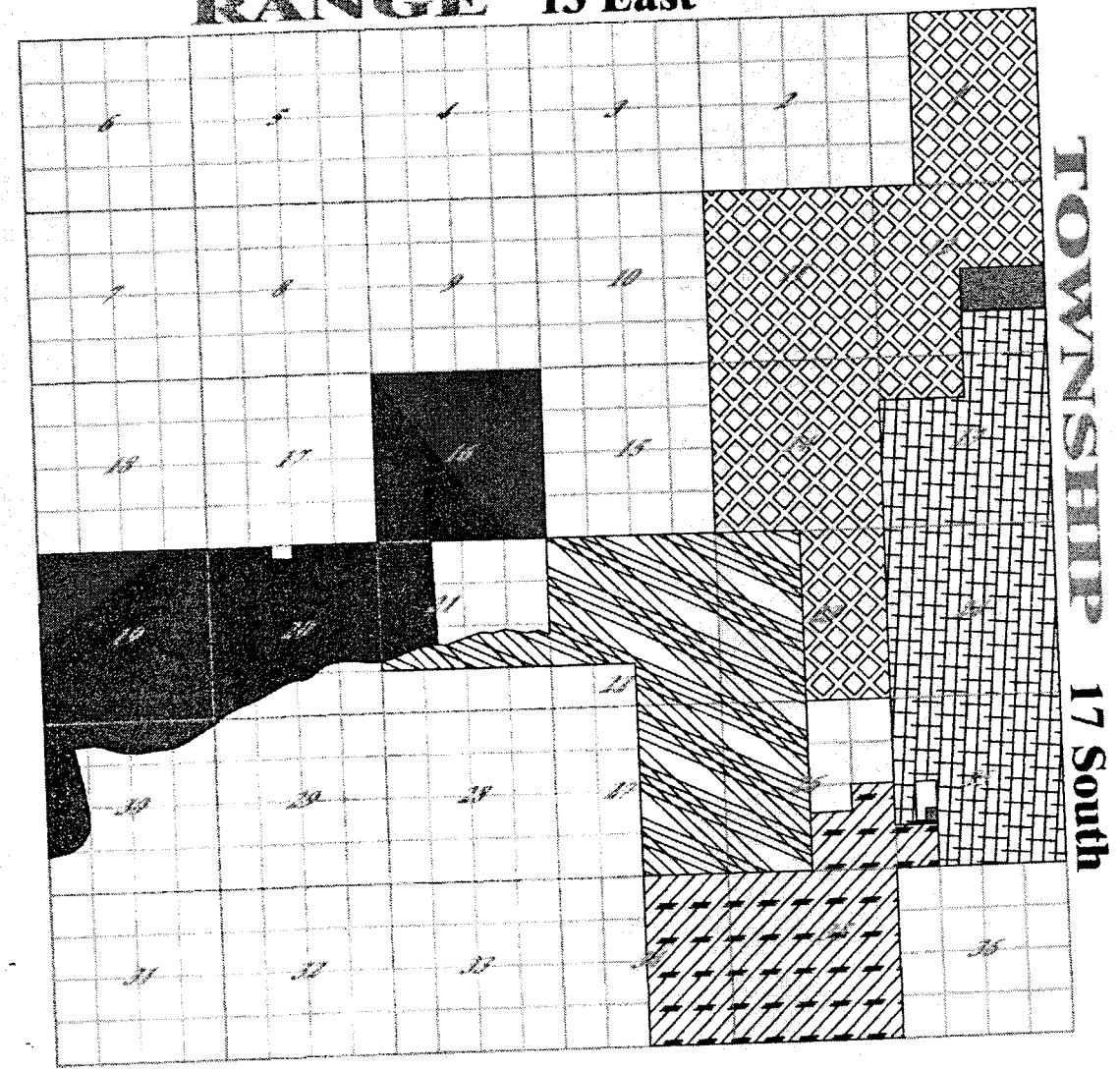
Pursuant to ARS § 39-121.03 this map is 'Not for Commercial Use'

Map No. 34

COUNTY: *Pima*

RANGE 13 East

TOWNSHIP 17 South



W-2304 (2)
Community Water Company of Green Valley

W-1654 (6)
Farmers Water Company

W-1583 (1)
Las Quintas Serenas Water Company

W-3718 (4)
Sahuarita Water Company, LLC

(1)
Sahuarita Village Water Company
(Nonjurisdictional)

Community Water Company of Green Valley
Docket No. W-02304A-07-0393
Application for Extension

(3)
Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

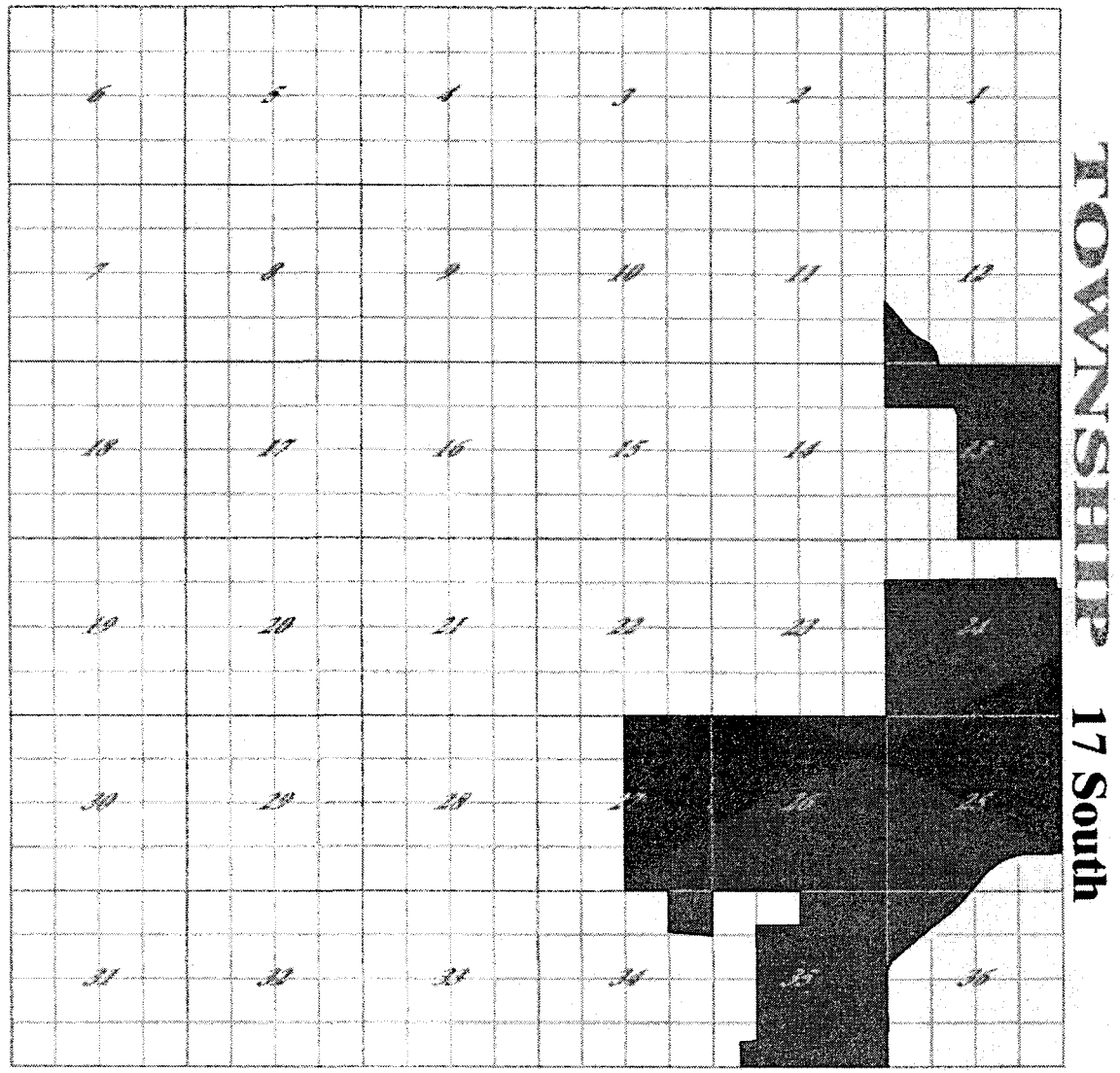
TR17S13E 11 JAN 2001

Pursuant to ARS § 39-121.03 this map is 'Not for Commercial Use'

Map No. 52

COUNTY: *Pima*

RANGE 12 East



W-3718 (3)
Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

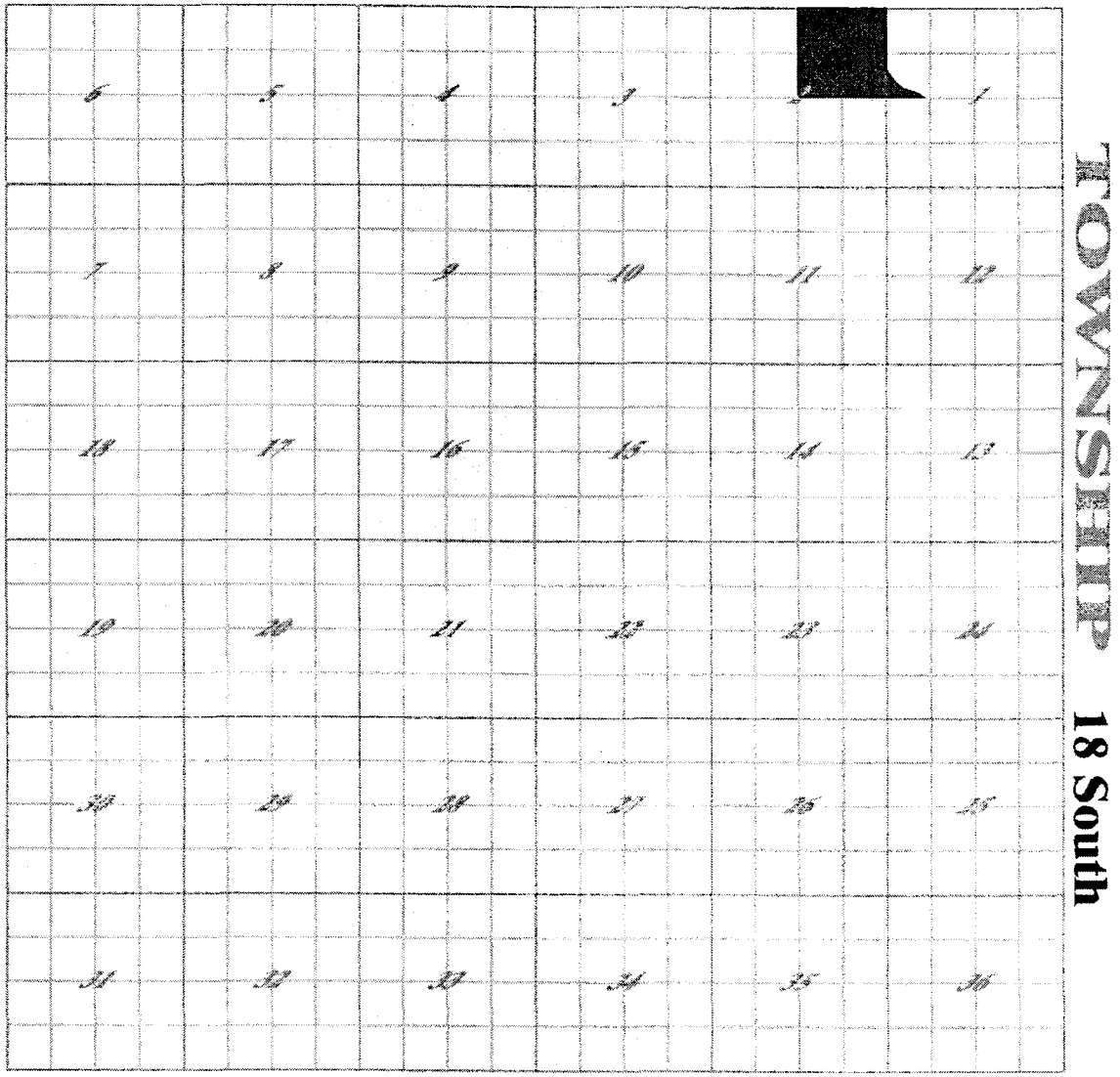
TR17S12E 11 JAN 2008

Pursuant to ARS § 39-121.03 this map is 'Not for Commercial Use'

Map No. 53

COUNTY: *Pima*

RANGE 12 East



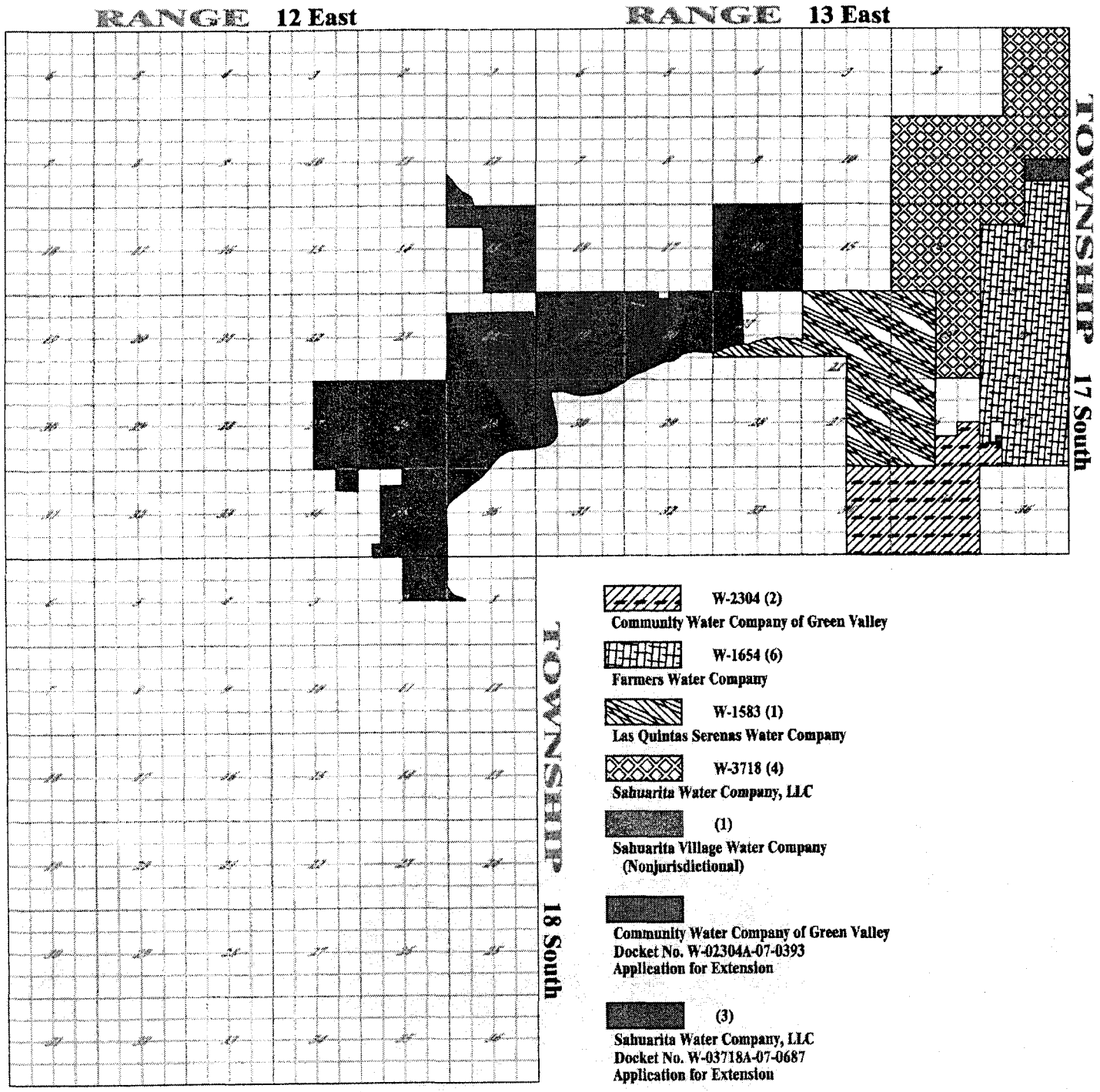
TOWNSHIP 18 South

[redacted] W-3718 (3)

Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

TR18S12E 11 JAN 2008

COUNTY: *Pima*


RANGE 12 East
RANGE 13 East
TOWNSHIP 17 South
TOWNSHIP 18 South
W-2304 (2)
Community Water Company of Green Valley
W-1654 (6)
Farmers Water Company
W-1583 (1)
Las Quintas Serenas Water Company
W-3718 (4)
Sahuarita Water Company, LLC
(1)
Sahuarita Village Water Company
(Nonjurisdictional)
Community Water Company of Green Valley
Docket No. W-02304A-07-0393
Application for Extension
(3)
Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

ORDER NO. 61377 NGW

LEGAL DESCRIPTON

EXHIBIT "A"

AN UNDIVIDED 83.3335% INTEREST IN AND TO THE FOLLOWING DESCRIBED PARCELS:

PARCEL 1:

That portion of Sections 12 and 13, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona, described as follows:

BEGINNING at the Southwest corner of said Section 12;

THENCE North 00 degrees 26 minutes 09 seconds West along the West line of said Section 12 a distance of 1,550.77 feet to the Westerly right-of-way line of Mission Road as shown on Book 2 of Records of Survey at Page 57, Records of Pima County, Arizona, said point being on the arc of a non-tangent curve concave to the Southwest; a radial line of said curve through said point having a bearing of North 42 degrees 32 minutes 51 seconds East;

THENCE Southerly along the arc of said curve, to the right, having a radius of 2814.79 feet and a central angle of 08 degrees 52 minutes 55 seconds for an arc distance of 436.35 feet to a point of tangency;

THENCE South 36 degrees 34 minutes 14 seconds East along said right-of-way line a distance of 630.70 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,195.92 feet and a central angle of 24 degrees 57 minutes 28 seconds for an arc distance of 520.94 feet to a point of tangency;

THENCE South 61 degrees 31 minutes 42 seconds East along said right-of-way line a distance of 162.19 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 606.20 feet and a central angle of 60 degrees 46 minutes 44 seconds for an arc distance of 706.70 feet to a point of tangency;

THENCE South 02 degrees 44 minutes 58 seconds East along said right-of-way line a distance of 87.39 feet;

8696 467

THENCE South 03 degrees 24 minutes 50 seconds East along the re-established right-of-way line of Mission Road a distance of 119.84 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,959.86 feet and a central angle of 29 degrees 57 minutes 08 seconds for an arc distance of 1,024.55 feet to a point of tangency;

THENCE South 33 degrees 21 minutes 58 seconds East along said right-of-way line a distance of 284.19 feet to the South line of the North Half of the Northwest Quarter of said Section 13;

THENCE North 89 degrees 46 minutes 18 seconds West along the South line of said North Half a distance of 2,073.85 feet to the West line of said Northwest Quarter;

THENCE North 00 degrees 14 minutes 11 seconds West along said West line a distance of 1,119.95 feet to the POINT OF BEGINNING.

PARCEL II:

That portion of Section 13, Township 17 South, Range 12 East, Gila and Salt River Base and Meridian, Pima County, Arizona, and that portion of the Waring Lode Mining Claim in Pima Mining District being shown on Mineral Survey No. 4187 on file in the Bureau of Land Management as granted by Patent recorded in Book 34 of Deeds of Mines at Page 220, Pima County Records, described as follows:

COMMENCING at the Southeast corner of said Section 13;

THENCE North 89 degrees 55 minutes 36 seconds West along the South line of said Section 13 a distance of 445.60 feet to the POINT OF BEGINNING, said point being on the Westerly right-of-way line of Mission Road as re-established from the existing paving of said road;

THENCE continue North 89 degrees 55 minutes 36 seconds West along said South line of Section 13 a distance of 2,651.19 feet to a line 440.00 feet West of and parallel with North-South midsection line of said Section 13;

THENCE North 00 degrees 16 minutes 37 seconds West along said parallel line a distance of 3,740.03 feet to said right-of-way line of Mission Road;

THENCE South 33 degrees 21 minutes 58 seconds East along said right-of-way line a distance of 1,978.94 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,462.40 feet and a central angle of 24 degrees 53 minutes 38 seconds for an arc distance of 644.07 feet to a point of tangency;

THENCE South 56 degrees 15 minutes 38 seconds East along said right-of-way line a distance of 434.74 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 1147.53 feet and a central angle of 32 degrees 57 minutes 22 seconds for an arc distance of 660.05 feet to a point of tangency;

THENCE South 25 degrees 18 minutes 14 seconds East along said right-of-way line a distance of 430.76 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 857.49 feet and a central angle of 13 degrees 52 minutes 12 seconds for an arc distance of 207.58 feet to a point of tangency;

THENCE South 11 degrees 26 minutes 02 seconds East along said right-of-way line a distance of 352.14 feet to the POINT OF BEGINNING.

EXCEPT from the above described properties and any and all rights to oil, gas, minerals and associated hydrocarbons as reserved in Docket 2220 at Page 266 and in Docket 7944 at Page 306.

PARCEL III:

That portion of Section 13, Township 17 South, Range 12 East, Gila and Salt River Base and Meridian, Pima County, Arizona, and that portion of the Waring Lode Mining Claim in Pima Mining District being shown on Mineral Survey No. 4187 on file in the Bureau of Land Management as granted by patent recorded in Book 34 of Deeds of Mines at Page 220, Pima County Records, described as follows:

BEGINNING at the Southeast corner of said Section 13;

THENCE North 89 degrees 55 minutes 36 seconds West along the South line of said Section 13 a distance of 343.54 feet to the Easterly right-of-way line of Mission Road as re-established from the existing paving of said road;

THENCE North 11 degrees 26 minutes 02 seconds West along said right-of-way line a distance of 372.50 feet to a point of curvature of a tangent curve concave to the West;

THENCE Northerly along the arc of said curve, to the left, having a radius of 957.49 feet and a central angle of 13 degrees 52 minutes 12 seconds for an arc distance of 231.79 feet to a point of tangency;

THENCE North 25 degrees 18 minutes 14 seconds West along said right-of-way line a distance of 430.76 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Northerly along the arc of said curve, to the left, having a radius of 1,247.53 feet and a central angle of 32 degrees 57 minutes 22 seconds for an arc distance of 717.57 feet to the point of tangency;

THENCE North 58 degrees 15 minutes 38 seconds West along said right-of-way line a distance of 434.74 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Northerly along the arc of said curve, to the right, having a radius of 1,382.40 feet and a central angle of 24 degrees 53 minutes 38 seconds for an arc distance of 600.62 feet to a point of tangency;

THENCE North 33 degrees 21 minutes 58 seconds West along said right-of-way line a distance of 2519.86 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Northerly along the arc of said curve, to the right, having a radius of 1,859.56 feet and a central angle of 29 degrees 57 minutes 08 seconds for an arc distance of 972.27 feet to a point of tangency;

THENCE North 03 degrees 24 minutes 50 seconds West along said right-of-way line a distance of 40.50 feet to a point 75.00 feet South of and parallel with the North line of said Section 13, said point being on the South right-of-way line of Helmet Peak Road;

THENCE South 89 degrees 43 minutes 16 seconds East along said parallel line a distance of 3,606.47 feet to the East line of the Northeast Quarter of said Section 13;

THENCE South 00 degrees 18 minutes 59 seconds East along said East line a distance of 2,555.56 feet to the Southeast corner of said Northeast Quarter;

THENCE South 00 degrees 18 minutes 15 seconds East along the East line of Government Lot 1 and 4 of said Section 13 a distance of 2,630.26 feet to the POINT OF BEGINNING;

EXCEPT any and all rights to oil, gas, minerals and associated hydrocarbons as reserved in Docket 2220 at Page 266 and in Docket 7944 at Page 314.

February 15 2008
Psomas # 95016-10

LEGAL DESCRIPTION
RANCHO SAHUARITA WATER COMPANY BOUNDARY

PARCEL 1
Portions of Sections 24 through 27, and 34 through 36, Township 17 South, Range 12 East and portions of Sections 19 and 30, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22 and Book 45 at Page 92, records of Pima County Arizona, described as follows:

BEGINNING at the North one-quarter corner of said Section 27;

THENCE upon the North line of said Section, N 89°21'41" E a distance of 1341.87 feet;

THENCE continue upon said north line, N 89°20'54" E a distance of 1342.07 feet to the northwest corner of Section 26;

THENCE upon the north line of said Section 26, N 89°20'30" E a distance of 1322.48 feet;

THENCE continue upon said north line, N 89°20'16" E a distance of 1325.05 feet to the north one-quarter corner;

THENCE continue upon said north line, N 89°20'57" E a distance of 1336.10 feet;

THENCE N 89°20'28" E a distance of 1311.91 feet to the southwest corner of Section 24;

THENCE upon the west line of said Section 24, N 01°11'04" W a distance of 2639.36 feet to the west one-quarter corner;

THENCE continue upon said west line, N 01°08'44" W a distance of 1319.49 feet to the north line of the south one-half of the north one-half of said Section 24;

THENCE upon said north line, N 89°25'57" E a distance of 2657.64 feet;

THENCE continue upon said north line, N 89°23'50" E a distance of 1329.33 feet;

THENCE continue upon said north line, N 89°24'36" E a distance of 1139.69 feet to the westerly right-of-way of Mission-Twin Buttes Road, recorded in Road Maps Book 1 at Pages 20-23 and Book 12 at Page 31, records of said Pima County;

THENCE upon said westerly right-of-way the following 14 courses and distances:

1) S 12°26'32" E a distance of 6002.25 feet;

2) N 77°33'28" E a distance of 10.00 feet to a point on the arc of a non-tangent curve concave westerly, a radial line of said curve through said point having a bearing of N 77°33'31" E;

3) Southerly upon the arc of said curve, to the right, having a radius of 9269.74 feet and a central angle of 5°15'49" for an arc length of 851.59 feet to a point of tangency;

4) S 07°10'40" E a distance of 633.01 feet to a point of curvature of a tangent curve concave northwesterly;

5) Southwesterly upon the arc of said curve, to the right, having a radius of 955.37 feet and a central angle of 85°29'56" for an arc length of 1425.64 feet to a point of tangency;

6) S 78°19'16" W a distance of 588.25 feet to a point of curvature of a tangent curve concave northerly;

7) Westerly upon the arc of said curve, to the right, having a radius of 2824.93 feet and a central angle of 14°32'34" for an arc length of 717.02 feet to a point of tangency;

8) N 87°08'11" W a distance of 120.17 feet to a point of curvature of a tangent curve concave southeasterly;

9) Southwesterly upon the arc of said curve, to the left, having a radius of 1849.57 feet and a central angle of 52°03'35" for an arc length of 1680.55 feet to a point of tangency;

10) S 40°48'14" W a distance of 1259.01 feet to a point of curvature of a tangent curve concave northwesterly;

11) Southwesterly upon the arc of said curve, to the right, having a radius of 676.78 feet and a central angle of 10°31'45" for an arc length of 124.37 feet to a point of tangency;

12) S 51°19'59" W a distance of 2263.92 feet to a point of curvature of a tangent curve concave southeasterly;

13) Westerly upon the arc of said curve, to the left, having a radius of 756.78 feet and a central angle of 54°16'41" for an arc length of 716.92 feet to a point of tangency;

14) S 02°56'42" E a distance of 1284.38 feet to the northerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon said northerly right-of-way line the following 13 courses and distances;

1) S 89°40'33" W a distance of 103.05 feet to a point of curvature of a tangent curve concave southerly;

2) Westerly upon the arc of said curve, to the left, having a radius of 2894.79 feet and a central angle of 7°29'45" for an arc length of 378.72 feet to a point of tangency;

3) S 82°10'48" W a distance of 187.02 feet to a point of curvature of a tangent curve concave northerly;

4) Westerly upon the arc of said curve, to the right, having a radius of 1879.86 feet and a central angle of 13°26'00" for an arc length of 440.74 feet to a point of tangency;

5) N 84°23'12" W a distance of 927.54 feet to a point of curvature of a tangent curve concave northerly;

6) Westerly upon the arc of said curve, to the right, having a radius of 542.96 feet and a central angle of 14°05'45" for an arc length of 133.58 feet to a point of tangency;

7) N 70°17'27" W a distance of 166.64 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 19°43'06" E;

8) Westerly upon the arc of said curve, to the left, having a radius of 602.96 feet and a central angle of 24°15'25" for an arc length of 255.27 feet;

9) S 85°36'25" W a distance of 63.46 feet to a point of curvature of a tangent curve concave southerly;

10) Westerly upon the arc of said curve, to the left, having a radius of 1939.86 feet and a central angle of 11°33'45" for an arc length of 391.47 feet to a point of tangency;

11) S 74°02'40" W a distance of 691.23 feet to a point of curvature of a tangent curve concave northerly;

12) Westerly upon the arc of said curve, to the right, having a radius of 1270.00 feet and a central angle of 13°15'46" for an arc length of 293.98 feet to a point of tangency;

13) S 87°18'26" W a distance of 48.88 feet;

THENCE N 00°47'09" W a distance of 1331.20 feet;

THENCE N 00°46'29" W a distance of 2038.55 feet;

THENCE N 89°13'05" E a distance of 1531.71 feet to the east line of the northeast one-quarter of Section 35;

THENCE upon said east line, N 01°11'55" W a distance of 1024.90 feet to the south one-quarter corner of Section 26;

THENCE upon the south line of said Section, S 89°18'08" W a distance of 1524.37 feet;

THENCE continue upon said south line, S 89°19'01" W a distance of 1124.01 feet to the northeast corner of Section 34;

THENCE upon the east line of said Section, S 01°23'09" E a distance of 1344.73 feet;

THENCE N 86°28'30" W a distance of 1378.82 feet;

THENCE upon the north line of said Section 21, N 88°57'37" E a distance of 1681.96 feet;

THENCE S 01°49'19" E a distance of 3226.42 feet to the northerly right-of-way of Twin Buttes Road, recorded in Surveys Book 5 at Pages 17 and 19, records of said Pima County, lying on the arc of a non-tangent curve concave northerly, a radial line of said curve through said point having a bearing of S 03°41'28" E;

THENCE upon said northerly right-of-way the following 30 courses and distances:

1) Westerly upon the arc of said curve, to the right, having a radius of 634.16 feet and a central angle of 2°43'13" for an arc length of 30.11 feet to a non-tangent line;

2) S 89°10'36" W a distance of 113.99 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 00°51'39" W;

3) Westerly upon the arc of said curve, to the left, having a radius of 1436.65 feet and a central angle of 17°47'23" for an arc length of 446.06 feet to a non-tangent line;

4) S 71°14'59" W a distance of 433.16 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 18°33'53" W;

5) Northwesterly upon the arc of said curve, to the left, having a radius of 2072.29 feet and a central angle of 7°50'43" for an arc length of 283.75 feet to a point of reverse curvature of a non-tangent curve, concave northerly, a radial line of said curve through said point having a bearing of S 26°29'45" E;

6) Westerly upon the arc of said curve, to the right, having a radius of 1649.24 feet and a central angle of 33°12'23" for an arc length of 955.83 feet to a non-tangent line;

7) N 83°16'46" W a distance of 300.48 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 06°41'16" E;

8) Westerly upon the arc of said curve, to the left, having a radius of 2617.41 feet and a central angle of 19°23'31" for an arc length of 885.87 feet to a point of compound curvature of a non-tangent curve concave southeasterly, a radial line of said curve through said point having a bearing of N 12°39'55" W;

9) Southwesterly upon the arc of said curve, to the left, having a radius of 892.72 feet and a central angle of 26°06'18" for an arc length of 406.74 feet to a non-tangent line;

10) S 51°13'30" W a distance of 231.88 feet to a point of curvature of a tangent curve concave northwesterly;

11) Southwesterly upon the arc of said curve, to the right, having a radius of 856.38 feet and a central angle of 29°24'46" for an arc length of 439.62 feet to the west line of the east one-half of said Section 20;

12) Upon said west line, N 01°46'54" W a distance of 45.36 feet;

13) S 80°53'44" W a distance of 9.64 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 09°16'22" W;

14) Westerly upon the arc of said curve, to the left, having a radius of 2189.63 feet and a central angle of 17°47'42" for an arc length of 680.06 feet to a non-tangent line;

15) S 62°58'37" W a distance of 766.40 feet to a point on the arc of a non-tangent curve concave northwesterly, a radial line of said curve through said point having a bearing of S 27°02'25" E;

16) Southwesterly upon the arc of said curve, to the right, having a radius of 2698.50 feet and a central angle of 7°13'17" for an arc length of 340.11 feet to a non-tangent line;

17) S 70°09'35" W a distance of 314.36 feet to a point on the arc of a non-tangent curve concave southeasterly, a radial line of said curve through said point having a bearing of N 19°46'58" W;

18) Southwesterly upon the arc of said curve, to the left, having a radius of 2001.81 feet and a central angle of 10°22'42" for an arc length of 362.60 feet to a non-tangent line;

19) S 59°47'07" W a distance of 404.63 feet to the west line of Section 20;

20) Upon said west line, S 01°41'07" E a distance of 49.31 feet to the southwest corner;

21) Upon the south line of said Section 20, N 89°02'25" E a distance of 5.45 feet to a point on the arc of a non-tangent curve concave southeasterly, a radial line of said curve through said point having a bearing of N 31°57'43" W;

22) Southwesterly upon the arc of said curve, to the left, having a radius of 1541.19 feet and a central angle of 3°38'01" for an arc length of 97.74 feet to a point of reverse curvature of a non-tangent curve concave northwesterly, a radial line of said curve through said point having a bearing of S 35°40'20" E;

23) Southwesterly upon the arc of said curve, to the right, having a radius of 1481.19 feet and a central angle of 5°34'21" for an arc length of 144.06 feet to a non-tangent line;

24) S 59°48'34" W a distance of 896.58 feet to a point on the arc of a non-tangent curve concave northerly, a radial line of said curve through said point having a bearing of S 30°11'18" E;

THENCE N 00°07'13" W a distance of 1243.26 feet to the south line of Section 27;

THENCE upon the south line of said Section, S 89°18'00" W a distance of 1374.64 feet to the south one-quarter corner;

THENCE upon the west line of the east one-half of said Section 27, the following 4 courses and distances:

1) N 00°50'51" W a distance of 1316.70 feet;

2) N 00°49'57" W a distance of 1317.07 feet;

3) N 00°49'36" W a distance of 1317.21 feet;

4) N 00°49'40" W a distance of 1317.77 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 2

Portions of Sections 19 through 21, 29 and 30, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Book 41 of Surveys, Page 22, Records of Pima County, Arizona described as follows:

BEGINNING at the northwest corner of Section 19;

THENCE upon the north line of said Section, N 89°06'58" E a distance of 2567.47 feet to the north one-quarter corner;

THENCE continue upon said north line, N 89°06'28" E a distance: 2628.85 feet to the northwest corner of Section 20;

THENCE upon the west line of said Section 20, S 01°41'07" E a distance of 30.00 feet;

THENCE N 88°43'21" E a distance of 1979.26 feet;

THENCE S 01°41'07" E a distance of 399.99 feet;

THENCE N 88°43'21" E a distance of 668.88 feet to the west line of the east one-half of said Section 20;

THENCE upon said west line, N 01°46'54" W a distance of 430.00 feet to the north line of said Section 20;

THENCE upon said north line, N 88°43'00" E a distance of 2647.38 feet to the northwest corner of Section 21;

25) Westerly upon the arc of said curve, to the right, having a radius of 1752.46 feet and a central angle of 30°05'12" for an arc length of 920.24 feet to a point of reverse curvature of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 00°05'12" W;

26) Westerly upon the arc of said curve, to the left, having a radius of 869.19 feet and a central angle of 13°15'29" for an arc length of 201.13 feet to a point of reverse curvature of a non-tangent curve concave northerly, a radial line of said curve through said point having a bearing of S 13°21'52" E;

27) Westerly upon the arc of said curve, to the right, having a radius of 2325.40 feet and a central angle of 34°27'47" for an arc length of 1398.71 feet to a non-tangent line;

28) N 68°53'14" W a distance of 151.79 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 21°04'23" E;

29) Westerly upon the arc of said curve, to the left, having a radius of 1010.68 feet and a central angle of 26°56'23" for an arc length of 475.21 feet to a non tangent line;

30) S 84°05'18" W a distance of 381.65 feet to the easterly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 1 at Pages 20-23, records of said Pima County;

THENCE upon said easterly right-of-way, N 12°26'32" W a distance of 4625.24 feet

THENCE N 89°25'11" E a distance of 86.94 feet to the west line of Section 19;

THENCE upon said west line, N 01°14'52" W a distance of 1311.71 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 3

All of Section 16, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona, Except the north 75 feet.

TOGETHER WITH:
PARCEL 4

A portion of Section 35, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22, records of Pima County Arizona, described as follows:

BEGINNING at the east one-quarter corner of said Section 35:

THENCE upon the east line of said Section, S 00°16'41" E a distance of 1684.22 feet to the northerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon said northerly right-of-way, S 89°40'33" W a distance of 103.88 feet to the easterly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 12 at Page 31, records of said Pima County;

THENCE upon said easterly right-of-way, N 02°56'42" W a distance of 1288.04 feet to a point of curvature of a tangent curve concave easterly;

THENCE northerly upon the arc of said curve, to the right, having a radius of 676.78 feet and a central angle of 43°13'34" for an arc length of 510.59 feet to the east line of said Section 35;

THENCE upon east line, S 01°46'39" E a distance of 73.92 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 5

A portion of Section 35, Township 17 South, Range 12 East and a portion of Section 2 , Township 18 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22, records of Pima County Arizona, described as follows:

BEGINNING at the northeast corner of said Section 2;

THENCE upon the east line of said Section, S 00°11'26" E a distance of 1214.24 feet to a point on the easterly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 12 at Page 31, records of said Pima County;

THENCE upon said easterly right-of-way, N 02°56'42" W a distance of 2129.52 feet to the southerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon southerly right-of-way, N 89°40'33" E a distance of 100.94 feet to the east line of said Section 35;

THENCE upon said east line, S 00°16'41" E a distance of 913.05 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 6

A portion of Section 35, Township 17 South, Range 12 East and a portion of Sections 1 and 2, Township 18 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22 and Book 45 at Page 92, records of Pima County Arizona, described as follows:

BEGINNING at the south one-quarter corner of said Section 35;

THENCE upon the south line of said Section 35, S 89°36'56" W a distance of 1800.65 feet;

THENCE N 01°10'34" W a distance of 764.87 feet to the southerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon said southerly right-of-way the following 13 courses and distances;

1) N 87°18'26" E a distance of 294.56 feet to a point of curvature of a tangent curve concave northerly;

2) Northerly upon the arc of said curve, to the left, having a radius of 1330.00 feet and a central angle of 13°15'46" for an arc length of 307.87 feet to a point of tangency;

3) N 74°02'40" E a distance of 691.20 feet to a point of curvature of a tangent curve concave southerly;

4) Easterly upon the arc of said curve, to the right, having a radius of 1879.86 feet and a central angle of 11°33'45" for an arc length of 379.36 feet to a point of tangency;

5) N 85°36'25" E a distance of 66.39 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 04°14'32" W;

6) Easterly upon the arc of said curve, to the right, having a radius of 542.99 feet and a central angle of 23°56'23" for an arc length of 226.87 feet to a non-tangent line;

7) S 70°17'27" E a distance of 166.87 feet to a point of curvature of a tangent curve, concave northerly;

8) Easterly upon the arc of said curve, to the left, having a radius of 602.96 feet and a central angle of 14°05'45" for an arc length of 148.34 feet to a point of tangency;

9) S 84°23'12" E a distance of 927.54 feet to a point of curvature of a tangent curve, concave northerly;

10) Easterly upon the arc of said curve, to the left, having a radius of 1939.86 feet and a central angle of 13°26'00" for an arc length of 454.81 feet to a point of tangency;

11) N 82°10'48" E a distance of 187.02 feet to a point of curvature of a tangent curve, concave southerly;

12) Easterly upon the arc of said curve, to the right, having a radius of 2834.79 feet and a central angle of 7°29'45" for an arc length of 370.87 feet to a point of tangency;

13) N 89°40'33" E a distance of 105.94 feet to the westerly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 12 at Page 31, records of said Pima County;

THENCE upon said westerly right-of-way the following 6 courses and distances;

1) S 02°56'42" E a distance of 2415.93 feet to a point of curvature of a tangent curve concave easterly;

2) Southerly upon the arc of said curve, to the left, having a radius of 756.78 feet and a central angle of 33°37'34" for an arc length of 444.14 to a point of tangency;

3) S 36°34'18" E a distance of 300.36 feet to a point of curvature of a tangent curve concave northeasterly;

4) Southeasterly upon the arc of said curve, to the left, having a radius of 756.78 feet and a central angle of 43°59'24" for an arc length of 581.03 feet to a point of tangency;

5) S 80°33'43" E a distance of 12.61 feet to a point on the arc of a non-tangent curve concave southwesterly, a radial line of said curve through said point having a bearing of N 09°26'20" E;

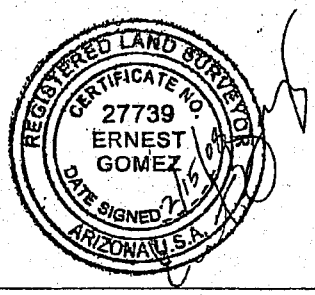
6) Southeasterly upon the arc of said curve, to the right, having a radius of 676.78 feet and a central angle of 34°25'30" for an arc length of 406.63 feet to the south line of the north one-half of said Section 1;

THENCE upon said south line, N 89°58'30" W a distance of 1111.01 feet to the east one-quarter corner of said Section 2;

THENCE upon the south line of the northeast one-quarter of said Section 2, N 89°49'13" W a distance of 2610.14 feet to the center one-quarter corner;

THENCE upon the west line of said northeast one-quarter, N 00°40'50" W a distance of 2605.25 feet to the **POINT OF BEGINNING.**

Prepared by:
PSOMAS



Ernest Gomez, AZ. R.L.S. 27739

EXHIBIT 2

MEMORANDUM

DATE June 26, 2008

TO: Vicki Wallace, Chief
Consumer Services & Special Projects

FROM: Dorothy Hains, P. E. DH
Utilities Engineer

RE: WATER CC&N EXTENSION FOR SAHUARITA WATER COMPANY, LLC.
DOCKET NOS. W-03718A-07-0687

I. Introduction

Sahuarita Water Company, LLC. ("Sahuarita" or "Company") has submitted a Certificate of Convenience and Necessity ("CC&N") extension application to the Arizona Corporation Commission ("ACC") to provide water services near the Town of Sahuarita ("Town") in southwest Pima County. The Company currently serves approximately a five square mile service area. The Company has an existing customer base of approximately 4,250 customers. The requested extension area, which is non-contiguous to the existing service area, is approximately seven square miles in size. The requested extension area is located southwest of the Company's existing CC&N. If this application is approved, the Company estimates that it will be serving 2,204 new customers in the extension area within five years.

II. Analysis of Water Systems

Existing System

The Company operates a water system that consists of one drinking water well (having a production rate of 1,620 gallons per minute ("GPM")); three storage tanks (having a combined capacity of 2,550,000 gallons); and five pressure tanks which serve the existing CC&N. Although the Company does not own the production well, the Company holds a 99 year lease agreement from the Town who owns the well. The existing Sahuarita system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N.

Proposed System

To serve the requested extension area within the next five years, the Company proposes to install, within five years, new plant items including but not limited to (1) one new 1,500 GPM well, (2) three 600,000 gallon storage tanks, (3) one 2,500 GPM booster station, (4) one 1,700 GPM booster station, (5) one 2,300 GPM booster station, (6) one 3,300 GPM booster station and

transmission mains. The Company does not expect to provide service in the requested extension area until late 2009.

Estimated Cost of the Proposed System

In response to Staff data requests, the Company submitted an Engineer's Report and Infrastructure Analysis prepared by Westland Resources, Inc. The report included a description of the proposed new water system and estimated plant costs which totaled $16,533,375.

The summary of the infrastructure pipelines and their estimated costs for the first five years are as follows:

year	Plant Description	Quality	Unit Price ($/unit)	Amount ($)
2008	No Activity			0
2009	No Activity			0
2010	New 1,500 GPM well	1 unit	1,100,000	1,100,000
	600,000 gallon forebay reservoir	1 unit	600,000	600,000
	24-inch DIP water main	7,200 (in feet)	175	900,000
	16-inch DIP water main	14,400 (in feet)	120	1,728,000
	12-inch PVC main	3,000 (in feet)	80	240,000
	2,500 GPM booster pump station	1 unit	525,000	525,000
	1,700 GPM booster pump station	1 unit	425,000	425,000
	2,300 GPM booster pump station	1 unit	525,000	525,000
	16-inch PVC water main	2,1600 (in feet)	120	259,200
	12-inch PVC water main	8,400 (in feet)	80	672,000
	24-inch DIP main	4,700 (in feet)	175	822,500
	25%Engineering, Contingencies, Inspection & Permits			1,949,175
	Subtotal			**9,745,875**
2011	600,000 gallon reservoir	1 unit	600,000	600,000
	3,300 GPM booster pump station	1 unit	600,000	600,000
	12-inch PVC water main	27,000 (in feet)	80	1,584,000
	24-inch DIP main	8,400(in feet)	175	1,470,000
	25%Engineering, Contingencies, Inspection & Permits			1,207,500
	Subtotal			**6,037,500**
2012	600,000 gallon forebay reservoir	1 unit	600,000	600,000
	25%Engineering, Contingencies, Inspection & Permits			150,000
	Subtotal			**750,000**
	Total			**16,533,375**

Staff concludes that the estimated costs listed above are reasonable. However, no "used and useful" determination of the proposed plant was made, and no conclusions should be inferred for rate making or rate base purposes.

III. Arizona Department of Environmental Quality ("ADEQ") Compliance

Compliance Status

ADEQ regulates the water system under ADEQ Public Water System I.D. #10-312. ADEQ reported that it has determined that Sahurita is in compliance with ADEQ requirements and is currently delivering water that meets the water quality standards required by Arizona Administrative Code, Title 18, Chapter 4.[1]

Certificate of Approval to Construct

The Company has not submitted ADEQ or other authorized agencies issued permits, either Certificates of Approval to Construct ("ATC") or Certificates of Approval of Construction ("AOC") for the plant items needed to serve the requested extension area. Staff recommends that the Company docket, as a compliance item in this case, within two years of the effective date of the Order copies of the ATCs for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

IV. Arizona Department of Water Resources ("ADWR") Compliance

Compliance Status

Sahurita is located in the Tucson Active Management Area ("AMA"), as designated by ADWR. Staff received an ADWR compliance status report on June 23, 2008, ADWR reported that it has determined that Sahuarita Water Company is currently in compliance with departmental requirements governing water providers and/or community water systems.

Designation of Assured Water Supply ("DAWS")

Staff recommends that the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's DAWS has been modified to include this new extension area.

V. ACC Compliance

According to the Utilities Division Compliance Section, the Company has no delinquent ACC compliance items.

---

[1] Compliance status reports received from ADEQ on May 30, 2008.

VI. Curtailment Tariff

The Company has an approved curtailment tariff.

VII. Wastewater Provider

According to the Company wastewater service in the requested extension area will be provided by either Pima County Wastewater Management or the Town.

VIII. Summary

I. Conclusions

1. According to the Utilities Division Compliance Section, Sahuarita has no delinquent ACC compliance items.

2. Sahurita is in compliance with ADEQ requirements and is currently delivering water that meets the water quality standards required by Arizona Administrative Code, Title 18, Chapter 4.

3. Sahuarita is currently in compliance with ADWR requirements governing water providers and/or community water systems.

4. Sahuarita is in ADWR Tucson AMA.

5. The existing Sahuarita system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N. Staff concludes that the plant items listed above will provide the Company with sufficient capacity to serve the requested extension area. Staff further concludes that it is reasonable to assume that Sahurita will develop additional capacity as needed to meet future growth in the requested extension area.

6. The Company estimates that the total cost to install the water infrastructure to serve the requested area for the next five years is $16,533,375. Staff concludes that the Company's estimates of the initial five year period expenditures are reasonable and appropriate for this project. However, approval of this CC&N application does not imply any particular future treatment for rate base. No "used and useful" determination of the proposed plant in service was made, and no conclusions should be inferred for future rate making or rate base purposes.

II. Recommendations

1. Staff recommends that the Company docket, as a compliance item in this case, within two years of the Order copies of the Approval to Construct for well(s), storage tank(s), booster

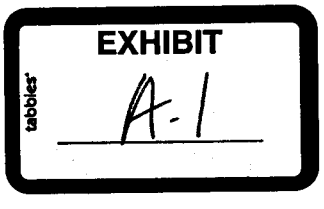
pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

2. Staff recommends that the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's DAWS has been modified to include this new extension area.

EXHIBIT A-1

(December 13, 2007 CC&N Extension Application)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
KRISTIN K. MAYES
GARY PIERCE

IN THE MATTER OF THE APPLICATION OF SAHUARITA WATER COMPANY, L.L.C. FOR AN EXTENSION OF ITS EXISTING CERTIFICATE OF CONVENIENCE AND NECESSITY IN ORDER TO PROVIDE WATER SERVICE TO AND WITHIN INCORPORATED AND UNINCORPORATED AREAS IN PIMA COUNTY, ARIZONA.	)	DOCKET NO. W-03718A-07-___ APPLICATION

Sahuarita Water Company, L.L.C. ("Sahuarita Water"), by and through its undersigned attorney, submits this Application for an Opinion and Order of the Commission granting Sahuarita Water an extension of its existing Certificate of Convenience and Necessity ("CC&N") in order to provide water service to and within incorporated and unincorporated areas within Pima County, Arizona. In support of its Application, Sahuarita Water provides the following information.

I.

IDENTIFICATION OF APPLICANT

Sahuarita Water is an Arizona limited liability company, and it is in good standing with both the Commission's Utilities and Corporations Divisions. A Certificate of Good Standing attesting to that effect is attached hereto as Appendix "A" and is incorporated herein by this reference.

On December 20, 1995, in Decision No. 59431, the Commission granted Interchange Water Company, Inc. ("IWC"), an Arizona corporation, a CC&N to provide water service to the public in an area of approximately 3,000 acres within the Town of Sahuarita in Pima County,

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Arizona. The water service area therein certificated included the then contemplated master-planned community of Rancho Sahuarita, which has since become a reality.[1] On November 2, 1999, in Decision No. 62032, the Commission authorized Rancho Sahuarita Water Company, L.L.C. ("RSWC"), an Arizona limited liability company, to acquire the water system assets and then existing CC&N of IWC. On June 25, 2004, in Decision No. 67068, the Commission granted an extension of RSWC's then existing CC&N to include additional properties in Pima County, Arizona.

On October 15, 2007, RSWC filed Articles of Amendment For Rancho Sahuarita Water Co., L.L.C. in which RSWC indicated that Mission Peaks 4000, LLC ("Mission Peaks 4000"), a Nevada limited liability company, had acquired a 20% or greater member interest in RSWC. On October 18, 2007, RSWC filed a further Articles of Amendment For Rancho Sahuarita Water Co., L.L.C. in which RSWC indicated that its name was being changed to Sahuarita Water Company, L.L.C. or "Sahuarita Water" as a defined term for purposes of this Application.

II.

APPLICANT'S CONTACT PERSONS AND CONTACT INFORMATION

The name of and contact information for Sahuarita Water's General Manager in connection with this Application are as follows:

Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Phone: (520) 399-1105
Fax: (520) 399-1095
Email: Mseamans@ranchosahuarita.com

[1] At present, Sahuarita Water is providing water service to approximately 4,250 customers located in the Rancho Sahuarita and Rancho Resort residential communities. At buildout, it is currently anticipated that the Rancho Sahuarita development will contain 10,100 single-family units, 1,460 multi-family units, and approximately 3.1 million square feet of commercial use. The aforesaid buildout is currently anticipated to occur in 2017.

The name of and contact information for Sahuarita Water's attorney in connection with this Application are as follows:

Lawrence V. Robertson, Jr.
P. O. Box 1448
Tubac, Arizona 85646

Phone: (520) 398-0411
Fax: (520) 398-0412
Email: Tubaclawyer@aol.com

III.

DESCRIPTION OF CIRCUMSTANCES OCCASIONING APPLICATION

The aforementioned change in name from RSWC to Sahuarita Water was occasioned by requests for water service which RSWC had received from several owners of real property adjacent or near to the exterior boundaries of its existing CC&N. These properties include Mission Peaks 4000, Sahuarita Mission Partners, L.L.C. ("Sahuarita Mission"), an Arizona limited liability company, the Arizona State Land Department ("ASLD") and the Sahuarita Unified School District ("SUSD"). Each of these properties is located outside of the boundaries of the Rancho Sahuarita master-planned community, but within the general vicinity of the Town of Sahuarita, and the owners of Sahuarita Water thus concluded that the aforesaid change in name would be appropriate in order to reflect a more regional presence.

MISSION PEAKS 4000

A copy of Mission Peaks 4000's request for service is attached hereto as Appendix "B" and is incorporated herein by this reference. Attached hereto as Appendix "C" and incorporated herein by this reference is a copy of the legal description for Mission Peaks 4000's acreage. As noted in Appendix "B," Mission Peaks 4000 intends to facilitate the development of the 4,228 acres it owns, which is to be called the Mission Peaks Master-Planned Community ("Mission Peaks"). As currently envisioned, Mission Peaks will consist of (i) 11,123 single-family units, (ii) 2,371 active-adult units, (iii) 1,506 multi-family units, and (iv) an additional 1.1 million

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square feet of non-residential use, which will include commercial developments, recreation centers, places of worship, and a police and fire station. In addition, current plans contemplate one (1) high school, one (1) middle school and two (2) elementary schools. In response to Mission Peaks 4000's request, Sahuarita Water has advised Mission Peaks 4000 that Sahuarita Water is willing and able to provide the requested service, subject to (i) Sahuarita Water's prior receipt of a CC&N extension from the Commission authorizing provision of the requested water service on terms and conditions acceptable to Sahuarita Water, and (ii) the consummation of Commission-approved line extension agreements and off-site facilities agreements between Sahuarita Water and the master and/or subdivision developer(s) of Mission Peaks as and when determined to be appropriate by Sahuarita Water. In turn, Mission Peaks 4000 has requested that Sahuarita Water proceed with the preparation and filing of this Application. Copies of this exchange of correspondence between Sahuarita Water and Mission Peaks 4000 are attached hereto as Appendices "D" and "E," respectively, and are incorporated herein by this reference.

SAHUARITA MISSION

A copy of Sahuarita Mission's request for service is attached hereto as Appendix "F" and is incorporated herein by this reference. Attached hereto as Appendix "G" and incorporated herein by this reference is a copy of the legal description for Sahuarita Mission's acreage. As noted in Appendix "F," Sahuarita Mission contemplates the ultimate development of 3,000 single-family units on the 471 acres which it owns. In response to Sahuarita Mission's request, Sahuarita Water has advised Sahuarita Mission that Sahuarita Water is willing and able to provide the requested service, subject to (i) Sahuarita Water's prior receipt of a CC&N extension from the Commission authorizing provision of the requested water service on terms and conditions acceptable to Sahuarita Water, and (ii) the consummation of Commission-approved line extension agreements and off-site facilities agreements between Sahuarita Water and the master and/or subdivision developer(s) of Sahuarita Mission's acreage as and when determined to be appropriate by Sahuarita Water. In turn, Sahuarita Mission has requested that Sahuarita Water proceed with the preparation and filing of this Application. Copies of this exchange of

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correspondence between Sahuarita Water and Sahuarita Mission are attached hereto as Appendices "H" and "I," respectively, and are incorporated herein by this reference.

ASLD

A copy of ASLD's request for service is attached hereto as Appendix "J" and is incorporated herein by this reference. Attached hereto as Appendix "K" and incorporated herein by this reference is a copy of the legal description for ASLD's acreage. As noted in Appendix "J," ASLD currently contemplates a buildout density of 2,300 single-family units for the 634 acres which it owns. In response to ASLD's request, Sahuarita Water has advised ASLD that Sahuarita Water is willing and able to provide the requested service, subject to (i) Sahuarita Water's prior receipt of a CC&N extension from the Commission authorizing provision of the requested water service on terms and conditions acceptable to Sahuarita Water, and (ii) the consummation of Commission-approved line extension agreements and off-site facilities agreements between Sahuarita Water and the master and/or subdivision developer(s) of ASLD's acreage as and when determined to be appropriate by Sahuarita Water. Copies of the exchange of correspondence between Sahuarita Water and ASLD are attached as Appendices "J" and "L," respectively, and are incorporated herein by this reference.

SUSD

A copy of SUSD's request for service is attached hereto as Appendix "N" and is incorporated herein by this reference[2]. Attached hereto as Appendix "O" and incorporated herein by this reference is a copy of the legal description for SUSD's acreage. SUSD's real property consists of 112 acres, and is currently an uncertificated "island" within Sahuarita Water's existing CC&N, which contains several SUSD facilities. The existing school facilities on the SUSD acreage consist of a high school, a middle school and an elementary school. In response to SUSD's request, Sahuarita Water has advised SUSD that Sahuarita Water is willing and able to include SUSD's acreage within Sahuarita Water's certificated service area, subject to Sahuarita Water's prior receipt of a CC&N extension from the Commission authorizing

[2] Appendix "M" was reserved for what was anticipated to be a second letter from ASLD to Sahuarita Water. The wording of Appendix "J" obviates the necessity for a second letter from ASLD. Hence, Appendix "M" will not be used at this time.

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provision of the requested water service on terms and conditions acceptable to Sahuarita Water. In turn, SUSD has requested that Sahuarita Water proceed with the preparation and filing of this Application. Copies of this exchange of correspondence between Sahuarita Water and SUSD are attached hereto as Appendices "P" and "Q," respectively, and are incorporated herein by this reference.

Attached hereto as Appendix "R" and incorporated herein by this reference is a copy of a map which depicts the proposed extension of Sahuarita Water's CC&N which is the subject of this Application. As may be noted therefrom, the boundaries of the Mission Peaks 4000, Sahuarita Mission, ASLD and SUSD acreage, respectively, are depicted within the proposed CC&N extension area.

IV.

DESCRIPTION OF CONTEMPLATED WATER SYSTEM FACILITIES

Attached hereto as Appendix "S" and incorporated herein by this reference is a copy of a November 2007 Water System Master Plan ("Water Plan") for Sahuarita Water, as prepared by WestLand Resources, Inc. ("WestLand"). Because of the size of both (i) the population increases which will occur in its existing CC&N at buildout, and (ii) the population that would reside in the proposed CC&N extension area at projected buildout, Sahuarita Water retained WestLand to prepare a comprehensive analysis and plan for use in connection with the future development and management of Sahuarita Water's system. The Water Plan represents the resulting work product and planning tool. As may be noted from the following table, which appears on page 3 of the Water Plan, it is currently anticipated that at buildout of the existing CC&N and the proposed CC&N extension areas, Sahuarita Water would be serving a projected population of 82,681.[3]

[3] The 500 single-family units included in the Mission Peaks single-family unit total of 11,623 consists of families or individuals who currently haul water to their homes, and conceivably might be interested in purchasing water from Sahuarita Water on a standpipe basis, if Sahuarita Water's standpipe location in the Mission Peaks area would be closer to them than their present source(s) of supply.

Future Developments Population Projections

Development	SF Units	MF Units	AA Units	Total Units	Projected Population
Rancho Sahuarita	10,086	-	1,460	11,546	29,860
State Land	2,300	-	-	2,300	6,210
Sahuarita Mission	3,000	-	-	3,000	8,100
Mission Peaks	11,623*	1,506	2,371	15,500	38,511
Total	27,009	1,506	3,831	32,346	82,681

* includes 500 units for a stand-pipe system that would benefit nearby residents that truck water

It is currently anticipated that the provision of water service to residential and non-residential customers located within the proposed CC&N extension area will begin in 2010.[4] The following table sets forth by type of customer use and aggregate customer usage the water system development that it is anticipated will occur during the first five (5) years in that area. In that regard, the estimates of water system construction costs associated with the initial period of system development in the proposed CC&N extension area are included as a part of Appendix "T."

Sahuarita Water Company CC&N Extension 5-yr Summary

	Residential				Non-Residential		
Year	Single Family Units	Multi Family Units	Active Adult Units	Commercial (sq. ft.)	High School Students	Elementary School Students	ADD (gallons)
2010	100	174	100	30,000	1,226	2,350	154,108
2011	640	174	300	60,000	1,226	2,350	357,688
2012	1,430	174	600	90,000	1,226	2,350	655,318
2013	2,495	600	900	120,000	1,226	2,350	1,107,469
2014	3,335	1,000	1,361	150,000	1,226	3,637	1,552,402

Numbers are cumulative

The Water Plan consists of (i) 25 pages of discussion text, (ii) 17 tables, (iii) an appendix setting forth the demand calculations which were used in connection with determining and sizing needed new facilities and upgrades to existing facilities, and (iv) 2 engineering design exhibits depicting current and future water system plans for purposes of providing adequate and reliable water service within the existing CC&N and the proposed CC&N extension areas. The

[4] However, water service to SUSD, which has existing facilities, would begin as soon as the necessary arrangements between SUSD and Sahuarita Water could be finalized.

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discussion text, in turn, is organized into the following sections: Introduction; Scope and Approach; Engineering Criteria; Existing System Analysis; and Future System Analysis.

The following table summarizes Sahuarita Water's existing well production, booster station and storage reservoir capacities by pressure zones. In that regard, Pressure Zone 2950 N is shown separately since it operates on a separate infrastructure from the other three (3) current pressure zones.

Existing Reservoir/Booster Summary

Pressure Zone	Well Capacity (gpm)	Booster Capacity	Storage (gallons)
2850	3,300	0	2,200,000
2950	0	2,550	0
3050	0	2,250	0
Total	**3,300**	**4,800**	**2,200,000**
2950 N	0	1,850	350,000

Based upon the above-indicated population of 29,860 in the existing CC&N area at buildout, the following table sets forth WestLand's recommendations as to the indicated types of capacity on Sahuarita Water's system as of that point in time, including the addition of a fire flow capability.

Existing System Buildout Capacity Requirements

Zone	Well Requirement (PDD) (gpm)	Total Well Capacity[a] (gpm)	Fire Flow Requirement	Booster Requirement (PDD + FF)	Proposed Booster Capacity (gpm)	Storage Requirement[b] (ADD + FF)	Proposed Storage Capacity (gallons)
2850	1,658	3,900	1,500	N/A	N/A	1,373,664	2,200,000
2950	2,793	1,500	2,000	2,610	3,050	2,490,749	2,500,000
3050	483	0	2,250	2,733	4,650	408,058	
Total	**4,934**	**5,400**		**5,343**	**7,700**	**4,272,471**	**4,700,000**
2950 N	323	0	1,500	1,823	1,850	412,371[c]	350,000
Total	**323**	**0**	**1,500**	**1,823**	**1,850**	**412,371**	**350,000**

[a] The total well capacity is 6,900 gpm for Well No. 18, 21, 23, 24B and 25. However, to demonstrate the largest well out of service, 5,400, gpm is shown as the well capacity.

[b] The proposed Fire Flow requirement of 1,500 gpm for 2 hours was added to the 2850 Zone Storage Requirement. The proposed fire flow requirement of 2,000 gpm for 4 hours was added to the 2950 Zone Storage Requirement. Because the 3050 Zone is served by the 2950 Zone reservoir at buildout the proposed fire flow requirement of 2,250 gpm for 4 hours was reduced to 250 gpm for 4 hours for the 3050 Zone Storage Requirement.

[c] A Fire Flow requirement of 1,500 gpm for 2 hours was also added to the 2950 North Zone Storage Requirement.

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Exhibit 1 to the Water Plan also depicts the proposed water main infrastructure associated with the recommended capacity additions and upgrades.

In the event that the Commission approves the proposed CC&N extension which is the subject of this Application, Sahuarita Water's system capacity at buildout for the existing CC&N area would be substantially increased beyond that capacity indicated in the immediately preceding table. More specifically, five (5) new pressure zones would be created in connection with the provision of water service to and within the CC&N extension area. The related new facilities additions would include the drilling of approximately ten (10) new wells. It is currently anticipated that the production capacity of eight (8) of the new wells would be 1,500 gpm each, and that the two (2) other new wells would have a production capacity of 1,000 gpm and 750 gpm, respectively.

The Water Plan further recommends adding 10.7 million gallons of storage reservoir capacity to the existing 2.55 million gallons of capacity, in order to produce a total of 13.25 million gallons of storage reservoir capacity to serve the combined requirements of the existing CC&N and the proposed CC&N extension areas at buildout, including provision for a fire flow requirement in each area. This total storage reservoir capacity amount includes 1,544,918 gallons of "excess" capacity.

The Water Plan also recommends a substantial increase in booster station capacity in order that the appropriate pressures and flows could be maintained in the multiple pressure zones which would exist on Sahuarita Water's expanded system. WestLand's specific recommendations in this regard are detailed at pages 20-21 of the Water Plan. Each booster station would be equipped with manual transfer switches for use of a portable backup generator to insure continued operation in the event of a power outage; and, similar redundancy would exist for booster pump maintenance and replacement.

Finally, the Water Plan contemplates dual large diameter water mains, which would allow for both (i) the movement of large volumes of water through the system to storage reservoirs located at higher elevations, and (ii) continued water transport during the shut-down of one (1) main for maintenance purposes or in the event of a line break. Large diameter mains

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would also reduce system head loss, with a resultant reduction in electrical pumping costs. In connection with the foregoing, the Water Plan also provides for a concept distribution system loop for fire flow and redundancy purposes. Exhibit 2 to the Water Plan generally depicts the location of the recommended facilities additions associated with the proposed CC&N expansion.

V.

ESTIMATED COST AND FINANCING OF CONTEMPLATED WATER SYSTEM FACILITIES

Attached hereto as Appendix "T" and incorporated herein by this reference is an analysis of the estimated cost of construction of the water system facilities in the proposed CC&N extension area for the first five (5) years of development as contemplated by the Water Plan. These estimates (Opinion of Probable Construction Cost) have been prepared by WestLand, and are based upon a combination of water industry and construction industry indices, coupled with actual experience in order to reflect conditions in the metropolitan Tucson area. Thomas J. Bourassa, C.P.A., a utility consultant who is well known to the Commission and its Staff, in turn, has taken these estimates and he and Sahuarita Water's Controller have projected Sahuarita Water's plant account balances, by year, for the first five (5) years of operation. That information is also included as a part of Appendix "T."

In conjunction with financing the construction of the aforesaid water system facilities, Sahuarita Water currently anticipates that initially it would use a combination of funds provided by master developer(s) and/or subdivision developer(s), and common equity. In that regard, attached hereto as Appendix "U" and incorporated herein by this reference is a pro forma Balance Sheet and a pro forma Income Statement reflecting the financial condition of Sahuarita Water for five (5) projected twelve (12) month periods ending December 31 following the commencement of water service to customers in the proposed CC&N extension area. Funds obtained from master developer(s) and/or subdivision developer(s) would be by means of line extension agreements and off-site facilities agreements approved by the Commission. The pro forma Balance Sheet also includes supporting schedules which depict current projections of advances in aid of construction and contributions in aid of construction which Sahuarita Water

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

would receive in connection with the proposed CC&N extension. In addition, it is conceivable that at some point in the buildout of the existing CC&N and CC&N extension areas, Sahuarita Water may conclude that it also would be appropriate to finance a portion of the water system capacity additions with long-term debt. In such event, Sahuarita Water would seek and obtain Commission authorization before incurring any long-term debt.

The financing of transmission mains of 8-inch or less, as well as distribution facilities within individual subdivisions in the existing CC&N and CC&N extension areas, will probably continue to be accomplished in large measure by the use of line extension agreements approved by the Commission. On occasion, and if consistent with Sahuarita Water's then current financial needs, common equity might be considered as a means of financing for a portion of the overall transmission system.

VI.

PROPOSED RATES AND CHARGES

Sahuarita Water proposes to charge its existing Commission-approved rates and charges for water service in the proposed CC&N extension area.

VII.

ESTIMATED ANNUAL OPERATING REVENUES, EXPENSES AND CUSTOMERS

Also attached hereto as part of Appendix "U" are schedules depicting, by year for the first five (5) years of operation, the estimated annual number of customers and associated operating revenues and expenses for Sahuarita Water's operations in the CC&N extension area. These estimates have been prepared by the aforesaid Mr. Bourassa and Sahuarita Water's Controller, and are based upon a combination of (i) development pace estimates provided by Mission Peaks 4000/Sahuarita Mission/ASLD, (ii) projected expenditures prepared by Mr. Bourassa in consultation with Sahuarita Water, and (iii) Sahuarita Water's current rates and charges for water service.

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

VIII.

ESTIMATED SCHEDULE FOR CONSTRUCTION OF WATER SYSTEM FACILITIES

As indicated in Appendix "A" (Demand Calculations) to the Water Plan, it is currently anticipated that development in the proposed CC&N extension area will occur in multiple phases over a thirty (30) year period of time. However, it is important to recognize that the dates associated with projected commencement and completion of construction of facilities are estimates, not guarantees, and that the actual dates will be significantly influenced by the pace at which development actually occurs.

IX.

ANALYSIS OF ASSURED WATER SUPPLY

Attached hereto as Appendix "V" and incorporated herein by this reference is a copy of (i) an Application For Modification of Designation of Assured Water Supply ("Modification Application"), and (ii) an Assured Water Supply Hydrology Report For Sahuarita Water Company ("Report"), as prepared by Brown and Caldwell, a highly respected engineering and hydrology firm providing professional consulting services to the water utility industry in a number of states, including Arizona. The Modification Application and the Report were submitted to the Arizona Department of Water Resources ("ADWR") on November 23, 2007. The Modification Application requests that Sahuarita Water's current Designation of Assured Water Supply be modified, by way of an increase, to reflect its ability to fully provide the projected water demand at buildout in both the existing CC&N and proposed CC&N extension areas for the statutorily-prescribed 100 years. Sahuarita Water currently has a Designation of Assured Water Supply from ADWR of 4,700 annual acre feet. As noted in the Executive Summary portion of the Report, the hydrogeologic analysis therein presented demonstrates the physical availability of 10,983 acre feet per year of local groundwater for both the existing CC&N and the proposed CC&N extension areas of Sahuarita Water at buildout for the requisite 100 year period.

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

Upon receipt from ADWR of the Modification of Designation of Assured Water Supply which has been requested, Sahuarita Water will file a copy of the same with the Commission in the docketed proceeding which is established to process this Application.

In addition, on its own initiative, Sahuarita Water also retained Brown and Caldwell to conduct a well spacing-well impact analysis of the contemplated supply wells for the proposed CC&N extension area. Attached hereto as Appendix "W" and incorporated herein by this reference is a copy of the December 5, 2007 Well Impact Study Report prepared by Brown and Caldwell to reflect the results of that analysis. As may be noted therefrom, the groundwater level drawdowns caused by the contemplated supply wells would not exceed any of the drawdown limits allowed under ADWR's Well Spacing and Well Impact Rules.

X.

CURTAILMENT TARIFF

Attached hereto as Appendix "X" and incorporated herein by this reference is a copy of the Curtailment Plan Tariff ("Tariff") which the Commission has previously approved for use in Sahuarita Water's existing CC&N. In that regard, the water company has inserted the necessary signage information that was left blank in the Stage 3 and Stage 4 portions of the form of Tariff approved by the Commission. Sahuarita Water intends to use the same curtailment plan in connection with its proposed provision of water service to and within the proposed CC&N extension area.

XI.

ADDITIONAL APPROVALS

Sahuarita Water has a water utility franchise from Pima County, Arizona, which would, by its terms, also be applicable to the provision of water service to and within the proposed CC&N extension area.

In the event of a Commission decision granting Sahuarita Water the CC&N extension requested by this Application, and in connection with subsequent construction of the contemplated water system for the CC&N extension area, Sahuarita Water will file with the Commission copies of the Approval(s) to Construct and Approval(s) of Construction which are

issued by the Arizona Department of Environmental Quality from time to time in connection with the design and construction of the various phases of the water system for the CC&N extension area.

XII.

MISCELLANEOUS

With the exception of the 112 acre SUSD acreage, which is located within the municipal boundaries of the Town of Sahuarita, all of the acreage included within the proposed CC&N extension area is not located within any city or town. In addition, such acreage is not located within the existing certificated service area of any public service corporation or municipal system providing water service. Finally, there are no existing water utility service connections within the proposed CC&N extension area.

XIII.

CONCLUSION

WHEREFORE, and based upon the discussion set forth in the preceding sections of this Application and the information contained in Appendices "A" through "X" hereto, Sahuarita Water respectfully requests that the Commission issue an Opinion and Order granting Sahuarita Water an extension to its existing CC&N thereby authorizing it to provide water service to and within the area(s) legally described and graphically depicted in Appendices "C," "G," "K," "O" and "R" hereto, respectively.

Dated this 13th day of December 2007.

Respectfully submitted,

Lawrence V. Robertson, Jr.
Attorney for Sahuarita Water Company, L.L.C.

The original and thirteen (13) copies of the foregoing Application have been delivered to a courier this 13th day of

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

December 2007 for subsequent filing with:

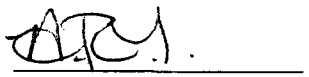
Docket Control
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

A copy of the foregoing Application will also be delivered by courier to:

Christopher Kempley, Chief Counsel
Legal Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Ernest Johnson, Director
Utilities Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629



LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

APPENDIX "A"

(Certificate of Good Standing)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

STATE OF ARIZONA

Office of the

CORPORATION COMMISSION

CERTIFICATE OF GOOD STANDING

To all to whom these presents shall come, greeting:

I, Brian C. McNeil, Executive Director of the Arizona Corporation Commission, do hereby certify that

*******SAHUARITA WATER COMPANY, L.L.C.******

a domestic limited liability company organized under the laws of the State of Arizona, did organize on the 30th day of December 1996.

I further certify that according to the records of the Arizona Corporation Commission, as of the date set forth hereunder, the said limited liability company is not administratively dissolved for failure to comply with the provisions of A.R.S. section 29-601 et seq., the Arizona Limited Liability Company Act; and that the said limited liability company has not filed Articles of Termination as of the date of this certificate.

This certificate relates only to the legal existence of the above named entity as of the date issued. This certificate is not to be construed as an endorsement, recommendation, or notice of approval of the entity's condition or business activities and practices.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the Arizona Corporation Commission. Done at Phoenix, the Capital, this 3rd Day of December, 2007, A. D.

Executive Director

Order Number: 192037

APPENDIX "B"

(Letter from Mission Peaks 4000, L.L.C. requesting water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

MISSION PEAKS 4000, LLC
901 North Green Valley Parkway, Suite 190
Henderson, NV 89074
(702) 458-8855

November 29, 2007

Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Re: Request for Water Service for Mission Peaks Master Planned Community

Dear Mr. Seamans:

Mission Peaks 4000, L.L.C. ("Mission Peaks 4000") hereby formally requests that Sahuarita Water Company, L.L.C. ("Sahuarita Water") undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to and within approximately 4,217 acres of land which Mission Peaks 4000 owns in an unincorporated area of Pima County, Arizona, northwest of the Town of Sahuarita. Attached to this letter as Appendix "A" are legal descriptions of the acreage in question.

Mission Peaks 4000 intends to cause or facilitate the development of a master-planned community on its aforesaid acreage, which may be known as the Mission Peaks Master Planned Community ("Mission Peaks"). As currently contemplated, Mission Peaks will consist of approximately (i) 11,123 single-family units, (ii) 2,371 active-adult units, (iii) 1,506 multi-family units, and (iv) an additional 1.1 million square feet of non-residential use, which will include commercial development, recreation centers, places of worship, schools and a police and fire station. In that regard, and as a result of previous discussions we have had with you upon this subject, it is our understanding that the projected water system demands associated with the Mission Peaks project have been included in a Water System Master Plan that WestLand Resources, Inc. has recently prepared for Sahuarita Water.

Please advise us in writing if Sahuarita Water is interested in becoming the lawfully authorized provider of water service to Mission Peaks. In that regard, you may use this request for water service in connection with any approvals Sahuarita Water must obtain from regulatory or permitting agencies or entities.

Sincerely,

Mathew Lawson
Vice President of Community Development
Mission Peaks 4000, L.L.C.

APPENDIX "C"

(Mission Peaks 4000, L.L.C. land legal description)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

July 27, 2007
Psomas # 95016-10

EXHIBIT A

LEGAL DESCRIPTION
RANCHO SAHUARITA WATER COMPANY BOUNDARY

Section 24, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT the north one-half of the north one-half said Section 24, and **FURTHER EXCEPTING** any portion lying within the right-of way of Mission -Twin Buttes Road.

Section 25, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying southerly of the northerly right of way line of Mission - Twin Buttes Road.

Section 26, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona.

The east one-half of Section 27, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona.

A portion of northeast one-quarter of Section 34, Township 17 South, Range 12 East, Gila and Salt River Meridian, described as Parcel 2 of Quiet Desert Ranches, recorded in Book 14 Records of Survey at Page 53, records of Pima County, Arizona.

Those portions of the west one-half of Section 35, Township 17 South, Range 12 East, Gila and Salt River Meridian, described as Parcels 5, 12, 13 and 14 of Quiet Desert Ranches, recorded in Book 13 Records of Survey at Page 70, being corrected in Book 14 Records of Survey at Page 35, and again in Book 14 Records of Survey at Page 53, records of Pima County, Arizona.

The East one-half of Section 35, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying within the right of way of Mission -Twin Buttes Road and **FURTHER EXCEPTING** any portion lying within the right of way of McGee Ranch Road, also known as Twin Buttes - McGee Road.

The North one-half of Section 36, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying southeasterly of the northwesterly right of way line of Mission -Twin Buttes Road.

The southwest one-quarter of the northwest one-quarter of Section 1, Township 18 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying northeasterly of the southwesterly right of way line of Mission -Twin Buttes Road.

Lots 1 and 2 and the south one-half of the northeast one-quarter of Section 2, Township 18 South, Range 12 East, Gila and Salt River Meridian Pima County, Arizona,

EXCEPT any portion lying within the right of way of Mission -Twin Buttes Road.

Section 16, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying northerly of the southerly right of way of Helmet Peak – Sahuarita Road.

Section 19, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying within the right of way of Mission -Twin Buttes Road.

Section 20, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying southerly of the northerly right of way line of Twin Buttes Road and **FURTHER EXCEPTING** the north 30 feet of the west one-half of said Section 20 and **FURTHER EXCEPTING** Lot 28 of Pimeria Alta Estates as recorded in Book 38 of maps and plats at page 9 therein, Records of Pima County, Arizona.

The west one-half of Section 21, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying easterly of the following described line;

COMMENCING at the northeast corner of said west one-half;

THENCE upon the north line of said west one-half, S 89°25'53" W, a distance of 959.80 feet to the **POINT OF BEGINNING**;

THENCE southerly upon the west line of that parcel as described in Docket 7437 at page 453 therein, Records of Pima County, Arizona, S 01°20'28" E to the northerly right of way line of Twin Buttes Road and the **POINT OF TERMINUS**.

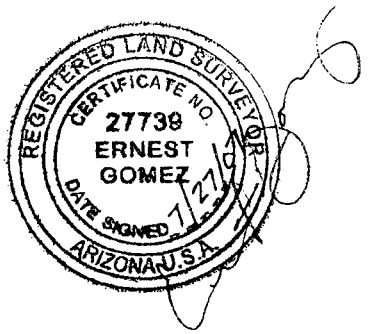
FURTHER EXCEPTING any portion lying southerly of the northerly right of way line of Twin Buttes Road.

The north one-half and the southwest one-quarter of Section 30, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona,

EXCEPT any portion lying southerly of the northerly right of way line of Twin Buttes Road and **FURTHER EXCEPTING** any portion lying easterly and southerly of the westerly and northerly right of way lines of Mission -Twin Buttes Road.

See attached Exhibit B

Prepared by:
Psomas



Ernest Gomez AZ. R.L.S. 27739

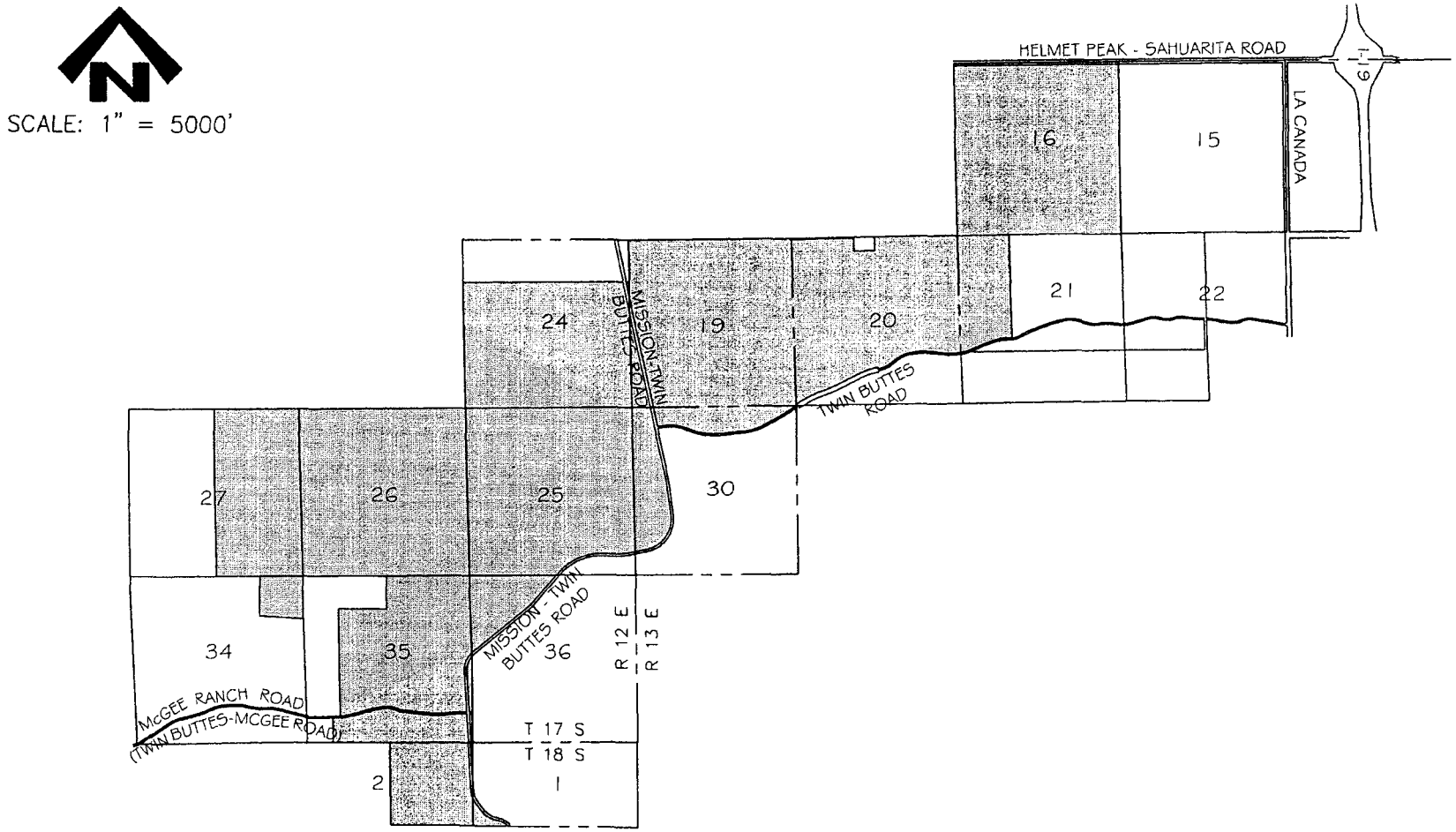


EXHIBIT B

RANCHO SAHUARITA WATER COMPANY BOUNDARY

PORTIONS OF SECTIONS 24–27, 34 & 35, TOWNSHIP 17 SOUTH, RANGE 12 EAST
AND PORTIONS OF SECTIONS 16, 19–21 & 30, TOWNSHIP 17 SOUTH, RANGE 13 EAST
AND PORTIONS OF SECTIONS 1 & 2, TOWNSHIP 18 SOUTH, RANGE 12 EAST
GILA & SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA

PSOMAS
800 E. Wetmore Road, Suite 110
Tucson, AZ 85719
(520) 292–2300 (520) 292–1290 fax
www.psomas.com

95016–10

DATE: July, 07 • DRAWN BY: mrf

E:\95016\10\Constraints\legal\water_dist_bndy.dwg egomez Fri, 27 Jul 2007, 10:52am

APPENDIX "D"

(Sahuarita Water Company, L.L.C. letter responding to Mission Peaks 4000, L.L.C.'s request for water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Water Company

November 29, 2007

Matt Lawson, Vice President Community Development
Mission Peaks 4000, L.L.C.
901 N. Green Valley Parkway, Suite 190
Henderson, Nevada 89074

Re: Request For Water Service For
Mission Peaks Master Planned Community
("Mission Peaks")

Dear Mr. Lawson:

This letter will acknowledge Sahuarita Water Company, L.L.C.'s ("Sahuarita Water") receipt of your November 29, 2007 letter requesting that Sahuarita Water undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to Mission Peaks which Mission Peaks 4000, L.L.C. ("Mission Peaks 4000") contemplates developing.

Sahuarita Water is interested in becoming the lawfully authorized provider of water service to Mission Peaks, and is willing and able to do so, subject to prior receipt of the necessary approvals and authorizations from governmental entities with jurisdiction over Sahuarita Water's water provider operations. These will include the receipt of the necessary certificate of convenience and necessity from the Arizona Corporation Commission ("ACC"), and ACC approval of such line extension agreements and off-site facilities agreements as Sahuarita Water may find to be necessary.

In that regard, as a condition to Sahuarita Water's willingness to proceed with such actions as may be necessary to obtain the requisite approvals and authorizations, Sahuarita Water will require that Mission Peaks 4000 reimburse Sahuarita Water for any expenses Sahuarita Water may incur in connection with such efforts. Sahuarita Water believes that the cost of such activities should not be borne by the ratepayers of its existing certificated service area.

If the foregoing condition is acceptable to Mission Peaks 4000, please so advise me in writing and Sahuarita Water will promptly undertake to obtain the approvals and authorizations necessary to enable it to be the lawful water provider to the Mission Peaks.

Sincerely,

Sahuarita Water Company, L.L.C.

By: _____
Mark J. Seamans, General Manager

Field Office: c/o Rancho Resort, 15900 S. Rancho Resort Blvd., P.O. Box 1520, Sahuarita, AZ 85629-0530
Ph. (520) 399-1105 Fax (520) 399-1095

APPENDIX "E"

(Mission Peaks 4000, L.L.C.'s reply to Sahuarita Water Company, L.L.C.'s response to Mission Peaks 4000, L.L.C.'s request for water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

MISSION PEAKS 4000, LLC
901 North Green Valley Parkway, Suite 190
Henderson, NV 89074
(702) 458-8855

November 29, 2007

Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Re: Request for Water Service for Mission Peaks Master Planned Community

Dear Mr. Seamans:

The condition outlined in your letter of November 29, 2007 to me is acceptable to Mission Peaks 4000, L.L.C. ("Mission Peaks 4000"). Accordingly, please proceed with all actions necessary to enable Sahuarita Water Company, L.L.C. ("Sahuarita Water") to become the lawful water provider to Mission Peaks.

In that regard, please provide me with a copy of all documents filed with such governmental entities from whom the necessary approvals or authorizations are requested by Sahuarita Water; and, please provide me with periodic statements of fees and costs incurred by Sahuarita Water in connection with its efforts on our behalf, in order that Mission Peaks 4000 may either directly pay the same or reimburse Sahuarita Water.

Sincerely,

Mathew Lawson
Vice President Community Development
Mission Peaks 4,000, L.L.C.

APPENDIX "F"

(Letter from Sahuarita Mission Partners, L.L.C.
requesting water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

SHARPE & ASSOCIATES, INC.
4549 E. Fort Lowell Road • Tucson, AZ 85712 • (520) 299-8766
FAX (520) 529-3137

November 28, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request for Water Service For
Sahuarita Mission
("Sahuarita Mission")

Dear Mr. Seamans:

Sahuarita Mission Partners, L.L.C. ("Sahuarita Mission") hereby formally requests that Sahuarita Water Company, L.L.C. ("Sahuarita Water") undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to and within approximately 471 acres of land which Sahuarita Mission owns in an unincorporated area of Pima County, Arizona, northwest of the Town of Sahuarita. Attached to this letter as Appendix "A" is a legal description of the acreage in question.

Sahuarita Mission intends to cause or facilitate the development of approximately 3,000 single-family residential units on its aforesaid acreage, which will be known as Sahuarita Mission. In that regard, and as a result of previous discussions we have had with you upon this subject, it is our understanding that the projected water system demands associated with Sahuarita Mission project have been included in a Water System Master Plan that WestLand Resources, Inc. has recently prepared for Sahuarita Water.

Please advise us in writing if Sahuarita Water is interested in becoming the lawfully authorized provider of water service to Sahuarita Mission. In that regard, you may use this request for water service in connection with any approvals Sahuarita Water must obtain from regulatory or permitting agencies or entities.

Sincerely,

Sahuarita Mission Partners, L.L.C.

APPENDIX "G"

(Sahuarita Mission Partners, L.L.C. land legal description)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

ORDER NO. 61377 NCA

LEGAL DESCRIPTON

EXHIBIT "A"

AN UNDIVIDED 83.3335% INTEREST IN AND TO THE FOLLOWING DESCRIBED PARCELS:

PARCEL 1:

That portion of Sections 12 and 13, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona, described as follows:

BEGINNING at the Southwest corner of said Section 12;

THENCE North 00 degrees 26 minutes 09 seconds West along the West line of said Section 12 a distance of 1,550.77 feet to the Westerly right-of-way line of Mission Road as shown on Book 2 of Records of Survey at Page 57, Records of Pima County, Arizona, said point being on the arc of a non-tangent curve concave to the Southwest; a radial line of said curve through said point having a bearing of North 42 degrees 32 minutes 51 seconds East;

THENCE Southerly along the arc of said curve, to the right, having a radius of 2814.79 feet and a central angle of 08 degrees 52 minutes 56 seconds for an arc distance of 436.35 feet to a point of tangency;

THENCE South 38 degrees 34 minutes 14 seconds East along said right-of-way line a distance of 630.70 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,195.92 feet and a central angle of 24 degrees 57 minutes 28 seconds for an arc distance of 520.94 feet to a point of tangency;

THENCE South 63 degrees 31 minutes 42 seconds East along said right-of-way line a distance of 162.19 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 805.20 feet and a central angle of 50 degrees 46 minutes 44 seconds for an arc distance of 706.70 feet to a point of tangency;

THENCE South 02 degrees 44 minutes 58 seconds East along said right-of-way line a distance of 87.39 feet;

THENCE South 03 degrees 24 minutes 50 seconds East along the re-established right-of-way line of Mission Road a distance of 119.84 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,959.86 feet and a central angle of 29 degrees 57 minutes 05 seconds for an arc distance of 1,024.55 feet to a point of tangency;

THENCE South 33 degrees 21 minutes 55 seconds East along said right-of-way line a distance of 284.14 feet to the South line of the North Half of the Northwest Quarter of said Section 13;

THENCE North 89 degrees 49 minutes 15 seconds West along the South line of said North Half a distance of 2,073.85 feet to the West line of said Northwest Quarter;

THENCE North 00 degrees 14 minutes 11 seconds West along said West line a distance of 1,119.95 feet to the POINT OF BEGINNING.

PARCEL II:

That portion of Section 13, Township 17 South, Range 12 East, Gila and Salt River Base and Meridian, Pima County, Arizona, and that portion of the Waring Lode Mining Claim in Pima Mining District being shown on Mineral Survey No. 4187 on file in the Bureau of Land Management as granted by Patent recorded in Book 34 of Deeds of Mines at Page 220, Pima County Records, described as follows:

COMMENCING at the Southeast corner of said Section 13;

THENCE North 89 degrees 55 minutes 36 seconds West along the South line of said Section 13 a distance of 445.60 feet to the POINT OF BEGINNING, said point being on the Westerly right-of-way line of Mission Road as re-established from the existing paving of said road;

THENCE continue North 89 degrees 55 minutes 36 seconds West along said South line of Section 13 a distance of 2,651.19 feet to a line 440.00 feet West of and parallel with North-South midsection line of said Section 13;

THENCE North 00 degrees 16 minutes 37 seconds West along said parallel line a distance of 1,740.03 feet to said right-of-way line of Mission Road;

THENCE South 33 degrees 21 minutes 56 seconds East along said right-of-way line a distance of 1,976.94 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,452.40 feet and a central angle of 24 degrees 53 minutes 35 seconds for an arc distance of 644.07 feet to a point of tangency;

THENCE South 58 degrees 15 minutes 38 seconds East along said right-of-way line a distance of 434.74 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 1147.53 feet and a central angle of 32 degrees 57 minutes 22 seconds for an arc distance of 660.05 feet to a point of tangency;

THENCE South 25 degrees 18 minutes 14 seconds East along said right-of-way line a distance of 430.76 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 557.49 feet and a central angle of 13 degrees 52 minutes 12 seconds for an arc distance of 207.56 feet to a point of tangency;

THENCE South 11 degrees 26 minutes 02 seconds East along said right-of-way line a distance of 352.14 feet to the POINT OF BEGINNING.

EXCEPT from the above described properties and any and all rights to oil, gas, minerals and associated hydrocarbons as reserved in Docket 2220 at Page 266 and in Docket 7944 at Page 306.

PARCEL III:

That portion of Section 13, Township 17 South, Range 12 East, Gila and Salt River Base and Meridian, Pima County, Arizona, and that portion of the Waring Lode Mining Claim in Pima Mining District being shown on Mineral Survey No. 4187 on file in the Bureau of Land Management as granted by patent recorded in Book 34 of Deeds of Mines at Page 220, Pima County Records, described as follows:

BEGINNING at the Southeast corner of said Section 13;

THENCE North 89 degrees 55 minutes 36 seconds West along the South line of said Section 13 a distance of 343.54 feet to the Easterly right-of-way line of Mission Road as re-established from the existing paving of said road;

THENCE North 11 degrees 26 minutes 02 seconds West along said right-of-way line a distance of 372.50 feet to a point of curvature of a tangent curve concave to the West;

THENCE Northerly along the arc of said curve, to the left, having a radius of 957.46 feet and a central angle of 13 degrees 52 minutes 12 seconds for an arc distance of 231.79 feet to a point of tangency;

THENCE North 25 degrees 18 minutes 14 seconds West along said right-of-way line a distance of 430.76 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Northerly along the arc of said curve, to the left, having a radius of 1,267.53 feet and a central angle of 32 degrees 57 minutes 22 seconds for an arc distance of 717.57 feet to the point of tangency;

THENCE North 58 degrees 15 minutes 38 seconds West along said right-of-way line a distance of 434.74 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Northerly along the arc of said curve, to the right, having a radius of 1,352.40 feet and a central angle of 24 degrees 53 minutes 35 seconds for an arc distance of 600.62 feet to a point of tangency;

THENCE North 33 degrees 21 minutes 58 seconds West along said right-of-way line a distance of 2519.86 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Northerly along the arc of said curve, to the right, having a radius of 1,559.75 feet and a central angle of 29 degrees 57 minutes 06 seconds for an arc distance of 972.27 feet to a point of tangency;

THENCE North 03 degrees 24 minutes 50 seconds West along said right-of-way line a distance of 40.50 feet to a point 75.00 feet South of and parallel with the North line of said Section 13, said point being on the South right-of-way line of Helmet Peak Road;

THENCE South 89 degrees 43 minutes 16 seconds East along said parallel line a distance of 1,606.47 feet to the East line of the Northeast Quarter of said Section 13;

THENCE South 00 degrees 14 minutes 59 seconds East along said East line a distance of 2,555.56 feet to the Southeast corner of said Northeast Quarter;

THENCE South 00 degrees 14 minutes 15 seconds East along the East line of Government Lot 1 and 4 of said Section 13 a distance of 2,630.26 feet to the POINT OF BEGINNING;

EXCEPT any and all rights to oil, gas, minerals and associated hydrocarbons as reserved in Docket 2220 at Page 266 and in Docket 7944 at Page 314.

APPENDIX "H"

(Sahuarita Water Company, L.L.C. letter responding to Sahuarita Mission Partners, L.L.C.'s request for water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Water Company

November 28, 2007

Robert M. Sharpe, General Partner
Sahuarita Mission Partners, L.L.C.
4549 E. Fort Lowell Road
Tucson, Arizona 85712

Re: Request For Water Service For
Sahuarita Mission ("Sahuarita Mission")

Dear Mr. Sharpe:

This letter will acknowledge Sahuarita Water Company, L.L.C.'s ("Sahuarita Water") receipt of your November 28, 2007 letter requesting that Sahuarita Water undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to the Sahuarita Mission acreage which Sahuarita Mission Partners L.L.C. ("Sahuarita Mission") contemplates developing or facilitating the development of.

Sahuarita Water is interested in becoming the lawfully authorized provider of water service to the Sahuarita Mission acreage, and is willing and able to do so, subject to prior receipt of the necessary approvals and authorizations from governmental entities with jurisdiction over Sahuarita Water's water provider operations. These will include the receipt of the necessary certificate of convenience and necessity from the Arizona Corporation Commission ("ACC"), and ACC approval of such line extension agreements and off-site facilities agreements as Sahuarita Water may find to be necessary.

In that regard, as a condition to Sahuarita Water's willingness to proceed with such actions as may be necessary to obtain the requisite approvals and authorizations, Sahuarita Water will require that Sahuarita Mission reimburse Sahuarita Water for Sahuarita Mission's proportionate share of any expenses Sahuarita Water may incur in connection with such efforts. Sahuarita Water believes that the cost of such activities should not be borne by the ratepayers of its existing certificated service area.

If the foregoing condition is acceptable to Sahuarita Mission, please so advise me in writing and Sahuarita Water will promptly undertake to obtain the approvals and authorizations necessary to enable it to be the lawful water provider to Sahuarita Mission.

Sincerely,

Sahuarita Water Company, L.L.C.

By: _____
Mark J. Seamans, General Manager

Field Office: c/o Rancho Resort, 15900 S. Rancho Resort Blvd., P.O. Box 1520, Sahuarita, AZ 85629-0530
Ph. (520) 399-1105 Fax (520) 399-1095

APPENDIX "I"

(Sahuarita Mission Partners, L.L.C.'s reply to Sahuarita Water Company, L.L.C.'s response to Sahuarita Mission Partners, L.L.C.'s request for water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

SHARPE & ASSOCIATES, INC.
4549 E. Fort Lowell Road • Tucson, AZ 85712 • (520) 299-8766
FAX (520) 529-3137

November 28, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request For Water Service For
Sahuarita Mission ("Sahuarita Mission")

Dear Mr. Seamans:

The condition outlined in your letter of November 28, 2007 to me is acceptable to Sahuarita Mission Partners, L.L.C. ("Sahuarita Mission"). Accordingly, please proceed with all actions necessary to enable Sahuarita Water Company, L.L.C. ("Sahuarita Water") to become the lawful water provider to Sahuarita Mission.

In that regard, please provide me with a copy of all documents filed with such governmental entities from whom the necessary approvals or authorizations are requested by Sahuarita Water; and, please provide me with periodic statements of fees and costs incurred by Sahuarita Water in connection with its efforts on our behalf, in order that Sahuarita Mission may either directly pay the same or reimburse Sahuarita Water.

Sincerely,

Sahuarita Mission Partners, L.L.C.
By: _____
Robert M. Sharpe, General Partner

APPENDIX "J"

(Letter from Arizona State Land Department requesting water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

ARIZONA STATE LAND DEPARTMENT

Janet Napolitano
Governor

Mark Winkleman
State Land
Commissioner

December 12, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request for Water Service For
Arizona State Land Department ("ASLD")

Dear Mr. Seamans:

Arizona State Land Department ("ASLD") hereby formally requests that Sahuarita Water Company, L.L.C. ("Sahuarita Water") undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to and within approximately 634 acres of land which ASLD owns in an unincorporated area of Pima County, Arizona, northwest of the Town of Sahuarita. Attached to this letter as Appendix "A" is a legal description of the acreage in question.

ASLD intends to facilitate the development of approximately 2,300 single-family residential units on its aforesaid acreage. In that regard, it is ASLD's understanding that the projected water system demands associated with such development have been included in a Water System Master Plan that WestLand Resources, Inc. has recently prepared for Sahuarita Water.

Please advise us in writing if Sahuarita Water is interested in becoming the lawfully authorized provider of water service to ASLD's acreage. In that regard, you may use this request for water service in connection with any approvals Sahuarita Water must obtain from regulatory or permitting agencies or entities. This can be accomplished by Sahuarita Water's actions with the Arizona Corporation Commission and by issuing ASLD a letter of intent to serve.

Sincerely,

Jamie Hogue
Deputy Commissioner
Arizona State Land Department

C: Paul Wichmann, Southern Arizona State Land Department

1616 West Adams, Phoenix, AZ 85007 • www.land.az.gov

May 24, 2006

EXHIBIT "A"

Rancho Maria: Description of State Parcel in Section 16

Section 16, Township 17 South, Range 13 East of the Gila and Salt River Meridian, Pima County, Arizona.

Excepting therefrom that portion of said Section 16 lying withinthe right-of-way of Helmet Peak Road, Road Proceeding No. 1019 as recorded in Book 8 of Road Maps at Page 97, records of Pima County, Arizona.

See Exhibit 'B' attached hereto and made a part hereof.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
39333
WENDELL T.
HARNESS
Date Signed 5-24-06
ARIZONA U.S.A.

Prepared for and on behalf of

M M L A
P S O M A S

Project No. 95016-10

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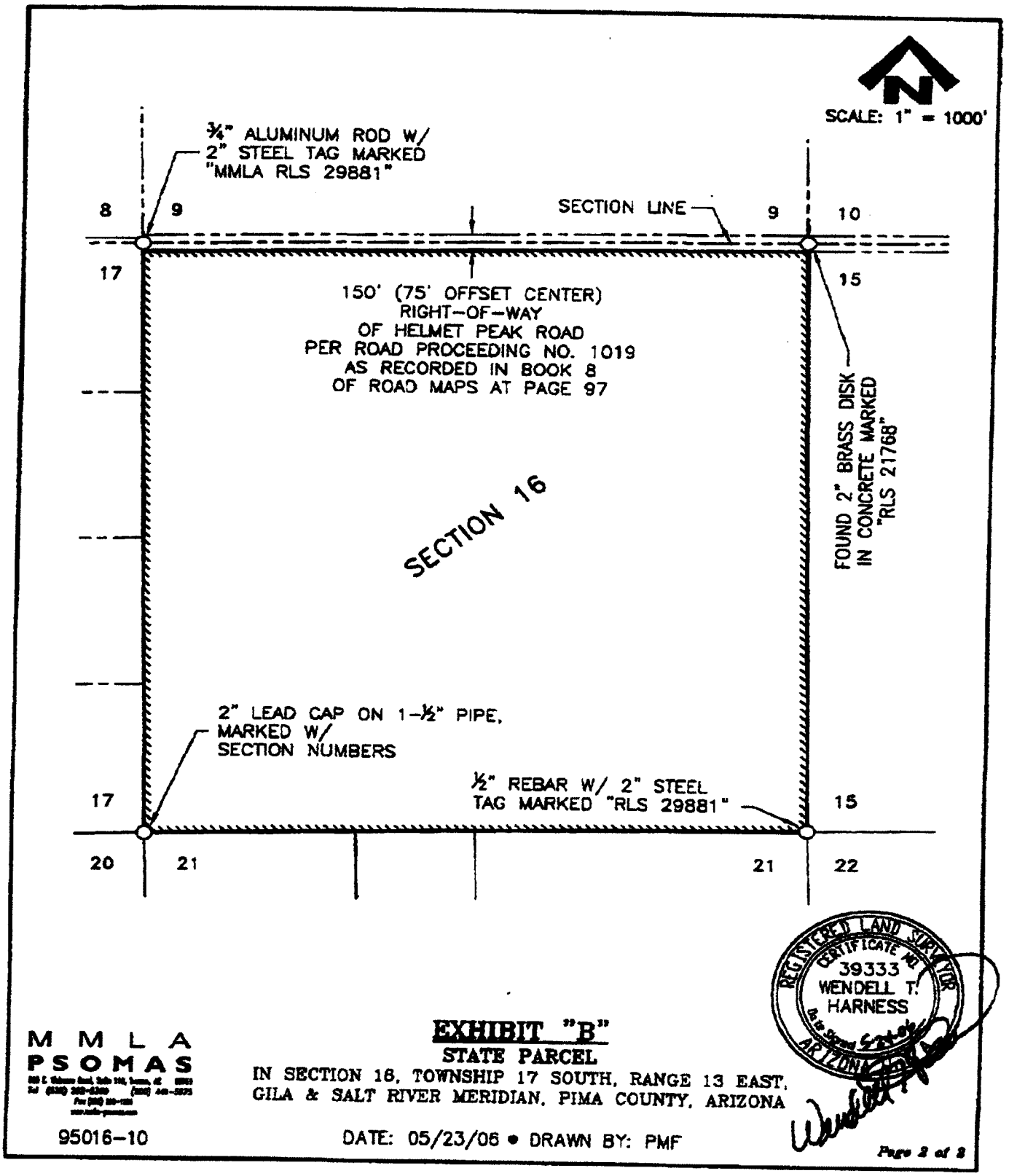

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
39333
WENDELL T.
HARNESS
ARIZONA

M M L A
P S O M A S

EXHIBIT "B"

STATE PARCEL

IN SECTION 16, TOWNSHIP 17 SOUTH, RANGE 13 EAST,
GILA & SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA

95016-10

DATE: 05/23/06 • DRAWN BY: PMF

APPENDIX "K"

(Arizona State Land Department legal description)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

May 24, 2006

EXHIBIT "A"

Rancho Maria: Description of State Parcel in Section 16

Section 16, Township 17 South, Range 13 East of the Gila and Salt River Meridian, Pima County, Arizona.

Excepting therefrom that portion of said Section 16 lying withinthe right-of-way of Helmet Peak Road, Road Proceeding No. 1019 as recorded in Book 8 of Road Maps at Page 97, records of Pima County, Arizona.

See Exhibit 'B' attached hereto and made a part hereof.

Prepared for and on behalf of

M M L A
P S O M A S

Project No. 95016-10

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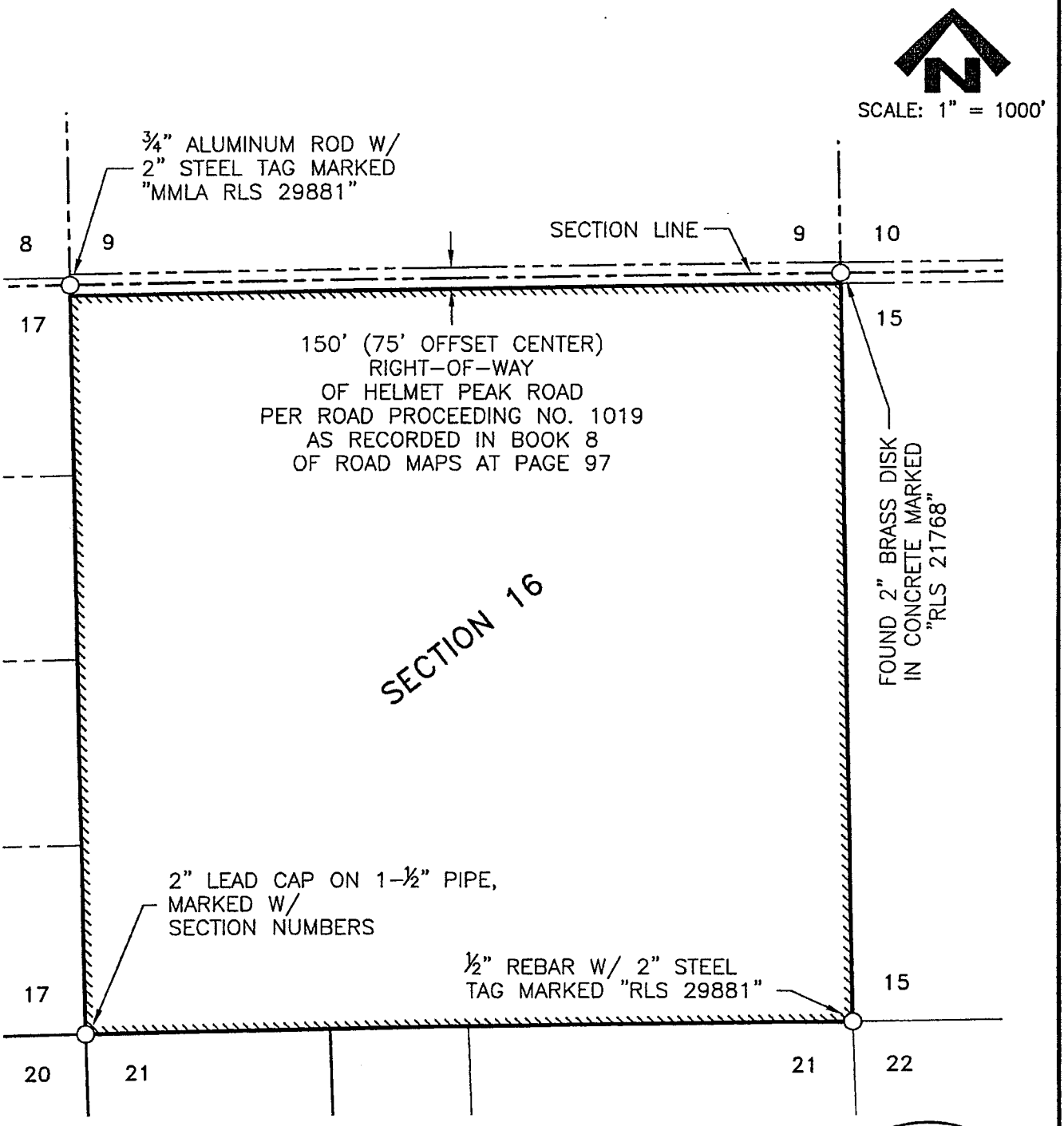

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
39333
WENDELL T.
HARNESS
Date Signed 5-24-06
ARIZONA U.S.A.

Wendell Harness

M M L A
PSOMAS
800 E. Wetmore Road, Suite 110, Tucson, AZ 85719
Tel (520) 292-2300 (800) 441-5875
Fax (520) 292-1290
www.mmla-psomas.com

EXHIBIT "B"

STATE PARCEL

IN SECTION 16, TOWNSHIP 17 SOUTH, RANGE 13 EAST,
GILA & SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA

95016-10

DATE: 05/23/06 • DRAWN BY: PMF

APPENDIX "L"

(Sahuarita Water Company, L.L.C. letter responding to Arizona State Land Department's request for water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Water Company

December 12, 2007

Ms. Jamie Hogue
Deputy State Land Commissioner
Arizona State Land Department
1616 W. Adams
Phoenix, Arizona 85007

Re: Request For Water Service For
Arizona State Land Department

Dear Ms. Hogue:

This letter will acknowledge Sahuarita Water Company, L.L.C.'s ("Sahuarita Water") receipt of your December 12, 2007 letter requesting that Sahuarita Water undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to certain acreage which the Arizona State Land Department ("ASLD") currently owns, and anticipates development of, in the vicinity of the Town of Sahuarita, Arizona.

Sahuarita Water is interested in becoming the lawfully authorized provider of water service to the aforesaid acreage owned by ASLD, and is willing and able to do so, subject to prior receipt of the necessary approvals and authorizations from governmental entities with jurisdiction over Sahuarita Water's water provider operations. These will include the receipt of the necessary certificate of convenience and necessity from the Arizona Corporation Commission ("ACC"), and ACC approval of such line extension agreements and off-site facilities agreements with master and/or subdivision developers as Sahuarita Water may find to be necessary in connection with the development of such acreage.

Sincerely,

Sahuarita Water Company, L.L.C.
By: _____
Mark J. Seamans, General Manager

Corporate Office: 4549 E Ft Lowell Rd. Tucson, AZ 85712 Ph. (520) 299-8766 Fax: (520) 529-3137

Field Office: c/o Rancho Resort, 15900 S. Rancho Resort Blvd., P.O. Box 1520, Sahuarita, AZ 85629-0530
Ph. (520) 399-1105 Fax (520) 399-1095

APPENDIX "N"

(Letter from Sahuarita Unified School District requesting water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Unified School District
District Administration Office

350 W. Sahuarita Road, Building 10
Sahuarita, AZ 85629-9000
Ph: (520) 625-3502 x1001
Fax: (520) 625-4609
Office of the Superintendent

November 28, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request for Water Service For
Sahuarita Unified School District No. 30
("SUSD")

Dear Mr. Seamans:

Sahuarita Unified School District No. 30 ("SUSD") hereby formally requests that Sahuarita Water Company, L.L.C. ("Sahuarita Water") undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of potable water service to and within approximately 112 acres of land which SUSD owns in the Town of Sahuarita, Arizona. Attached to this letter as Appendix "A" is a legal description of the acreage in question.

SUSD owns 112 acres of land, which is surrounded by, but not included within; Sahuarita Water's currently certificated water service area. SUSD has a high school, a middle school and an elementary school located on its acreage, which is provided water from a private well owned and operated by SUSD. However, SUSD is desirous of connecting the aforesaid school facilities to a public water provider system, such as Sahuarita Water, for potable use only. In that regard, and as a result of previous discussions we have had with you upon this subject, it is our understanding that the projected potable water system demands associated with SUSD facilities have been included in a Water System Master Plan that West Land Resources, Inc. has recently prepared for Sahuarita Water.

Please advise us in writing if Sahuarita Water is interested in becoming the lawfully authorized provider of potable water service to SUSD. In that regard, you may use this request for potable water service in connection with any approvals Sahuarita Water must obtain from regulatory or permitting agencies or entities.

Respectfully yours,

Jay C. St. John, Ed.D.
Superintendent of Schools

APPENDIX "O"

(Sahuarita Unified School District land legal description)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Stantec Consulting Inc.
201 North Bonita Avenue Suite 101
Tucson AZ 85745-2999
Tel: (520) 750-7474 Fax: (520) 750-7470
stantec.com

Stantec

DESCRIPTION OF A PORTION OF LAND FOR PROPOSED ANNEXATION TO SAHUARITA WATER COMPANY

DESCRIPTION of land for proposed annexation to Sahuarita Water Company, located in a portion of Sections 11 and 12, Township 17 South, Range 13 East, Gila & Salt River Meridian, Town of Sahuarita, Pima County, Arizona. Said land being more fully described as follows:

COMMENCING AT the East quarter corner of Section 11, said point being a found 2 inch aluminum capped rebar, stamped 7141, from which the South corner of said Section 11 bears South 00°57'31" East, 2618.40 feet; Thence South 00°57'31" East, 1170.32 feet, along the East line of Section 11; Thence leaving said East line, North 89°02'29" East, 204.26 feet to the **TRUE POINT OF BEGINNING**;

Thence North 69°49'40" East, 188.39 feet;

Thence North 55°35'53" East, 413.17 feet;

Thence South 75°31'01" East, 357.94 feet;

Thence North 71°13'27" East, 249.57 feet;

Thence South 61°40'53" East, 464.57 feet;

Thence North 65°15'39" East, 262.49 feet;

Thence South 00°52'36" East, 1567.35 feet to a point on the North Right of Way line of Sahuarita Road;

Thence North 89°38'31" West along said Right of Way, 1952.32 feet;

Thence continue along said Right of Way South 89°07'56" West, 1491.01 feet to a point on the East Right of way line of Rancho Sahuarita Boulevard;

Thence North 00°56'50" West along said Right of Way, 981.30 feet;

Project: Sahuarita Water Company
Job No: 185120207

Thence leaving said Right of Way continue North 00°56'50" West, 252.76 feet;

Thence North 89°07'37" East, 1296.43 feet;

Thence North 69°49'40" East, 421.13 feet to the **POINT OF BEGINNING.**

Disclaimer: Stantec Consulting accepts no liability for this description if it has been modified or reformatted in any way from its original format and content, or used for any purpose other than that for which it was originally intended.

Prepared by Nathan L. Gardner, RLS 36786
Prepared for and on behalf of Stantec Consulting Inc.
Prepared on November 6, 2007
Project Number: 185120207

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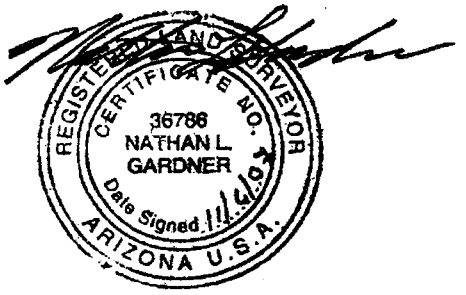
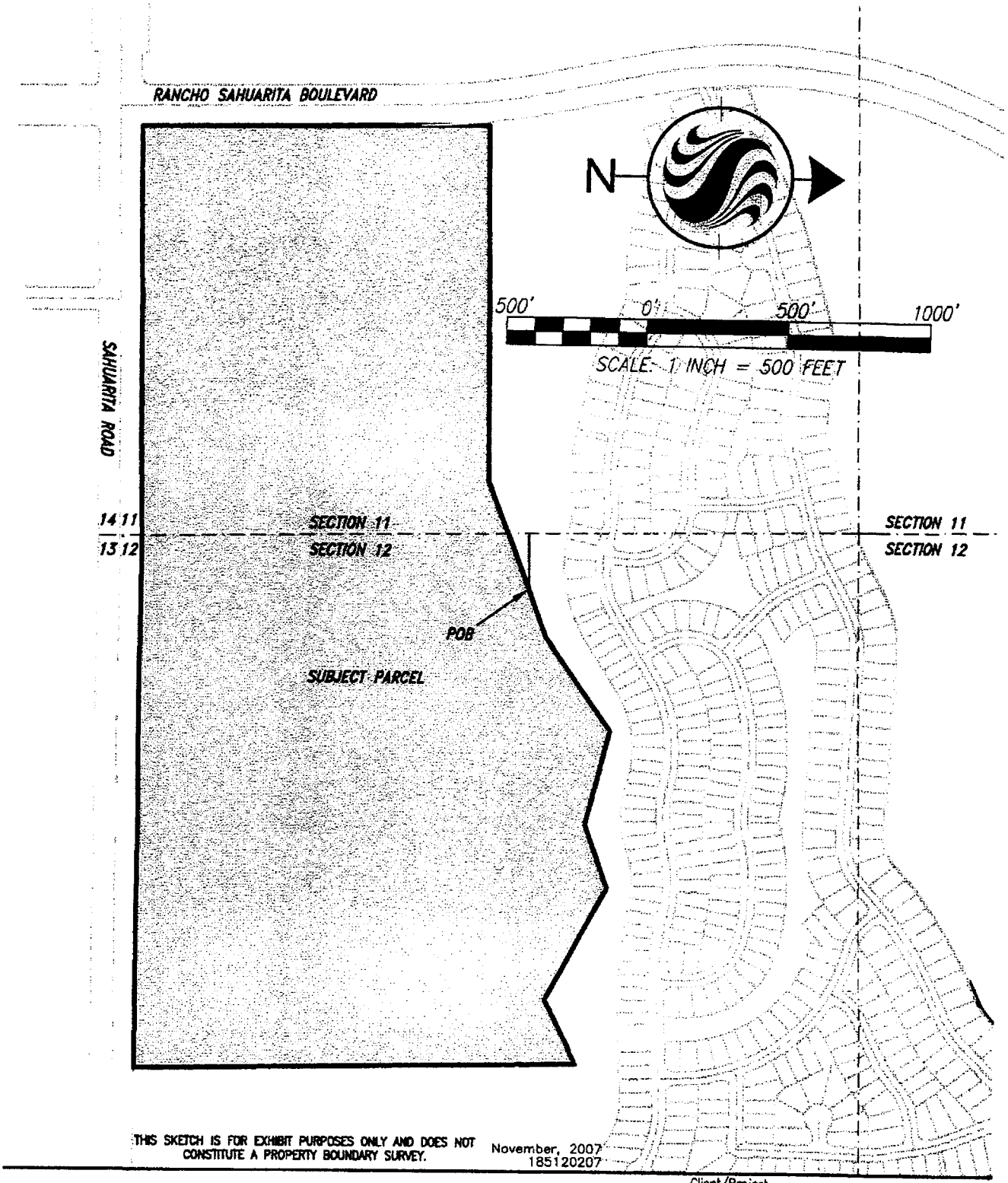




THIS SKETCH IS FOR EXHIBIT PURPOSES ONLY AND DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.

November, 2007
185120207

Stantec Consulting
201 North Bonita Ave
Tucson AZ U.S.A.
85745-2999
Tel. 520.750.7474
Fax. 520.750.7470
www.stantec.com

Client/Project
Sahuarita Water Company
T. 17, R. 13, SEC. 11 & 12

Figure No.
1.0

Title
Annexation Easement Exhibit

APPENDIX "P"

(Sahuarita Water Company, L.L.C.'s letter responding to Sahuarita Unified School District's request for water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Water Company

November 28, 2007

Dr. Jay St. John, Superintendent
Sahuarita Unified School District No. 30
P. O. Box 26
350 W. Helmet Peak Road
Sahuarita, Arizona 85629

Re: Request For Potable Water Service For
Sahuarita Unified School District No. 30 ("SUSD")

Dear Dr. St. John:

This letter will acknowledge Sahuarita Water Company, L.L.C.'s ("Sahuarita Water") receipt of your November 27, 2007 letter requesting that Sahuarita Water undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of potable water service to SUSD's existing school facilities within the Town of Sahuarita.

Sahuarita Water is interested in becoming the lawfully authorized provider of potable water service to SUSD, and is willing and able to do so, subject to prior receipt of the necessary approvals and authorizations from governmental entities with jurisdiction over Sahuarita Water's water provider operations. These will include the receipt of the necessary certificate of convenience and necessity from the Arizona Corporation Commission ("ACC"), and ACC approval of such line extension agreements and off-site facilities agreements as Sahuarita Water may find to be necessary.

In that regard, as a condition to Sahuarita Water's willingness to proceed with such actions as may be necessary to obtain the requisite approvals and authorizations, Sahuarita Water will require that SUSD reimburse Sahuarita Water for SUSD's proportionate share of any expenses Sahuarita Water may incur in connection with such efforts. Sahuarita Water believes that the cost of such activities should not be borne by the ratepayers of its existing certificated service area.

If the foregoing condition is acceptable to SUSD, please so advise me in writing and Sahuarita Water will promptly undertake to obtain the approvals and authorizations necessary to enable it to be the lawful water provider of potable water to SUSD.

Sincerely,

Sahuarita Water Company, L.L.C.

By: _____
Mark J. Seamans, General Manager

Field Office: c/o Rancho Resort, 15900 S. Rancho Resort Blvd., P.O. Box 1520, Sahuarita, AZ 85629-0530
Ph. (520) 399-1105 Fax (520) 399-1095

APPENDIX "Q"

(Sahuarita Unified School District's reply to
Sahuarita Water Company, L.L.C.'s response to
Sahuarita Unified School District's request
for water service)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Unified School District
District Administration Office

350 W. Sahuarita Road, Building 10
Sahuarita, AZ 85629-9000
Ph: (520) 625-3502 x1001
Fax: (520) 625-4609
Office of the Superintendent

November 28, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request For Potable Water Service For
Sahuarita Unified School District No. 30
("SUSD")

Dear Mr. Seamans:

The condition outlined in your letter of November 28, 2007 to me is acceptable to Sahuarita Unified School District No. 30 ("SUSD"). Accordingly, please proceed with all actions necessary to enable Sahuarita Water Company, L.L.C. ("Sahuarita Water") to become the lawful water provider of potable water to SUSD in the Town of Sahuarita.

In that regard, please provide me with a copy of all documents filed with such governmental entities from whom the necessary approvals or authorizations are requested by Sahuarita Water; and, please provide me with periodic statements of fees and costs incurred by Sahuarita Water in connection with its efforts on our behalf, in order that SUSD may either directly pay SUSD's proportionate share of the same or reimburse Sahuarita Water.

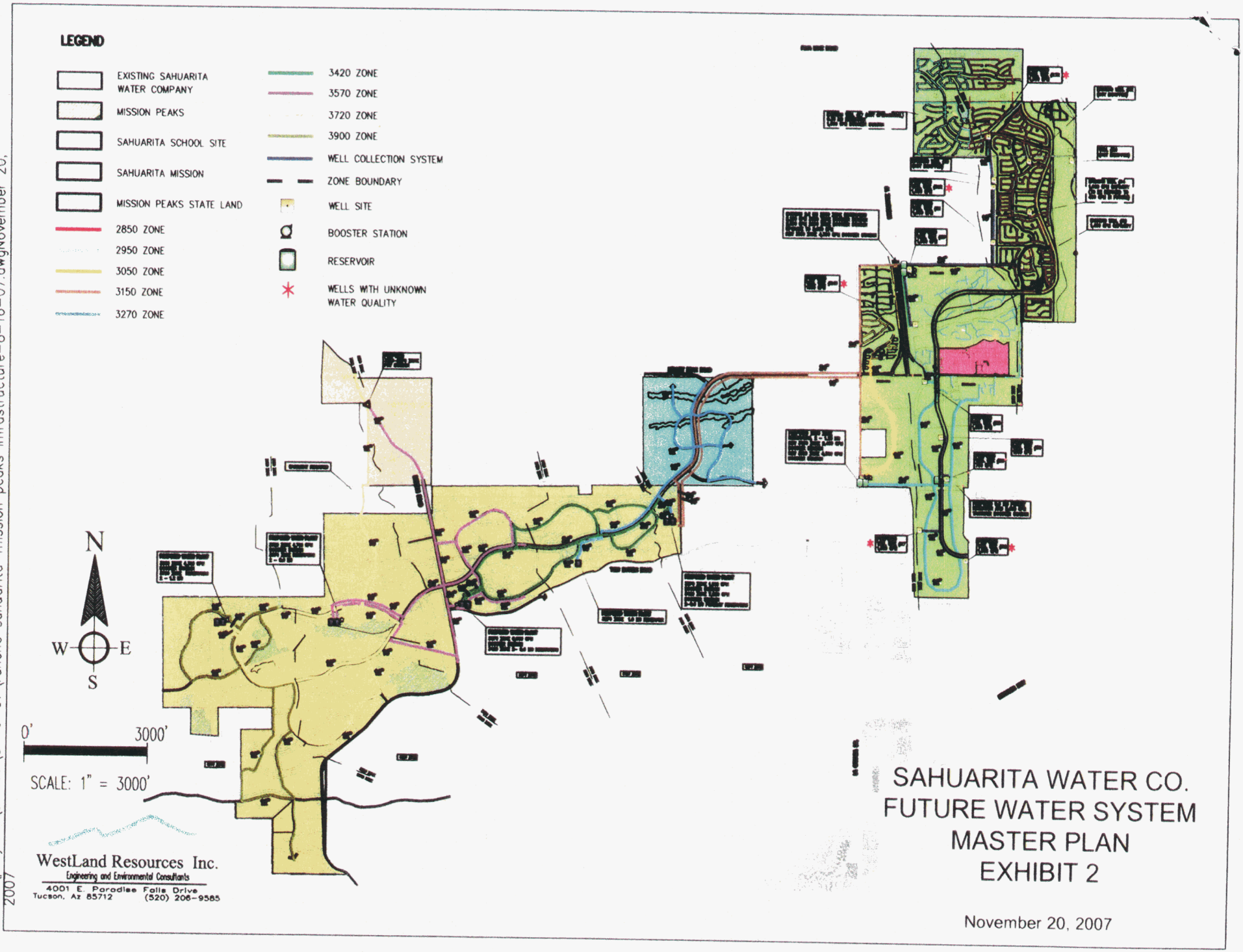
Respectfully yours,

Jay C. St. John, Ed.D.
Superintendent of Schools

APPENDIX "R"

(Map of Proposed CC&N Extension Area)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____



m:\projects\217.85\8-16-07\rancho sahuarita-mission peaks infrastructure-8-16-07.dwgNovember 20, 2007

APPENDIX "S"

(November 2007 Water System Master Plan, as prepared by WestLand Resources, Inc.)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

SAHUARITA
WATER COMPANY, LLC

WATER SYSTEM
MASTER PLAN

Prepared for:

SAHUARITA WATER COMPANY
15900 Rancho Resort Blvd, Bldg No. 3
Sahuarita, Arizona 85629
(520) 399-1105

Prepared by:

WESTLAND RESOURCES, INC.
4001 E. Paradise Falls Drive
Tucson, Arizona 85712
(520) 206-9585

NOVEMBER 2007
Project No. 217.132 A 8000

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Exhibit 1. Existing Water System Master Plan
Exhibit 2. Future Water System Master Plan

LIST OF ACRONYMS

ACC	Arizona Corporate Commission
ADD	Average Daily Demand
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
CC&N	Certificate of Convenience and Necessity
gpad	gallons per acre per day
gpcd	gallons per capital per day
gpm	gallons per minute
lf	lineal feet
MCL	maximum contaminant level
MG	million gallons
MGD	million gallons per day
PDD	Peak-day Demand
PDEQ	Pima County Department of Environmental Quality
PHD	Peak-hour Demand
ppb	parts per billion
PRV	pressure reducing valve
psi	pounds per square inch
USEPA	US Environmental Protection Agency

CHAPTER 1. INTRODUCTION

The Sahuarita Water Company (SWC) is a private water utility currently located within the Town of Sahuarita, Arizona. The water company's current Certificate of Convenience and Necessity (CC&N) encompasses 3,314 acres that is generally located 10 miles south of Tucson City limits and straddles Interstate 19 (Exhibit 1). The current CC&N for the SWC approximately coincides with the Rancho Sahuarita Master Planned Community. SWC is requesting that the existing CC&N boundary be expanded to include an additional 5,445 Acres (Exhibit 2). Projects within the requested expansion include Mission Peaks, State Land, Sahuarita Mission, and an existing Sahuarita Unified School District school site. This water system master plan report will cover the buildout of the existing system and the expansion areas.

1.1. EXISTING CC&N SITE AND FACILITIES

The current Rancho Sahuarita property, contained within the existing CC&N boundary, is relatively flat with no major geologic formations within the site. The parcel of land gradually slopes eastward to the Santa Cruz River at approximately two percent. The highest portion of the property, located at La Cañada Drive and El Toro Road, is at an elevation of 2,920. The lowest point within the property is near the northeast corner at an elevation of 2,670.

The property surrounding SWC is primarily undeveloped land to the north, pecan orchards located along the east property boundary, and Asarco Mining Facilities and tailing areas to the west. Las Quintas Serenas Water Company is located southwest of the existing SWC CC&N. A Sahuarita Unified School District (SUSD) high, middle, and elementary school is surrounded by the existing CC&N boundary along Sahuarita Road. The CC&N is proposed to be extended to include the school site, which is currently served by its own well and distribution system.

The Rancho Sahuarita property, contained within the existing CC&N boundary, was at one time owned by Asarco, Inc. Portions of the original Asarco well fields are located within the property boundaries. Within the site boundaries are six large production wells which served the Asarco Mining Complex. The large production wells were originally served by three-phase overhead power and large transmission mains transporting the water northerly and then pumping westerly to the Mining Complex. Four of the six original production wells within the property are no longer operating. All pumps, motors, and associated equipment have been removed and the well casings capped. Two of the wells have been rehabilitated and are now serving the Rancho Sahuarita system; well numbers 14 and 18 are discussed further in this report.

1.2. OBJECTIVES

The current CC&N boundary is proposed to be extended to serve three new offsite projects west of the current CC&N boundary and the school site that is currently surrounded by the existing CC&N boundary. This master plan will address existing facilities and present future infrastructure requirements to serve both the existing CC&N service area and the proposed extension of the CC&N service area.

1.3. SYSTEM DEVELOPMENT AREA AND LAND USES

This report will be broken into the existing development area and future development areas. The existing service area is confined by the existing SWC CC&N boundary.

The existing Rancho Sahuarita Specific Plan consists of low- to high-density residential, a town center, regional commercial center, park industrial, public facilities, and open space. At buildout the current Rancho Sahuarita development will contain approximately 10,100 single-family (SF) units, 1,460 active-adult units, and approximately 3.1 million square feet of commercial use. Rancho Sahuarita's buildout is planned to occur in 2017.

Future developments, shown in Exhibit 2, consist of State Land, Sahuarita Mission, Mission Peaks, and an existing SUSD school site and are summarized below.

The State Land parcel consists of 634 acres, located in Section 16, Township 17 South, Range 13 East, and has a planned buildout density of 2,300 SF units. Planned non-residential use consists of commercial development and several proposed schools (one high school, one middle school, and one elementary school).

Sahuarita Mission consists of 471 acres, located in Sections 12 and 13, Township 17 South, Range 12 East, and has a planned buildout density of 3,000 SF units.

Mission Peaks consists of 4,216 acres, located in portions of Sections 19, 22, and 30 of Township 17 South, Range 13 East, portions of Sections 24 thru 27, 34, 35, and 36 of Township 17 South, Range 12 East, and portions of Sections 1 and 2 of Township 18 South, Range 12 East. Mission Peaks is anticipated to include 15,000 units. Within the 15,000 units, there are 11,123 single-family units, 2,371 active-adult units, 1,506 multi-family units. In addition to this number, 500 existing offsite units will be included to the water demands for this property as they may be served by the SWC potable water infrastructure at buildout of Mission Peaks. These units are in the Magee Ranch area. They are currently served by Las Quintas in an existing stand-pipe system. They may be served by a similar stand-pipe system located at the westerly border of Mission Peaks closer to their property by the proposed SWC. Mission Peaks will also include the development of an additional 1.1 million square feet of non-residential use. Non-residential use consists of commercial development, recreation centers, worship, and a police and fire station. Several proposed schools will also be located within Mission Peaks with one high school, one middle school, and two elementary schools planned.

The existing SUSD school site consists of 112 acres, located in portions of Sections 11 and 12, Township 17 South, Range 13 East and is surrounding by the existing SWC CC&N boundary. The existing school consists of a high school, middle school, and elementary school.

1.4. POPULATION PROJECTIONS

Population projections are determined based on land use type and number of units. Single-family (SF) units are estimated to have a persons per housing unit population of 2.7. Multi-family (MF) housing units are estimated to have a persons per housing unit population of 1.9. Active-adult (AA) housing units are estimated to have a persons per housing unit population of 1.8. The existing Sahuarita Water Company CC&N area has a projection population of 29,860 persons based on the criteria above. Future population is estimated based on the projected number of housing units and summarized in the Table 1. Buildout of the existing and future expansion area is projected at approximately 82,700 persons.

Table 1. Future Developments Population Projections

Development	SF Units	MF Units	AA Units	Total Units	Projected Population
Rancho Sahuarita	10,086	-	1,460	11,546	29,860
State Land	2,300	-	-	2,300	6,210
Sahuarita Mission	3,000	-	-	3,000	8,100
Mission Peaks	11,623*	1,506	2,371	15,500	38,511
Total	27,009	1,506	3,831	32,346	82,681

*Includes 500 units for a stand-pipe system that would benefit nearby residents that truck water.

CHAPTER 2. SCOPE AND APPROACH

2.1. WATER SOURCE CAPACITY AND QUALITY REQUIREMENTS

The Arizona Department of Environmental Quality (ADEQ) requires that the well system be capable of providing peak day demand (PDD) for the entire system with the largest well out of service. The Master Plan will develop the capacity requirements and locations for wells to meet this requirement. All new sources will be tested for water quality to determine if treatment is required to meet the current ADEQ water quality requirements.

2.2. STORAGE REQUIREMENTS

Reservoir storage capacity is a highly critical element in the design and operation of water systems. The storage will provide operational flexibility and system reliability. Reservoir storage is used primarily to accommodate hourly fluctuations and demand, PDD fluctuations, fire flow requirements, and emergency reserve storage. Each of these requirements added together form the required storage capacity for each zone. Current ADEQ criteria typically require 1.0 times the average daily demand (ADD) peak month plus fire flow requirements to be the minimum storage capacity per zone. Under certain circumstances, specifically in service areas with multiple wells, the storage capacity may be lowered. Pima County Department of Environmental Quality (PDEQ) has generally allowed the total storage to be reduced to ADD plus fire flow for a multiple well system. Storage capacity may be based on existing consumption and phased as the water system expands. Storage should be provided in the zone where the usage is required or be available to be readily transferred to the zone of use.

The goal of the Master Plan is to develop future reservoir capacity using floating storage wherever possible. The highest zones may be an exception, as an appropriate floating reservoir location may not be available. The water surface of a floating reservoir is set at the high water elevation for the zone, which is generally about 100-feet above the highest home in the zone. This allows the homes within the zone boundary to be served directly from the reservoir by gravity and the system pressure to be regulated by the reservoir elevation. This method provides a highly reliable system with very low pressure fluctuations. The system will also continue to operate during power outages using the stored water in the reservoir system.

2.3. PRESSURE REQUIREMENTS

Pressure extremes in water systems result in a potential for contamination to enter the system. Low pressures may allow polluted fluids to be forced into the system. High pressures may cause ruptures or breaks. Normal working pressure in the distribution system should not be less than 40 pounds per square inch (psi). System pressures under peak hour conditions should not drop below 35 psi anywhere within the system. The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all

points in the distribution system under all conditions of flow. Typically, a hydraulic analysis is run at a minimum of 25 psi in order to ensure that there is a minimum of 20 psi at any given household. This is generally understood to mean that the minimum residual pressure must be 20 psi for each customer in a fire flow event from any hydrant, during a flow condition of peak day plus fire flow. Maximum pressures as high as 100 psi can be allowed in small, low-lying areas not subject to high flow rates and surge pressure. The Uniform Plumbing Code limits the highest water pressure within the individual property owners' plumbing to 80 psi. Regulating the pressure from the meter to the customer is the responsibility of the customer.

2.4. FIRE FLOW REQUIREMENTS

There are generally two considerations to providing adequate fire flow. The first consideration includes offsite requirements such as the volume of fire flow storage available in reservoirs, adequately designed pressure zones, and the size of transmission mains. The second factor is the internal distribution system within the neighborhood, including main sizes, adequate looping, and fire hydrant placement. The goal of the Master Plan is to develop adequately sized reservoirs, properly designed pressure zones, and water transmission mains sized to provide fire flow to existing areas, if possible, and to provide adequate fire flow for new development.

Fire flow requirements for homes typically vary from 1,000 to 1,750 gallons per minute (gpm), depending on the size of the home. The typical residential subdivision will have a fire flow requirement of 1,000 gpm for houses under 3,600 square feet and 1,750 gpm for houses 3,600 square feet and above. The standard duration requirement for residential fire flow is two hours. Commercial facility fire flow requirements also vary depending on the square footage of the commercial building, occupancy type, building material type, exposure distance to other buildings, and whether the structure is sprinklered. Typical commercial facilities will have fire low requirements from 1,500 to 2,500 gpm for a two to four hour duration. Fire flows can be adjusted by the local fire district, if the nature of the system or the rural nature of the area precludes the full fire flow per the International Fire Code. For purposes of the Master Plan, the fire flow will be assumed to be the different for each zone (see Tables 8 and 14) based on different types of non-residential use in each zone.

2.5. WATER MAIN REQUIREMENTS

The goal for the Master Plan is to describe a spine water transmission system that will transport the appropriate volume of source water to the zone of which it is utilized. Spine mains will also be sized to transport the appropriate volume of fire flow throughout each zone. The transmission and distribution systems should be sized and arranged to minimize friction-generated line losses and provide redundancy. It is recommended that the policy of SWC shall be to require or provide looped water transmission and distribution systems for the water main grid system wherever possible. In addition, appropriate valve

locations and intervals should be required to isolate small sections of main during breakages and reduce the number of residences out of service.

2.6. Land and Easement Requirements

The Master Plan will help to provide locations and sizes for future wells, reservoirs, booster stations, future treatment facilities, and major transmission mains to serve the water system. These facilities will be generally located on water system maps. Many factors and constraints will be required to determine the final location for each site. These factors include the proximity to existing water transmission mains, the proximity to three-phase power, access to local public streets, specific elevation requirements for floating reservoirs, hydrologic requirements for well sites, noise and buffer requirements for booster stations and wells, aesthetic screening requirements for aboveground facilities, and the cost of land and/or the availability of other preferable sites.

2.7. System Upgrades

The Master Plan will develop the system design criteria to guide the utility in designing proposed water facilities. The system design criteria will include methods for demand calculations, peaking factors, water supply requirements, the number and capacity of wells required, reservoir storage and booster station capacity requirements, emergency backup systems, distribution system sizing, and treatment and water system grid requirements.

The Master Plan will identify requirements for the existing CC&N boundary and future CC&N expansion at buildout, and specify the required new facilities and existing facility upgrades. These facilities will include additional and/or upgraded wells, booster station additions and upgrades, reservoir capacity additions, and transmission and distribution main extensions.

CHAPTER 3. ENGINEERING CRITERIA

Based on the information presented in Chapter 2, the system design criteria for the Master Plan are described below in terms of demand, supply, storage, and distribution system assumptions. The criteria presented in this chapter follow ADEQ, Arizona Department of Water Resources (ADWR), and Arizona Administrative Code (AAC) standards.

3.1. DEMAND CRITERIA

- Average daily per capita water usage for Single-Family and Active Adult residential ..... 110 gpcd
- Average daily per capita water usage for Multi-Family residential ..... 90 gpcd
- Average daily per square foot commercial, industrial, Institutional water use (gallons per day per square foot)..... 0.12*
- Average daily water usage for elementary/middle school use 25 gallons per student per day (gpsd)
- Average daily water usage for high school use ..... 43 gpsd
- Average number of persons per Single-Family dwelling unit..... 2.7
- Average number of persons per Active Adult dwelling unit..... 1.8
- Average number of persons per Multi-Family dwelling unit..... 1.9
- Ratio of peak-day to average-day use 2.0
- Ratio of peak-hour to average-day use 3.2

*Based on Arizona Administrative Code Title 18, Chapter 9, Shopping Center no food or laundry, sewage assumed to be 85 percent of water usage.

gpcd – gallons per capita per day
gpad – gallons per acre per day

3.2. SUPPLY CRITERIA

- Well capacity to meet PDD with the largest well out of service.
- Minimum supply from well and boosters pumping to elevated storage to meet PDD.
- Minimum booster capacity to zones without elevated storage to meet peak hour demand (PHD) or PDD plus fire flow, whichever is larger.

3.3. STORAGE CRITERIA

- Provide storage volume equal to a minimum of 1.0 times the ADD.
- Provide additional storage volume required to provide fire flow for a specific duration to each zone (see Tables 8 and 14)
- Provide valving at reservoirs to allow a change in the direction of supply to lower zones if required for fire flow.
- Provide two equally sized reservoirs at critical sites for phasing and maintenance considerations.

3.4. DISTRIBUTION SYSTEM CRITERIA

- System design and construction to meet Sahuarita Water Company, City of Tucson Water Department, and Arizona Department of Health Services requirements.

- Maximum friction head loss for lines up to and including 8 inches in size to be 8 feet per 1,000 feet or less. Head loss for lines over 8 inches in size to be 5 feet per 1,000 feet or less, according to pipe size. Maximum head losses will be determined by hydraulic modeling studies to maintain the required flow and system pressures.

- Distribution lines to be sized and arranged to provide required fire flows and to move source water to the zones with which it is utilized.

- The SWC pressure zones and zone boundaries are at 100 and 150-foot elevation differences for most of the system.

- Provide a line-size valve, normally closed, or a PRV station at pipelines crossing zone boundaries.

- Water will be supplied at the customer's meter within a static pressure range of 43 to 87 psi in 100-ft zones and 43 to 108 psi in 150-ft zones. Due to localized conditions, certain locations may receive water pressure slightly less or greater.

CHAPTER 4. EXISTING SYSTEM ANALYSIS

4.1. EXISTING SYSTEM OVERVIEW

The existing Sahuarita Water CC&N area is separated into pressure zones with zone boundaries located at 100-foot intervals. The high water elevations of the zone boundaries are also spaced at approximately 100-foot intervals. Typical static pressure fluctuations within the system will vary from approximately 40 psi at the top of the zone to 87 psi at the bottom of the zone, although static pressures will vary with daily demand fluctuations and fire flow conditions. The zone boundaries and high water elevations of the existing SWC CC&N area are shown in Table 2. The zone delineation is shown on Exhibit 1. The existing water system is divided into the following zones: 2850, 2950, and 3050. The 2950 Zone is further divided into two areas, a north area and a south area. For this report, the south 2950 Zone will be considered the 2950 Zone, while the north area will be noted as 2950 North (2950 N). The 2950 North Zone is presented individually in some subsequent tables, since this zone operates on a separate system of infrastructure than the other zones.

The 2850 Zone is currently served by gravity from two floating 2850 Zone Reservoirs and direct connection of Well Nos. 14 and 18 into the zone. The 2950 and 3050 Zones are currently served by booster stations pumping from storage at the 2850 Zone Reservoir. The 2950N Zone is served by a booster station pumping from storage at the Well No. 17 reservoir. In the future the 2950 Zone reservoir will be served by gravity from a proposed 2950 Zone floating reservoir.

Table 2. SWC Pressure Zone Boundaries

High Water (elev)	Elevation Boundaries	Static Pressure (psi)
2850	2650 – 2750	87 – 43
2950 and 2950 N	2750 – 2850	87 – 43
3050	2850 – 2950	87 – 43

The existing Sahuarita Water system currently delivers groundwater from two production wells to the 2850 Zone reservoir. The water supply must be distributed to the rest of the system through a booster station and reservoir system. The wells must provide sufficient capacity to meet PDD with the largest well out of service.

There are two reservoirs that serve to pressurize or float on the 2850 Zone. The floating storage serves as forebay storage for a booster station that provides pressure for the 2950 and 3050 Zones.

Exhibit 1 shows the existing infrastructure including wells, reservoirs, booster stations, and transmission mains.

4.2. EXISTING UNITS AND NON-RESIDENTIAL AREA

4.2.1. Existing Units

Table 3 demonstrates the number of existing units per zone within Sahuarita Water Company CC&N boundary. These numbers represents the number of connections as of April 2007.

Table 3. SWC Existing Units

Zone	Units
2850 Zone	2,973
2950 Zone	225
2950 N Zone	144
3050 Zone	357
TOTAL	**3,699**

4.2.2. Existing Non-Residential Area

Table 4 shows the existing non-residential acreage totals. This information was provided by Sahuarita Water Company.

Table 4. SWC Existing Non-Residential Areas

Zone	Use	Square Feet
2850 Zone	Main Lake Clubhouse, Lake, Lake Park, and Wastewater Treatment Plant	35,000 for Clubhouse and the Wastewater Treatment Plant, with an additional 17.5 acres for the Lake and Lake Park
2950 Zone	Post Office, Temporary Municipal Complex, Fire Department	24,000
2950 N Zone	Sonora Clubhouse	15,000
3050 Zone	Rancho Resort Clubhouse	15,000
TOTAL		**89,000**

4.3. EXISTING WELLS

The well capacity within the existing Sahuarita Water system consists of two active wells (Well Nos. 14 and 18) with a total capacity of 1,900 gpm for Well No. 14 plus 1,400 gpm for Well No. 18 for a total of 3,300 gpm or 4.75 million gallons per day (MGD). There are also four existing capped wells. The existing active wells and their capacities are shown in Table 5.

Table 5. Active Wells

Facility Name	Capacity (gpm)	Capacity (MGD)
Well No. 14	1,900	2.73
Well No. 18	1,400	2.02
TOTAL/AVERAGE	**3,300**	**4.75**

4.4. Existing Reservoirs and Booster Stations

The capacities and elevations of reservoirs and booster stations within Sahuarita Water are summarized in Table 6. The total booster station capacity within the Sahuarita Water system is approximately 6,650 gpm and the total reservoir capacity is 2.55-million gallons (MG).

Table 6. Existing Reservoir/Booster Summary

Pressure Zone	Well Capacity (gpm)	Booster Capacity	Storage (gallons)
2850	3,300	0	2,200,000
2950	0	2,550	0
3050	0	2,250	0
TOTAL	**3,300**	**4,800**	**2,200,000**
2950 N	0	1,850	350,000

4.5. Existing System Demands

The SWC verified the total number of existing connections for residential and commercial use (see Section 4.2). These values were used to calculate estimated existing demands. The number of units within each zone was used to calculate ADD, PDD, and PHD for each zone based on the engineering criteria presented in Chapter 2. This information is presented in Table 7. The 2950 North Zone is presented individually since this zone operates on a separate infrastructure system than the other zones. The 2950 North Zone is supplied source water to an on-site forebay reservoir by the 2850 Zone. The 2950 North Zone booster pumps water from the forebay reservoir to the 2950 North Zone distribution system and the booster is controlled by the pressure on the discharge side of the hydropneumatic tank.

As of the end of October 2007, actual water company source pumping records indicated a total volume of 1,212 acre-feet of water since the beginning of 2007. This equates to approximately 914 gpm over a 300 day period.

Table 7. Existing Demand

Pressure Zone	Existing Units	Existing Commercial (square feet)	Average Daily Demand (gpm)	Peak Daily Demand (gpm)	Peak Hour Demand (gpm)
2850	2,973 (SF)	35,000[a]	616	1,232[b]	1,972
2950	225 (SF)	24,000	48	97	155
3050	357 (AA)	15,000	50	101	161
TOTAL	**3,189 (SF) 357 (AA)**	**74,000**	**714**	**1,430**	**2,288**

[a]The 2850 Zone also includes demands for Lake and Lake Park. These demands were based on numbers received from Diane McKenzie at the Sahuarita Water Company and are not represented as a square footage.

[b] The 2850 Zone demand was calculated as follows: residential and non-residential demands were multiplied by a factor of 2 for conversion to PDD (as described in Chapter 3). The WWTP, Lake, and Lake Park demands were added as ADD since these properties should not experience significant peaking factors.

2950 N	76 (SF) 68 (AA)	15,000	26	53	84
TOTAL	**76 (SF) 68 (AA)**	**15,000**	**26**	**53**	**84**

The usage demands were calculated based on the previous design criteria and are as follows:

ADD = SF Units x 2.7 x 110 GPCD/1,440 = 0.21 gpm/SF unit
ADD = AA Units x 1.8 x 110 GPCD/1,440 = 0.14 gpm/AA unit
PDD = ADD x 2.0 = 0.42 gpm/SF unit
PDD = ADD x 2.0 = 0.28 gpm/AA unit
PHD = ADD x 3.2 = 0.67 gpm/SF unit
PHD = ADD x 3.2 = 0.45 gpm/AA unit

4.6. Existing System Fire Flow Requirements

Table 8 presents the existing fire flow requirements for each of the zones.

Table 8. Existing Fire Flow Requirements

Pressure Zone	Fire Flow Demand (gpm)	Fire Flow Duration (hours)	Total Fire Flow Storage (gallons)
2850	1,500	2	180,000
2950	2,000	4	480,000
3050	1,500	2	180,000
2950 N	1,500	2	180,000

4.7. Existing System Requirements

A summary of the existing requirements and the existing infrastructure is shown in Table 9. Exhibit 1 also presents the existing infrastructure and pipelines.

The table below demonstrates that the well production of both wells (Well Nos. 14 and 18) is above existing PDD demands. However, by ADEQ standards, the well production system must be able to

provide PDD when the largest well is out of service. The largest well is Well No. 14 at 1,900 gpm of flow. Therefore, with only Well No. 18 at 1,400 gpm to serve the system, the projected well requirement is just under the recommended criteria. Considering the actual demand recorded by the water company is approximately 914 gpm, the current well capacity is sufficient to provide existing demands with the largest well out of service. Plans are currently being designed to add a new well (Well No. 23) to the system.

The existing storage capacity is currently above the recommended standards presented in Chapter 3.

Table 9. Existing System Capacity Requirements

Zone	Well Requirement (PDD) (gpm)	Total Well Capacity (gpm)	Fire Flow Requirement	Booster Requirement (PDD + FF)	Existing Booster Capacity (gpm)	Storage Requirement[b] (ADD + FF)	Existing Storage Capacity (gallons)
2850	1,232	1,400[a]	1,500	N/A	N/A	1,067,181	2,200,000
2950	97	0	2,000	2,097	2,550	369,705	
3050	101	0	1,500	1,601	2,250	72,486	
TOTAL	**1,430**	**1,400**		**3,198**	**4,800**	**1,509,372**	**2,200,000**
2950 N	53	0	1,500	1,553	1,850	259,836[c]	350,000
TOTAL	**53**	**0**	**1,500**	**1,553**	**1,850**	**259,836**	**350,000**

[a]The total well capacity is 1,400 gpm for Well No. 14 and 1,900 gpm for Well No. 18. However, to demonstrate the largest well out of service, 1,400 gpm is shown as the well capacity.
[b]The existing Fire Flow requirement of 1,500 gpm for 2 hours was added to the 2850 Zone Storage Requirement.
[c]A Fire Flow requirement of 1,500 gpm for 2 hours was also added to the 2950 North Zone Storage Requirement.

4.8. EXISTING SYSTEM BUILDOUT REQUIREMENTS

A summary of the existing system buildout requirements for the current CC&N boundary and the proposed infrastructure is shown in Table 10. Exhibit 1 also presents the proposed infrastructure and pipelines.

At buildout, the production capacity of Well No. 14 will be replaced by Well Nos. 23. Well No. 14 production capacity is planned to be replaced by source capacity from a newly drilled well in the future to insure greater system reliability since this well is reaching the projected life expectancy for a production well. It has been determined that Well No. 14 will be downsized to provide water to the current Town of Sahuarita Lake, Lake Park, and right-of-ways under a existing Type I water right. This well is planned to be taken off-line by the fourth quarter of 2010. Additional well production capacity needed will be provided by Well Nos. 21, 24B, and 25. Future storage capacity will consist of two 1.25 MG floating 2950 Zone reservoirs. Once the 2950 Zone reservoir is operational, the 2950 Zone booster will no longer be required to provide fire flow and will be sized to move PDD for the 2950 Zone. The 3050 Zone is planned to be served by two pressure controlled booster stations, one is currently existing and the second will be constructed at the new 2950 Zone reservoir site.

Table 10. Existing System Buildout Capacity Requirements

Zone	Well Requirement (PDD) (gpm)	Total Well Capacity[a] (gpm)	Fire Flow Requirement	Booster Requirement (PDD + FF)	Proposed Booster Capacity (gpm)	Storage Requirement[b] (ADD + FF)	Proposed Storage Capacity (gallons)
2850	1,658	3,900	1,500	N/A	N/A	1,373,664	2,200,000
2950	2,793	1,500	2,000	2,610	3,050	2,490,749	2,500,000
3050	483	0	2,250	2,733	4,650	408,058	
TOTAL	**4,934**	**5,400**		**5,343**	**7,700**	**4,272,471**	**4,700,000**

[a]The total well capacity is 6,900 gpm for Well No. 18, 21, 23, 24B and 25. However, to demonstrate the largest well out of service, 5,400 gpm is shown as the well capacity.

[b]The proposed Fire Flow requirement of 1,500 gpm for 2 hours was added to the 2850 Zone Storage Requirement. The proposed fire flow requirement of 2,000 gpm for 4 hours was added to the 2950 Zone Storage Requirement. Because the 3050 Zone is served by the 2950 Zone reservoir at buildout the proposed fire flow requirement of 2,250 gpm for 4 hours was reduced to 250 gpm for four hours for the 3050 Zone Storage Requirement.

2950 N	323	0	1,500	1,823	1,850	412,371[c]	350,000
TOTAL	**323**	**0**	**1,500**	**1,823**	**1,850**	**412,371**	**350,000**

[c]A Fire Flow requirement of 1,500 gpm for 2 hours was also added to the 2950 North Zone Storage Requirement.

CHAPTER 5. FUTURE SYSTEM ANALYSIS

5.1. FUTURE SYSTEM OVERVIEW

The expansion area of the Sahuarita Water CC&N boundary is separated into pressure zones with zone boundaries located at 150-foot intervals. The high water elevations of the zone boundaries are also spaced at approximately 150-foot intervals. The standard pressure for a typical 150-foot zone is 43 to 108 pounds per square inch (psi). For the 180-foot zone, the pressure will be approximately 43 to 122 psi, although static pressures will vary with daily demand fluctuations and fire flow conditions. Individual pressure-reducing valves (PRVs) will be required for all homes with main pressures greater than 80 psi. The zone boundaries and high water elevations of the proposed extension area of the SWC CC&N area are shown in Table 11. The existing SUSD School will be served by the existing 2950 Zone. The zone delineation is shown on Exhibit 2. The proposed water system expansion is divided into the following zones: 3270, 3420, 3570, 3720, and 3900.

Each zone is served by one or a combination of the following methods: floating reservoir, booster stations pumping from storage, or booster stations pumping to a reservoir that floats the zone.

Table 11. Proposed Sahuarita Water Company Pressure Zone Boundaries

Zone	High Water (ft)	Boundaries (ft)	Static Pressure (psi)	Ultimate Control Method
3270	3270	3020 to 3170	108 - 43	Level
3420	3420	3170 to 3320	108 - 43	Level
3570	3570	3320 to 3470	108 - 43	Level
3720	3720	3470 to 3620	108 - 43	Level
3900	3900	3620 to 3800	122 - 43	Pressure

5.2. PROPOSED CC&N BUILDOUT SYSTEM DEMANDS

The future buildout populations and demands are based on the zones as discussed in previous sections. The buildout demands were based on the latest land planning information for each project. The projected number of units served at buildout is approximately 32,300 units, as shown in Table 1. Within the 32,300 units, there are approximately 27,000 single-family units, 3,800 active-adult units, 1,500 multi-family units. The non-residential square footage is projected to be approximately 4.2 million square feet. The breakdown of these units and the associated water demands in terms of ADD, PDD, and PHD are presented in Table 12. Further analyses of all calculations are presented in Appendix A.

Table 12. Buildout Water Usage Summary

Pressure Zone	Future Units	Non-residential (Sq. Ft)	Number of Students	Average Daily Demand (gpm)	Peak Daily Demand (gpm)	Peak Hour Demand (gpm)
2850	3,992 (SF)	67,000	-	829	1,658	2,653
2950	5,603 (SF)	1,793,252	1,226 (HS) 3,150 (ES)	1,396	2,793	4,468
2950-N	491 (SF) 428 (AA)	15,000	-	161	323	516
3050	1,032 (AA)	1,197,683	-	242	483	773
3270	1,999 (SF) 174 (MF)	344,355	478 (HS) 2,028 (ES)	511	1,022	1,636
3420	375 (SF) 226 (MF) 1,161 (AA)	70,855	-	270	539	863
3570	3,478 (SF) 1,106 (MF) 1,210 (AA)	619,271	1,287 (ES)	1,089	2,178	3,485
3720	5,079 (SF)	-	478 (HS) 2,028 (ES)	1,097	2,194	3,510
3900	5,992 (SF)	70,855	-	1,242	2,484	3,974
TOTAL	**27,009 (SF) 1,506 (MF) 3,831 (AA)**	**4,178,271**	**2,182 (HS) 8,493 (ES)**	**6,837**	**13,674**	**21,878**

(HS) High School (ES) Elementary School

5.3. FUTURE SYSTEM SIZING

The previously provided water system design criteria were used to develop the future water system buildout capacity requirements for Sahuarita Water Company. Future system requirements include the capacity of wells, storage, boosters, and mains to serve future demands. The proposed future system upgrades are shown on Exhibit 2.

Exhibit 2 shows the interconnection of zones including production requirements, booster station facility capacities, and reservoir sizes. The proposed infrastructure is noted and proposed transmission mains are shown as solid lines. This exhibit identifies the zones without reservoirs where the boosters are required to provide PDD plus fire flow.

5.3.1. Wells

Well production requirements are based on meeting PDD. Sufficient reserve capacity is required to meet PDD with the largest well out of service.

A new arsenic standard that defines the maximum contaminant level of arsenic at 10 parts per billion (ppb) has been approved by the US Environmental Protection Agency (USEPA). Recent ADEQ MAPS tests results indicated that arsenic levels in both existing Well Nos. 14 and 18 are currently under the 10 ppb requirement. Well No. 14 production capacity is planned to be replaced by a newly drilled well in

the future to insure greater system reliability since this well is reaching the projected life expectancy for a production well. It has been determined that Well No. 14 will be downsized to provide water to the current Town of Sahuarita Lake, Lake Park, and right-of-ways under a existing Type I water right. This well is planned to be taken off-line by the fourth quarter of 2010.

In order to serve future demands, it is planned that approximately 10 new wells will be drilled to serve Sahuarita Water Company. The locations for these wells can be found on Exhibit 2. Exploratory borings have been conducted at five (Wells Nos. 21, 22, 23, 25, and 26) of the ten proposed well locations to verify lithology and groundwater quality. Water Quality results show that arsenic levels do not currently exceed the arsenic maximum contaminant level (MCL) or can be kept below the new requirement through well design. Additional exploratory drilling is expected to be done within the next few months on Well No. 24B for further investigation. It is anticipated that the production capacity of these wells will be approximately 1,500 gpm each; with the exception of Well No. 21 that has a projected capacity of 1,000 gpm and Well No. 26 with a projected capacity of 750 gpm. The first production well to be drilled will be Well No. 23, due to it's proximity to existing facilities. Well Site Nos. 17R, 18, 19R, and 21 are planned to pump via dedicated well collection main to the existing reservoirs located near Well No. 23. Well No. 25 is expected to pump directly into the 2950 pressure zone. The remaining wells, Well Nos. 26, 27, 28, and 30 are anticipated to pump through dedicated well collection mains to a forebay reservoir then pumped into the future 2950 Zone reservoir via booster station for distribution through the proposed water system. Depending on the capacities of each of these wells, there is the potential for more or less wells.

Each well will be equipped with a manual transfer switch to allow a portable backup generator to power the wells during a power outage.

A summary of the required well capacities and the future additional well capacity required is presented in Table 13.

Table 13. Future Well Capacity Requirements

	Buildout PDD capacity (gpm)
System Requirement:	**13,674**
	Future Well Capacity (gpm)
Future Wells:	
17R	1,500
18	1,400
19R	1,500
21	1,000
23	1,500
24B	1,500
25	1,500
26	750
27	1,500
28	1,500
30	1,500
14	This well will be downsized to serve non-potable demands of the Lake and Lake Park under the existing Town Type I Water right.
TOTAL	**15,150***

*13,750 gpm with largest well out of service.

5.3.2. Future Fire Flow Requirements

The fire flow requirement for the 2950 North Zone is considered separate as it was in the existing system. The largest fire flow, in the 3050 Zone, will dictate the size of the planned 2950 Zone reservoirs.

Table 14. Future Fire Flow Requirements

Pressure Zone	Fire Flow Demand (gpm)	Fire Flow Duration (hours)	Total Fire Flow Storage (gallons)
2850	1,500	2	180,000
2950	2,000	4	480,000
2950 N	1,500	2	180,000
3050	2,250	4	540,000
3270	2,250	2	270,000
3420	1,750	2	210,000
3570	2,250	2	270,000
3720	2,250	2	270,000
3900	1,750	2	210,000

5.3.3. Storage

Storage sizing requirements are based on meeting 1.0 times the ADD plus fire flow. Fire flow demands will either be served by a floating reservoir for the 2850, 2950, 3270, 3420, 3570, and 3720 Zones, or via a pressurized booster station feeding off a reservoir for the 2950N, 3050, and 3900 Zones.

The storage requirements per zone are presented in Table 15. The Sahuarita Water system buildout requires an additional 10.7 MG of storage distributed throughout the system to meet the storage criteria. The proposed reservoir sizing to meet this requirement is summarized by zone in Table 16. These reservoirs are anticipated to be constructed at the locations shown on Exhibit 2. These reservoirs will float the 2950, 3270, 3420, 3570, and 3720 Zones and will have booster stations onsite to serve the 3050 and 3900 Zones. The booster station at the 2950 Zone will act as a redundant booster station to the existing 3050 Zone booster station at the existing 2850 Zone reservoir site. Normal practice for upgrading storage or supply is when the system demand is at 90 percent of the system supply or storage capacity.

There will also be a 0.6 MG Well Collection reservoir designed at the Well No. 26 site. This reservoir will serve as a forebay reservoir for the four new wells on the south side of the Rancho Sahuarita property; Well Nos. 26, 27, 28, and 30.

Table 15. Future Reservoir Capacity Requirements

Zone	Potable Storage Requirement (1.0 ADD/ gal)	Fire flow Storage Requirement (gal)	Total Storage Requirement (gal)	Total Existing Storage Capacity (gal)	Total Future Storage Capacity (gal)	Excess Storage Capacity[a] (gal)
2850	1,193,664	180,000	1,373,664	2,200,000	-	826,336
2950	2,010,749	480,000	2,490,749	0	2,500,000	9,251
2950 N	232,371	180,000	412,171	350,000	-	(62,171)
3050	348,058	540,000[b]	348,058	0	0	(348,058)
3150	-	-	-	0	1,200,000	1,200,000
3270	736,034	270,000	1,006,034	0	1,000,000	(6,034)
3420	388,402	210,000	598,402	0	1,200,000	601,598
3570	1,568,160	270,000	1,838,160	0	1,800,000	(38,160)
3720	1,579,717	270,000	1,849,717	0	1,200,000	(649,717)
3900	1,788,127	210,000[c]	1,788,127	0	1,200,000	(588,127)
Well Collection Forebay	-	-	-	0	600,000	600,000
TOTAL	**9,845,281**		**11,705,082**	**2,550,000**	**10,700,000**	**1,544,918**

[a]Parentheses indicate negative numbers
[b]Fire flow volume already provided in 2850 and 2950 Zone reservoirs
[c]Fire Flow volume already provided in 3720 Zone reservoir

Table 16. Proposed Reservoirs

Zone	Potable Storage Requirement (gallons)	Proposed Storage Reservoirs (gallons)
2850*	2,200,000	1,000,000 / 1,200,000
2950*	2,500,000	1,250,000 / 1,250,000
2950 N	350,000	350,000
3050	0	-
3150	1,200,000	600,000 / 600,000
3270*	1,000,000	1,000,000
3420*	1,200,000	600,000 / 600,000
3570*	1,800,000	900,000 / 900,000
3720*	2,400,000	1,200,000 / 1,200,000
Forebay	600,000	600,000
TOTAL	**13,250,000**	**13,250,000**

*Zones with floating storage

5.3.4. Booster Station and Transmission Facilities

5.3.4.1 Booster Stations

Booster station facility sizing is based upon conveying the PDD from zones with excess supply capacity to the zones within the water system without supply capacity. As can be seen on Exhibit 2, all of the SWC wells are located in the 2850 and 2950 Zones. This situation occurs because the greatest hydrologic water availability is located within these zones. The water that is extracted within these zones must, therefore, be transported through booster stations to the remaining zones in the system. In zones that are not served by floating reservoirs, the PDD and fire flow requirements must be supplied by the booster station.

The 2850 Zone is currently a floating zone and will remain a floating zone, so there are no booster station requirements for this zone. The 2950 Zone will be a floating zone upon construction of the new reservoir at the intersection of El Toro and La Cañada Drive. Until this time, the 2950 Zone will be served by the booster station at the existing 2.2 MG 2850 Zone reservoir site. The existing capacity of this booster station is 2,550 gpm. Per WestLand's 2950 Zone booster station plans designed in January 2004, the first pump of this booster station (250 gpm) is designed to be replaced by a 750 gpm pump to provide an ultimate flow at this booster station of 3,050 gpm.

There will be a second 3050 Zone booster station at the site of the new 2950 Zone reservoir at the intersection of El Toro and La Cañada Drive. This booster station is expected to have a capacity of approximately 2,400 gpm. This size is based on a portion of the buildout flow for the 3050 Zone PDD plus 2,250 gpm fire flow.

There will also be two 3150 Zone booster stations designed for the transport of flow from the 2850 and 2950 Zone Reservoirs to the forebay reservoirs located within Mission Peaks 3270 Zone. The 3150 Zone booster stations will be sized to move PDD to the 3270, 3420, 3570, 3720, and 3900 Zones to serve State Land, Mission Peaks, and Sahuarita Mission. The PDD demands of these zones is approximately 8,400 gpm, therefore each booster will provide 4,300 gpm. There will be an additional 2950 Zone booster located at the well collection forebay storage reservoir that will transported treated or blended water to the proposed 2950 Zone reservoir. This booster will move well capacity for Well Nos. 26, 27, 28, and 30 with an estimated combined capacity of 5,250 gpm.

The large capacity transfer booster stations (3150, 3420, 3570, 3720, and 3900 Zones) will be designed with equal sized transfer booster pumps. The transfer booster stations will have dual suction manifolds from each reservoir and dual discharge lines for redundancy and ease of maintenance. Each booster station will be equipped with backup generators to ensure continued operation during a power outage. All proposed booster stations will have an extra equal sized pump and separate electrical panels to operate each pump to allow for pumps to be taken off-line for maintenance or replacement without having to shut-down the entire booster station.

Table 17. Booster Station Capacity Analysis

Zone	PDD (gpm)	Fire Flow Requirements (gpm)	Total Required Booster Station Capacity (gpm)	Proposed Booster Station Capacity (gpm)
2850	1,658	1,500 However, this is a floating zone, and therefore fire flow is provided by the 2850 Reservoir.	N/A, Floating	N/A, Floating
2950	2,793	2,000 However, this is a floating zone, and therefore fire flow is provided by the future 2950 Reservoirs.	2,793	3,050
2950 N	323	1,500	1,823	1,850
3050	483	2,250	2,733	1-2,400* 1-2,250
3150	8,417	N/A	8,417	2- 4,300
3270	1,022	2,250 However, this is a floating zone, and therefore fire flow is provided by the future 3270 Reservoirs.	1,022	1,100
3420	539	1,750 However, this is a floating zone, and therefore fire flow is provided by the future 3420 Reservoirs.	7,395	7,500
3570	2,178	2,250 However, this is a floating zone, and therefore fire flow is provided by the future 3570 Reservoirs.	6,856	6,900
3720	2,194	2,250 However, this is a floating zone, and therefore fire flow is provided by the future 3720 Reservoirs.	4,678	4,700
3900	2,484	1,750	4,234	4,300

*Includes existing booster station at the 2850 Reservoir and proposed 2950 Zone reservoir (corner of El Toro and La Cañada Drive).

5.3.4.2 Transmission Mains

Exhibit 1 also shows the total capacity of transmission systems required for transporting water throughout the system. Main size requirements can then be estimated based upon maximum velocity requirements and maximum pipe friction losses in order to maintain adequate pressure within the system during PDD plus fire flow conditions. The 3150 Zone mains will transport PDD for the 3270, 3420, 3570, 3720, and 3900 Zones. Large diameter mains are proposed to reduce head losses, operating and pumping costs. Dual water mains transfer source water through the system and provide redundancy for future maintenance or replacement. The water main between the proposed forebay reservoir at Well No. 26 and the 2950 Zone reservoir will be required to transport well capacity from Well Nos. 26, 27, 28, and 30 with an estimated combined capacity of 5,250 gpm. Well collection mains are sized based on the well capacity being transported by them.

5.4. PROPOSED FACILITIES

The facilities proposed to meet the future system buildout requirements are described below. These facilities are also shown on Exhibit 2.

5.4.1. Well System Requirements

In accordance with Table 12, the future buildout capacity of the Sahuarita Water system is approximately 13,556 gpm, which is equivalent to approximately 19.5 million gallons per day (MGD) capacity requirements. As was discussed in Section 5.3.1, in order to meet these peak day demands, an additional seven wells at 1,500 gpm, one well at 750 gpm, and one well at 1,000 gpm will be required. These nine wells will be supplemented by an extra well in case of a well outage.

The future and existing well site locations are shown on Exhibit 2. This report is not considering existing Well Nos. 17, 18, 19, or 20 as part of the future system. Existing Well Nos. 17, 19, and 20 are planned to be abandoned. Wells Nos. 17 and 19 will be replaced by proposed Well Nos. 17R and 19R.

5.4.2. Reservoir System Requirements

Based upon Table 15, it is anticipated that approximately 10.7 MG of additional reservoir capacity will be required to provide 1.0 times the ADD plus fire flow. The proposed floating zone storage systems within the SWC system will provide service to the 2850, 2950, 3270, 3420, 3570, and 3720 Zones. The 2950 N, 3050, and 3900 Zones will be served via pumped storage. Reservoir capacity will be split between equally sized reservoirs, when possible, to allow for system flexibility and maintenance. The following new reservoirs are proposed:

- Two adjacent 1.25 MG 2950 Zone reservoirs located at the intersection of El Toro and La Cañada Drive at southwest corner of the 3050 Zone (Exhibit 1). These reservoirs will have a combined capacity of 2.5 MG.

- A 0.6 MG Well Collection reservoir located at Well Site No. 26. This will serve as a forebay reservoir to Well Nos. 26, 27, 28, and 30.

- Two adjacent 0.6 MG forebay reservoirs located along the eastern edge of the Mission Peaks project. These reservoirs will be phased and provide storage capacity for zones located within the Mission Peaks and Sahuarita Mission projects. These reservoirs will have a combined capacity of 1.2 MG.

- A 1.0 MG floating 3270 Zone reservoir located within the Mission Peaks project.

- Two adjacent 0.6 MG floating 3420 Zone reservoirs located within the Mission Peaks project. These reservoirs will be phased and provide storage capacity for zones located within the Mission Peaks and Sahuarita Mission projects. These reservoirs will have a combined capacity of 1.2 MG.

- Two adjacent 0.9 MG floating 3570 Zone reservoirs located within the Mission Peaks project. These reservoirs will have a combined capacity of 1.8 MG.

- Two adjacent 1.2 MG 3720 Zone floating reservoirs located within the Mission Peaks project. These reservoirs will have a combined capacity of 2.4 MG. Additional storage capacity for the 3720 and 3900 Zones is stored in the 3150 Zone forebay reservoirs.

5.4.3. Booster Station Requirements

The booster station locations, zone boundaries, and capacities are as follows:

- Upgrade to the existing 2950 Zone booster station will be required. The upgrade will upsize pump 1 of this booster station from 250 gpm to 750 gpm to a total flow of 3,050 gpm.

- A new 3050 Zone booster station will be required. This booster station will be designed at the intersection of El Toro and La Cañada Drive next to the proposed 2950 Zone reservoirs. This booster station is expected to have a capacity of approximately 2,400 gpm. This size is based on a portion of the buildout flow for the 3050 Zone PDD plus 2,250 gpm fire flow.

- An upgrade to the 2950 North Zone booster station will be required. A spare 550 gpm pump will be added as future Pump 4 to this manifold. The addition of a pump to the booster station will mean that the booster station capacity will meet the buildout requirements of PDD (2,793 gpm).

- There will be a 5,250 gpm Well Collection booster station located at Well Site No. 26. This will serve to transport water from the Well Collection Reservoir fed by Well Nos. 26, 27, 28 and 30.

- Two new 3150 Zone booster stations will be required. The booster stations will be located at the intersection of El Toro and La Cañada Drive next to the proposed 2950 Zone reservoirs and adjacent to the existing 2850 Zone reservoir site and Well No. 23. These booster stations will transfer PDD for the 3270, 3420, 3570, 3720, and 3900 Zones to the forebay reservoirs located on the eastern boundary of Mission Peaks. Each booster will have a 4,300 gpm capacity.

- A 3270 Zone booster station will be required to fill the 3270 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3270 Zone. The proposed capacity of this booster station will be 1,100 gpm.

- A 3420 Zone booster station will be required to fill the 3420 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3420, 3570, 3720, and 3900 Zones. The proposed capacity of this booster station will be 7,500 gpm and will be phased in according to capacity requirements.

- A 3570 Zone booster station will be required to fill the 3570 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3570, 3720, and 3900 Zones. The proposed capacity of this booster station will be 6,900 gpm and will be phased in according to capacity requirements.

- A 3720 Zone booster station will be required to fill the 3720 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3720 and 3900 Zones. The proposed capacity of this booster station will be 4,700 gpm and will be phased in according to capacity requirements.

- A 3900 Zone booster station will be required to provide PDD plus fire flow to the 3900 Zone. This booster station will be controlled by pressure in the 3900 Zone. The proposed capacity of this booster station will be 4,300 gpm and will be phased in according to capacity requirements. This site will be equipped with a back-up generator.

5.4.4. Transmission System Requirements

A number of mains are required in order to provide transport capacity between wells and reservoirs, provide additional capacity for fire flow to interior service areas, and improve the looping and layout of the distribution system. In addition to the transmission mains between reservoirs, a concept distribution system loop for fire flow and redundancy is proposed. The sizing of these mains should be confirmed through further detailed analysis.

Dual large diameter water mains are proposed to move large volumes of source water up through the system to the reservoirs in the highest zones. Dual mains allow continued water transport during a main break or shut-down needed for maintenance purposes. Large diameter mains reduce system head loss which in turn reduces the amount of pumping head needed to transport water from one zone to the next. A reduction in pumping head will equate to a reduction in pumping electrical costs.

APPENDIX A

DEMAND CALCULATIONS

Rancho Sahuarita Water Mater Plan Demands - Summary

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential			Demand		
Zone	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)
2850	3,992	-	-	67,000	-	-	1,193,664	1,658	2,653
2950	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468
2950N	491	-	428	15,000	-	-	232,371	323	516
3050	-	-	1,032	1,197,683	-	-	348,058	483	773
3270	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636
3420	375	226	1,161	70,855	-	-	388,402	539	863
3570	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485
3720	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510
3900	5,992	-	-	70,855	-	-	1,788,127	2,484	3,974
Total	27,009	1,506	3,831	4,178,271	2,182	8,493	9,845,281	13,674	21,878

Revisions made per Matt on 8/24 (15000 units Mission Peaks + 2300 units State Land + 500 units McGee Ranch)
Revisions made per Marian on 9/12 (revise active adult units (100% of units in 3050, 428 units in 2950N)(revise commerical SF per e-mailed spreadshe
Revision made per Marian on 9/13 (revise hospital in 2950 zone to add 245,000 SF in 2017)

Rancho Sahuarita Water Mater Plan Demands - 2850 Zone

Demand Criteria

Residential		Non-residential		Peak Factors	
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2	peak day
1.9 pphu	multi-family			3.2	peak hour
1.8 pphu	active-adult				
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School		
90 gpcd	multi-family	43 gpsd	High School		

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	2,973	-	-	35,000	-	-	887,181	1,232	1972	1500
2007	3,356	-	-	35,000	-	-	1,000,932	1,390	2224	1500
2008	3,711	-	-	35,000	-	-	1,106,219	1,536	2458	1500
2009	3,781	-	-	35,000	-	-	1,127,157	1,565	2505	1500
2010	3,876	-	-	51,000	-	-	1,157,292	1,607	2572	1500
2011	3,992	-	-	59,000	-	-	1,192,704	1,657	2650	1500
2012	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2013	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2014	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2015	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2016	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2017	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2018	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2019	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2020	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2021	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2022	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2023	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2024	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2025	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2026	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2027	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2028	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2029	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2030	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2031	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2032	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2033	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2034	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 2950 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	225	-	-	24,000	-	-	69,705	97	155	2,000
2007	225	-	-	288,196	-	-	101,409	141	225	2,000
2008	1,064	-	-	376,305	1,159	2,900	483,502	672	1,074	2,000
2009	1,214	-	-	473,252	1,226	3,044	546,166	759	1,214	2,000
2010	1,590	-	-	698,252	1,226	3,150	687,488	955	1,528	2,000
2011	1,778	-	-	993,252	1,226	3,150	778,724	1,082	1,730	2,000
2012	2,307	-	-	1,043,252	1,226	3,150	941,837	1,308	2,093	2,000
2013	2,907	-	-	1,199,252	1,226	3,150	1,138,757	1,582	2,531	2,000
2014	3,507	-	-	1,296,252	1,226	3,150	1,328,597	1,845	2,952	2,000
2015	4,107	-	-	1,510,252	1,226	3,150	1,532,477	2,128	3,406	2,000
2016	4,707	-	-	1,548,252	1,226	3,150	1,715,237	2,382	3,812	2,000
2017	5,307	-	-	1,793,252	1,226	3,150	1,922,837	2,671	4,273	2,000
2018	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2019	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2020	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2021	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2022	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2023	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2024	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2025	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2026	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2027	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2028	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2029	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2030	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2031	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2032	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2033	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2034	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 2950N Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	76	-	68	15,000	-	-	37,836	53	84	1,500
2007	161	-	143	15,000	-	-	77,931	108	173	1,500
2008	341	-	297	15,000	-	-	161,883	225	360	1,500
2009	378	-	330	15,000	-	-	179,406	249	399	1,500
2010	429	-	374	15,000	-	-	203,265	282	452	1,500
2011	491	-	428	15,000	-	-	232,371	323	516	1,500
2012	491	-	428	15,000	-	-	232,371	323	516	1,500
2013	491	-	428	15,000	-	-	232,371	323	516	1,500
2014	491	-	428	15,000	-	-	232,371	323	516	1,500
2015	491	-	428	15,000	-	-	232,371	323	516	1,500
2016	491	-	428	15,000	-	-	232,371	323	516	1,500
2017	491	-	428	15,000	-	-	232,371	323	516	1,500
2018	491	-	428	15,000	-	-	232,371	323	516	1,500
2019	491	-	428	15,000	-	-	232,371	323	516	1,500
2020	491	-	428	15,000	-	-	232,371	323	516	1,500
2021	491	-	428	15,000	-	-	232,371	323	516	1,500
2022	491	-	428	15,000	-	-	232,371	323	516	1,500
2023	491	-	428	15,000	-	-	232,371	323	516	1,500
2024	491	-	428	15,000	-	-	232,371	323	516	1,500
2025	491	-	428	15,000	-	-	232,371	323	516	1,500
2026	491	-	428	15,000	-	-	232,371	323	516	1,500
2027	491	-	428	15,000	-	-	232,371	323	516	1,500
2028	491	-	428	15,000	-	-	232,371	323	516	1,500
2029	491	-	428	15,000	-	-	232,371	323	516	1,500
2030	491	-	428	15,000	-	-	232,371	323	516	1,500
2031	491	-	428	15,000	-	-	232,371	323	516	1,500
2032	491	-	428	15,000	-	-	232,371	323	516	1,500
2033	491	-	428	15,000	-	-	232,371	323	516	1,500
2034	491	-	428	15,000	-	-	232,371	323	516	1,500

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 3050 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	357	15,000	-	-	72,486	101	161	2,250
2007	-	-	357	15,000	-	-	72,486	101	161	2,250
2008	-	-	357	15,000	-	-	72,486	101	161	2,250
2009	-	-	357	424,000	-	-	121,566	169	270	2,250
2010	-	-	357	739,000	-	-	159,366	221	354	2,250
2011	-	-	357	782,486	-	-	164,584	229	366	2,250
2012	-	-	357	854,378	-	-	173,211	241	385	2,250
2013	-	-	357	878,378	-	-	176,091	245	391	2,250
2014	-	-	357	985,734	-	-	188,974	262	420	2,250
2015	-	-	357	1,047,683	-	-	196,408	273	436	2,250
2016	-	-	357	1,197,683	-	-	214,408	298	476	2,250
2017	-	-	357	1,197,683	-	-	214,408	298	476	2,250
2018	-	-	661	1,197,683	-	-	274,600	381	610	2,250
2019	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2020	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2021	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2022	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2023	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2024	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2025	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2026	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2027	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2028	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2029	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2030	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2031	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2032	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2033	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2034	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 3270 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	100	174	-	30,000	-	-	63,054	88	140	2,250
2011	200	174	-	60,000	-	-	96,354	134	214	2,250
2012	400	174	-	90,000	-	-	159,354	221	354	2,250
2013	800	174	-	120,000	-	-	281,754	391	626	2,250
2014	1,200	174	-	150,000	-	-	404,154	561	898	2,250
2015	1,600	174	-	180,000	478	2,028	597,808	830	1,328	2,250
2016	1,999	174	-	210,000	478	2,028	719,911	1,000	1,600	2,250
2017	1,999	174	-	240,000	478	2,028	723,511	1,005	1,608	2,250
2018	1,999	174	-	270,000	478	2,028	727,111	1,010	1,616	2,250
2019	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2020	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2021	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2022	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2023	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2024	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2025	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2026	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2027	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2028	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2029	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2030	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2031	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2032	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2033	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2034	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250

Development in this zone is located in Mission Peaks and State Land

Rancho Sahuarita Water Mater Plan Demands - 3420 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	-	-	100	-	-	-	19,800	28	44	1,750
2011	-	-	300	-	-	-	59,400	83	132	1,750
2012	150	-	600	-	-	-	163,350	227	363	1,750
2013	375	226	900	-	-	-	328,221	456	729	1,750
2014	375	226	1,161	-	-	-	379,899	528	844	1,750
2015	375	226	1,161	-	-	-	379,899	528	844	1,750
2016	375	226	1,161	30,000	-	-	383,499	533	852	1,750
2017	375	226	1,161	60,000	-	-	387,099	538	860	1,750
2018	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2019	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2020	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2021	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2022	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2023	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2024	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2025	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2026	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2027	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2028	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2029	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2030	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2031	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2032	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2033	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2034	375	226	1,161	70,855	-	-	388,402	539	863	1,750

Development in this zone is located in Mission Peaks

Rancho Sahuarita Water Mater Plan Demands - 3570 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-
2011	440	-	-	-	-	-	130,680	182	290	2,250
2012	880	-	-	-	-	-	261,360	363	581	2,250
2013	1,320	200	-	-	-	-	426,240	592	947	2,250
2014	1,760	600	200	-	-	1,287	697,095	968	1,549	2,250
2015	2,200	1,000	400	-	-	1,287	935,775	1,300	2,080	2,250
2016	2,640	1,106	600	100,000	-	1,287	1,136,181	1,578	2,525	2,250
2017	2,998	1,106	800	200,000	-	1,287	1,294,107	1,797	2,876	2,250
2018	3,238	1,106	1,000	300,000	-	1,287	1,416,987	1,968	3,149	2,250
2019	3,478	1,106	1,210	400,000	-	1,287	1,541,847	2,141	3,426	2,250
2020	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2021	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2022	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2023	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2024	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2025	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2026	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2027	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2028	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2029	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2030	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2031	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2032	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2033	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250
2034	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250

Sahuarita Mission Unit
240
480
720
960
1200
1440
1680
1920
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Development in this zone is located in Mission Peaks and Sahuarita Mission

Rancho Sahuarita Water Mater Plan Demands - 3720 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)	Sahuarita Mission Units
2006	-	-	-	-	-	-	-	-	-	-	0
2007	-	-	-	-	-	-	-	-	-	-	0
2008	-	-	-	-	-	-	-	-	-	-	0
2009	-	-	-	-	-	-	-	-	-	-	0
2010	-	-	-	-	-	-	-	-	-	-	0
2011	-	-	-	-	-	-	-	-	-	-	0
2012	-	-	-	-	-	-	-	-	-	-	0
2013	-	-	-	-	-	-	-	-	-	-	0
2014	-	-	-	-	-	-	-	-	-	-	0
2015	-	-	-	-	-	-	-	-	-	-	0
2016	-	-	-	-	-	-	-	-	-	-	0
2017	-	-	-	-	-	-	-	-	-	-	0
2018	-	-	-	-	-	-	-	-	-	-	0
2019	700	-	-	-	478	2,028	279,154	388	620	2,250	200
2020	1,400	-	-	-	478	2,028	487,054	676	1,082	2,250	400
2021	2,100	-	-	-	478	2,028	694,954	965	1,544	2,250	600
2022	2,840	-	-	-	478	2,028	914,734	1,270	2,033	2,250	840
2023	3,340	-	-	-	478	2,028	1,063,234	1,477	2,363	2,250	840
2024	3,840	-	-	-	478	2,028	1,211,734	1,683	2,693	2,250	840
2025	4,340	-	-	-	478	2,028	1,360,234	1,889	3,023	2,250	840
2026	4,840	-	-	-	478	2,028	1,508,734	2,095	3,353	2,250	840
2027	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840
2028	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840
2029	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840
2030	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840
2031	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840
2032	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840
2033	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840
2034	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250	840

Development in this zone is located in Mission Peaks and Sahuarita Mission

Rancho Sahuarita Water Mater Plan Demands - 3900 Zone

Demand Criteria

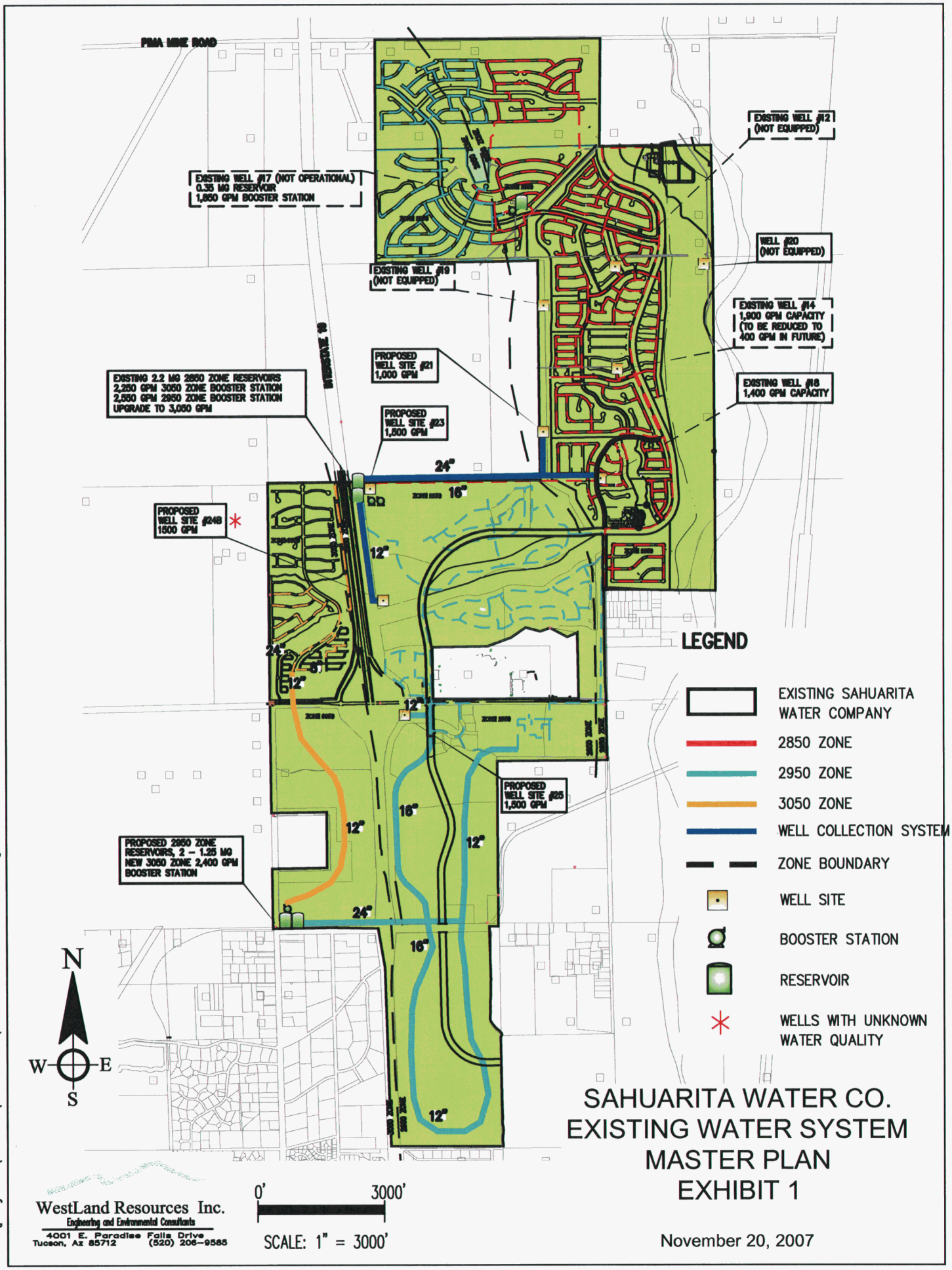
Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-	-	-	-
2021	-	-	-	-	-	-	-	-	-	-
2022	-	-	-	-	-	-	-	-	-	-
2023	-	-	-	-	-	-	-	-	-	-
2024	-	-	-	-	-	-	-	-	-	-
2025	-	-	-	-	-	-	-	-	-	-
2026	-	-	-	-	-	-	-	-	-	-
2027	750	-	-	70,855	-	-	231,253	321	514	1,750
2028	1,500	-	-	70,855	-	-	454,003	631	1,009	1,750
2029	2,250	-	-	70,855	-	-	676,753	940	1,504	1,750
2030	3,500	-	-	70,855	-	-	1,048,003	1,456	2,329	1,750
2031	4,250	-	-	70,855	-	-	1,270,753	1,765	2,824	1,750
2032	5,000	-	-	70,855	-	-	1,493,503	2,074	3,319	1,750
2033	5,750	-	-	70,855	-	-	1,716,253	2,384	3,814	1,750
2034	5,992	-	-	70,855	-	-	1,788,127	2,484	3,974	1,750

Development in this zone is located in Mission Peaks (500 homes served in McGee Ranch)

EXHIBIT 1

EXISTING WATER SYSTEM MASTER PLAN



SAHUARITA WATER CO.
EXISTING WATER SYSTEM
MASTER PLAN
EXHIBIT 1

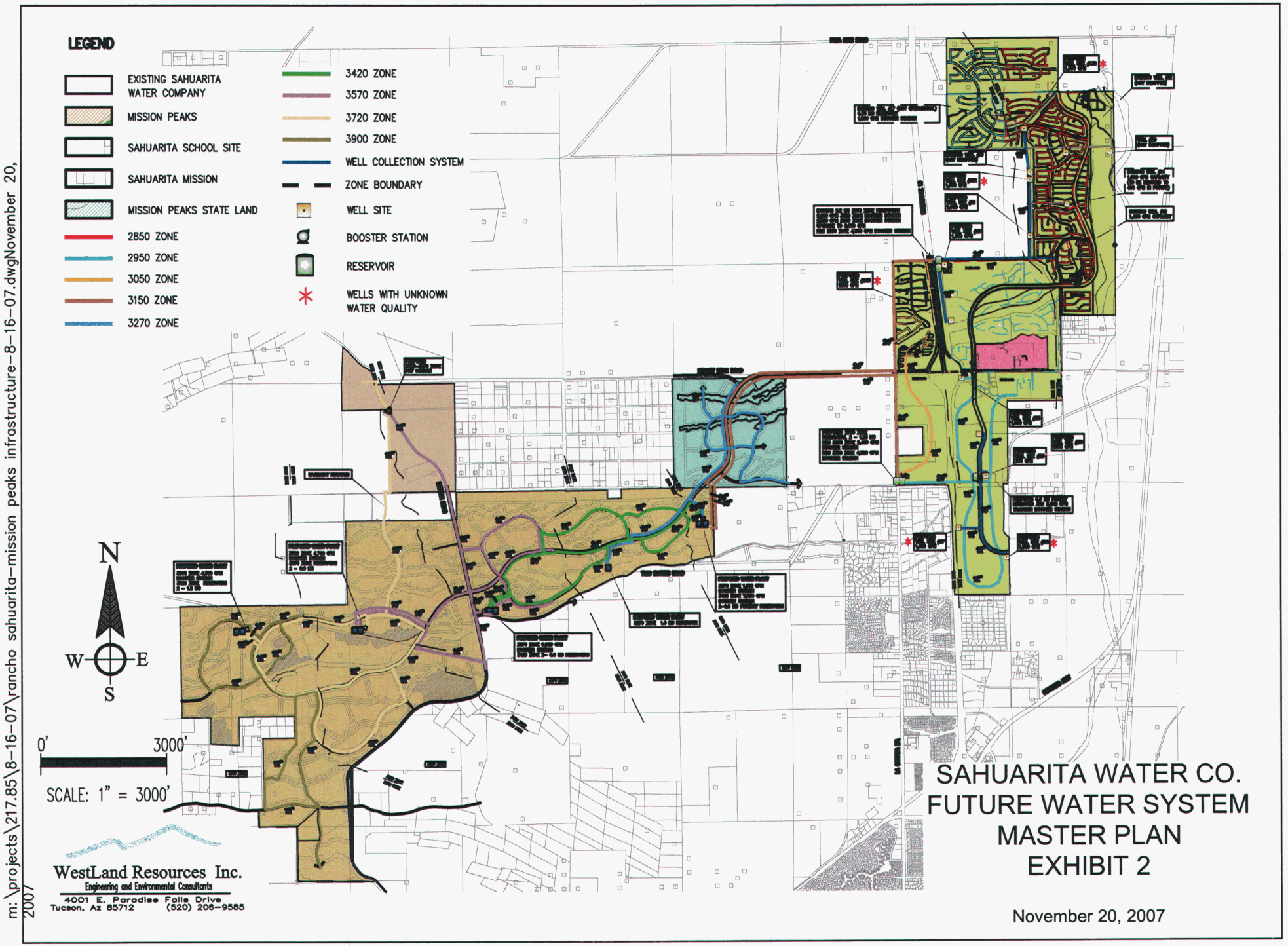
November 20, 2007

WestLand Resources Inc.
Engineering and Environmental Consultants
4001 E. Paradise Falls Drive
Tucson, Az 85712 (520) 206-9585

m: \projects\217.85\8-16-07\rancho sahuarita-existing infrastructure-10-10-07.dwgNovember 20, 2007

EXHIBIT 2

FUTURE WATER SYSTEM MASTER PLAN



WestLand Resources Inc.
Engineering and Environmental Consultants
4001 E. Paradise Falls Drive
Tucson, Az 85712 (520) 206-9585

m:\projects\217.85\8-16-07\rancho sahuarita-mission peaks infrastructure-8-16-07.dwgNovember 20, 2007

APPENDIX "T"

(Opinion of Probable Construction Cost, as prepared by WestLand Resources, Inc.; and, Projected Utility Plant Account Balances, as prepared by Thomas J. Bourassa, C.P.A.)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Water Co., L.L.C
Plant
Projected Years

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 1 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%	$ 120,000		$ 120,000	$ 120,000	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%	25,000		25,000	25,000	-	25,000	-
4	304	Structures and Improvements		2.90%	100,000	25,387	125,387	125,387	1,818	125,387	1,818
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%	1,237,350	314,130	1,551,481	1,551,481	31,030	1,551,481	31,030
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%	1,659,174	421,220	2,080,395	2,080,395	52,010	2,080,395	52,010
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%	674,918	171,344	846,262	846,262	13,963	846,262	13,963
14	331	Transmission and Distribution	0%	2.00%	5,198,784	1,319,833	6,518,617	6,518,617	65,186	6,518,617	65,186
15	331	Transmission and Distribution (AIAC)	100%	2.00%	364,287	92,483	456,770	456,770	4,568	456,770	4,568
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	124,013	31,483	155,496	155,496	2,021	155,496	2,021
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 9,503,527	$ 2,375,882	$ 11,879,409	$ 11,879,409	$ 170,596	$ 11,879,409	$ 170,596
35											
36		Composite Rate with 1/2 yr convention							1.44%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			2,375,882					
40		Total				$ 2,375,882					
41											

Sahuarita Water Co., L.L.C
Plant
Projected Years

APPENDIX T
Page 1.2

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 2 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%			-	-	-	25,000	-
4	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	5,454
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%		-	-	-	62,059	1,551,481	93,089
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%	701,915	175,479	877,394	877,394	125,955	2,957,789	177,964
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%	701,915	175,479	877,394	877,394	42,404	1,723,656	56,367
14	331	Transmission and Distribution	0%	2.00%	4,246,587	1,061,647	5,308,233	5,308,233	183,455	11,826,851	248,641
15	331	Transmission and Distribution (AIAC)	100%	2.00%	740,813	185,203	926,016	926,016	18,396	1,382,786	22,963
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	240,218	60,054	300,272	300,272	7,946	455,768	9,968
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 6,631,447	$ 1,657,862	$ 8,289,309	$ 8,289,309	$ 443,850	$ 20,168,718	$ 614,447
35											
36		Composite Rate with 1/2 yr convention							2.20%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			1,657,862					
40		Total				$ 1,657,862					
41											

Sahuarita Water Co., L.L.C
Plant
Projected Years

APPENDIX T
Page 1.3

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 3 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%			-	-	-	25,000	-
4	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	9,091
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%		-	-	-	62,059	1,551,481	155,148
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%		-	-	-	147,889	2,957,789	325,854
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%	729,992	182,498	912,490	912,490	71,937	2,636,146	128,304
14	331	Transmission and Distribution	0%	2.00%		-	-	-	236,537	11,826,851	485,178
15	331	Transmission and Distribution (AIAC)	100%	2.00%	1,134,468	283,617	1,418,085	1,418,085	41,837	2,800,871	64,800
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	351,343	87,836	439,178	439,178	17,559	894,946	27,527
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 2,215,802	$ 553,951	$ 2,769,753	$ 2,769,753	$ 581,454	$ 22,938,470	$ 1,195,901
35											
36		Composite Rate with 1/2 yr convention							2.53%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			553,951					
40		Total				$ 553,951					
41											

Sahuarita Water Co., L.L.C
Plant
Projected Years

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 4 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%			-	-	-	25,000	-
4	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	12,727
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%	1,391,851	347,963	1,739,814	1,739,814	96,856	3,291,294	252,004
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%		-	-	-	147,889	2,957,789	473,743
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%	1,012,255	253,064	1,265,319	1,265,319	107,871	3,901,465	236,174
14	331	Transmission and Distribution	0%	2.00%	2,148,512	537,128	2,685,640	2,685,640	263,393	14,512,490	748,571
15	331	Transmission and Distribution (AIAC)	100%	2.00%	1,931,636	482,909	2,414,545	2,414,545	80,163	5,215,416	144,963
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	573,910	143,478	717,388	717,388	32,595	1,612,333	60,122
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 7,058,164	$ 1,764,541	$ 8,822,705	$ 8,822,705	$ 732,403	$ 31,761,175	$ 1,928,304
35											
36		Composite Rate with 1/2 yr convention							2.31%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			1,764,541					
40		Total				$ 1,764,541					
41											

Sahuarita Water Co., L.L.C
Plant
Projected Years

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 6 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%			-	-	-	25,000	-
4	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	16,363
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%		-	-	-	131,652	3,291,294	383,655
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%		-	-	-	147,889	2,957,789	621,633
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%		-	-	-	128,748	3,901,465	364,923
14	331	Transmission and Distribution	0%	2.00%	757,977	189,494	947,471	947,471	299,725	15,459,961	1,048,296
15	331	Transmission and Distribution (AIAC)	100%	2.00%	1,910,470	477,617	2,388,087	2,388,087	128,189	7,603,503	273,152
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	545,335	136,334	681,669	681,669	50,782	2,294,002	110,904
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 3,213,781	$ 803,445	$ 4,017,227	$ 4,017,227	$ 890,622	$ 35,778,402	$ 2,818,926
35											
36		Composite Rate with 1/2 yr convention							2.49%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			803,445					
40		Total				$ 803,445					
41											

APPENDIX "U"

(Sahuarita Water Company, L.L.C.'s (i) Balance Sheet, (ii) Income Statement, and (iii) Annual Operating Revenues, Expenses and Customers for Projected Years 1 through 5, as prepared by Thomas J. Bourassa, C.P.A.)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

Sahuarita Water Co., L.L.C
Projected Balance Sheets
For the Years Ended

Line No.		Beginning of Year	Label	1st year Changes	Year 1	Year 2	Year 3	Year 4	Year 5
1									
2									
3	**Assets**								
4									
5	Utility Plant	-	(a)	11,879,409	11,879,409	20,168,718	22,938,470	31,761,175	35,778,402
6	Accumulated Depreciation	-	(b)	(170,596)	(170,596)	(614,447)	(1,195,901)	(1,928,304)	(2,818,926)
7									
8	Cash	25,000	(c)	206,770	231,770	616,526	560,521	179,239	346,959
9									
10									
11	**Total Assets**	$ 25,000		$ 11,915,582	$ 11,940,582	$ 20,170,797	$ 22,303,090	$ 30,012,110	$ 33,306,435
12									
13	Equity and Liabilities			-					
14									
15	**Equity**								
16									
17	Common Stock, Net of	25,000	(d)	11,158,486	11,183,486	18,039,441	18,049,027	22,048,307	22,048,307
18									
19	Retained Earnings		(e)	38,186	38,186	29,082	116,872	430,355	576,507
20	**Total Equity**	$ 25,000		$ 11,196,672	$ 11,221,672	$ 18,068,524	$ 18,165,899	$ 22,478,661	$ 22,624,814
21									
22	**Liabilities & Deferred Credits**			-					
23	Advances in Aid of Construction		(f)	580,783	580,783	1,705,988	3,370,394	6,164,726	8,759,029
24	Contributions in Aid of			-					
25	Construction		(g)	140,140	140,140	407,260	798,000	1,432,970	2,037,560
26	Less: Amortization		(g)	(2,013)	(2,013)	(10,975)	(31,203)	(64,247)	(114,967)
27	Customer Deposits			-					
28	Long-Term Debt								
29									
30									
31	**Total Liabilities and**								
32	**Deferred Credits**	-		718,910	718,910	2,102,273	4,137,191	7,533,449	10,681,622
33									
34									
35	**Total Equity & Liab.**	$ 25,000		$ 11,915,582	$ 11,940,582	$ 20,170,797	$ 22,303,090	$ 30,012,110	$ 33,306,435
36									
37									
38									

(a) Plant Additions ((See Appendix T, pages 1.1 through 1.5)
(b) Depreciation Computations (See Appendix T, pages 1.1 through 1.5)
(c) Cash flows (See Appendix U, page 1.5)
(d) Financing (See Appendix U, page 1.1)
(e) Profit or loss from operations (See Appendix U, page 2)
(f) Advances-in-Aid of Construction (See Appendix U, pages 1.2 and 1.4)
(g) Contibutions-in-Aid of Construction (See Appendix U, page 1.3)

Sahuarita Water Co., L.L.C
Schedule of Developer Advances and Refunds
Projected Years

Appendix U
Page 1.2

Line No.		Year 1	2	3	4	5
5	**Developer Advances Collected**					
6	Developer Advances - Trans & Dist.	$ 456,770	$ 926,016	$ 1,418,085	$ 2,414,545	$ 2,388,087
10	Total Collected	$ 456,770	$ 926,016	$ 1,418,085	$ 2,414,545	$ 2,388,087
12	Cummulative Collected	$ 456,770	$ 1,382,786	$ 2,800,871	$ 5,215,416	$ 7,603,503
15	**Developer Advances Refunded (a)**					
16	Based on Revenues		28,627	68,599	122,566	213,028
21	Total Refunds	$ -	$ 28,627	$ 68,599	$ 122,566	$ 213,028
23	Cummulative Refunds	$ -	$ 28,627	$ 97,226	$ 219,791	$ 432,820
25	Cummulative Balance	$ 456,770	$ 1,354,159	$ 2,703,645	$ 4,995,625	$ 7,170,684

28 (a) Refund Rate per Year 10% based on revenues.

Sahuarita Water Co., L.L.C
Schedule of Contributions-in-Aid of Construction
Projected Years

APPENDIX U
Schedule 1.3

Line No.		Year 1	2	3	4	5
1						
2						
3						
4						
5	**Contributions (Hook-up Fees)**					
6	Residential	130,900	259,000	381,500	626,850	595,350
7	Commercial	8,120	8,120	8,120	8,120	8,120
8	Irrigation	1,120	-	1,120	-	1,120
9	**Developer Contributions**					
10	Developer Contributions	$ -	$ -	$ -	$ -	$ -
11						
12						
13	Total Collected	$ 140,140	$ 267,120	$ 390,740	$ 634,970	$ 604,590
14						
15	Cummulative Collected	$ 140,140	$ 407,260	$ 798,000	$ 1,432,970	$ 2,037,560
16						
17	**Amortization**					
18	Composite Rate (1/2 Yr Conv.)	1.44%	2.20%	2.53%	2.31%	2.49%
19						
20	Amortization	$ 2,013	$ 8,963	$ 20,228	$ 33,044	$ 50,720
21						
22	Cummulative Amortization	$ 2,013	$ 10,975	$ 31,203	$ 64,247	$ 114,967
23						
24	Cummulative Balance	$ 138,127	$ 396,285	$ 766,797	$ 1,368,723	$ 1,922,593
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

Sahuarita Water Co., L.L.C
Schedule of Service Line and Meter Installation Refunds
Projected Years

APPENDIX U
Schedule 1.4

Line No.			Year 1	2	3	4	5
1							
2							
3							
4							
5	**Service Line and Meter Installations**						
6	Residential		$ 118,745	$ 234,950	$ 346,075	$ 568,643	$ 540,068
7	Commercial		5,268	5,268	5,268	5,268	5,268
8	School		-	-	-	-	-
9							
10	Total Collected		$ 124,013	$ 240,218	$ 351,343	$ 573,910	$ 545,335
11							
12	Cummulative Collected		$ 124,013	$ 364,230	$ 715,573	$ 1,289,483	$ 1,834,818
13							
14	**Service Line and Meter Installations Refunded (a)**						
15	Service Line & Meter Install. from	1		12,401	12,401	12,401	12,401
16	Service Line & Meter Install. from	2			24,022	24,022	24,022
17	Service Line & Meter Install. from	3				35,134	35,134
18	Service Line & Meter Install. from	4					54,534
19	Service Line & Meter Install. from	5					
20	Total Refunds		$ -	$ 12,401	$ 36,423	$ 71,557	$ 126,091
21							
22	Cummulative Refunds		$ -	$ 12,401	$ 48,824	$ 120,382	$ 246,472
23							
24	Cummulative Balance		$ 124,013	$ 351,829	$ 666,748	$ 1,169,101	$ 1,588,345
25							
26							
27							
28							
29	(a) Refund Rate per Year	10%					
30							
31							
32							
33							
34							
35							
36							
37							
38							

Sahuarita Water Co., L.L.C
Projected Cash Flows
For the Years Ended

Line No.		Year 0	1	2	3	4	5
3	**Cash from Operations**						
4	Beginning Cash Balance	$ -	$ 25,000	$ 231,770	$ 616,526	$ 560,521	$ 179,239
6	Income from Operations		38,186	(9,104)	87,790	313,482	146,152
7	Add Depreciation expense		168,584	434,888	561,226	699,359	839,901
9	**Total Cash From Operations**	$ -	$ 206,770	$ 425,784	$ 649,016	$ 1,012,841	$ 986,054
11	**Cash from Financing**						
13	Deposits (security) collected	$ -	$ -	$ -	$ -	$ -	$ -
14	Long-Term Debt	-	-	-	-	-	-
15	Common Equity	25,000	11,158,486	6,855,955	9,585	3,999,280	-
16	Advances in Aid of Const.	-	456,770	926,016	1,418,085	2,414,545	2,388,087
17	Contribution in Aid of Const.	-	140,140	267,120	390,740	634,970	604,590
18	Meter Deposits Collected	-	124,013	240,218	351,343	573,910	545,335
21	**Total Cash from Financing**	$ 25,000	$ 11,879,409	$ 8,289,309	$ 2,169,753	$ 7,622,705	$ 3,538,012
25	**Uses of Cash:**						
28	Long-term debt Repayment						
29	Advances Refunded	$ -	$ -	$ 41,028	$ 105,022	$ 194,123	$ 339,119
30	Meter Deposit Refunded						
31	Deposit (Security) refunded						
32	Capital Improvements - Plant	-	11,879,409	8,289,309	2,769,753	8,822,705	4,017,227
34	**Total Cash Uses**	$ -	$ 11,879,409	$ 8,330,337	$ 2,874,774	$ 9,016,828	$ 4,356,346
36	**Ending Cash Balance**	$ 25,000	$ 231,770	$ 616,526	$ 560,521	$ 179,239	$ 346,959
39	Interest Income: Assuming Earning Equal to Inflation Factor on Average Cash Balance						
40	Average Cash Balance	$ 12,500	$ 128,385	$ 424,148	$ 588,523	$ 369,880	$ 263,099
41	Interest Earned	$ 375	$ 3,852	$ 12,724	$ 17,656	$ 11,096	$ 7,893

Sahuarita Water Co., L.L.C
Projected Statements of Income
For the 12 Months Ended

Line No.		Cost Per	Description	Minimum	Year 1	2	3	4	5
1									
2									
3	Metered Water Revenues(g)				$ 286,271	$ 685,987	$ 1,225,657	$ 2,130,282	$ 2,814,506
4	Unmetered Water Revenues								
5	Other Water Revenues								
6	**Total estimated Revenues**				$ 286,271	$ 685,987	$ 1,225,657	$ 2,130,282	$ 2,814,506
7	**Variable Expenses**								
8	Pumping Power (per 1,000 gallons)(b)	0.30	per 1,000 gals		6,178	24,045	53,916	102,096	163,021
9	CAGRD Costs	See Gallons Sold Summary			7,634	33,812	85,460	180,165	317,474
10	Repairs & Maint.(a)(b)	0.25	/month/customer		589	2,328	5,329	10,231	16,454
11	Gen. Insurance (a)(b)	0.80	/month/customer	$ 1,500	1,829	7,451	17,054	32,740	52,652
12	Water Treatment & Testing (d)(b)	0.10	/1,000 gallon	$ 1,000	2,059	8,015	17,972	34,032	54,340
13	Billing, Postage, Operations (a)(b)	17.00	/month/customer	$ 5,000	38,862	158,325	362,401	695,722	1,118,859
14					$ 57,150	$ 233,976	$ 542,133	$ 1,054,986	$ 1,722,802
15	**Other Expenses**								
16	Depreciation net of Amortization of CIAC (h)				168,584	434,888	561,226	699,359	839,901
17	Office (b)	$ 2,500			2,500	2,575	2,732	2,985	3,360
18	Legal & Accounting (b)	$ 2,500			2,500	2,575	2,732	2,985	3,360
19	Miscellenous Expenses (b) (e)	$ 1,200			1,200	1,236	1,311	1,433	1,613
20	Income Taxes				-	-	-	-	-
21	Property Taxes (f)	See Property Tax			16,526	23,692	40,456	72,708	108,415
22									
23	**Total Other Expense**				$ 191,310	$ 464,966	$ 608,458	$ 779,469	$ 956,648
24									
25	**Total Operating Expenses**				$ 248,460	$ 698,942	$ 1,150,591	$ 1,834,455	$ 2,679,450
26									
27	**Operating income (loss)**				$ 37,811	$ (12,955)	$ 75,066	$ 295,827	$ 135,056
28	Less:								
29	Interest (Expense)Income on Work. Cap. (c)				375	3,852	12,724	17,656	11,096
30	Interest Expense Long-term Debt (c)				-	-	-	-	-
31	**Net Income**				$ 38,186	$ (9,104)	$ 87,790	$ 313,482	$ 146,152
32									
33	(a) Per customer per month								
34	(b) Annual Inflation of:	3.00%							
35	(c) If Applicable								
36	(d) ADEQ based on per 1,000 gallons sold								
37	(e) Miscellaneous Expenses of $100 per month								
38	(f) Property Tax Calculation (Appendix U, page 2.4)								
39	(g) Revenues (see Appendix U, page 2.1)								
40	(h) Depreciation and amortization (see Appendix T, pages 1.1 to 1.5 and Appendix U, page 1.3)								
41									

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

APPENDIX U
Page 2.1

Line No.		Year 1	2	3	4	5
3	Residential					
4	5/8 Inch	$ 85,197	$ 320,266	$ 700,140	$ 1,301,932	$ 2,007,860
5	3/4 Inch					
6	1 Inch					
7	2 Inch					
8	3 inch					
9						
10	Commercial					
11	5/8 Inch					
12	1 Inch	1,229	3,587	5,945	8,303	10,661
13	2 Inch	3,896	11,537	19,178	26,819	34,460
14	3 Inch					
15						
16						
17	Irrigation					
18	3/4 Inch	1,387	2,725	4,112	5,449	6,837
19	1 Inch	3,210	6,370	9,579	12,739	15,949
20	2 Inch					
21	3 Inch					
22	School	32,750	32,750	32,750	32,750	32,750
23	Construction Water	158,603	308,753	453,953	742,290	705,990
24						
25	Total	$ 286,271	$ 685,987	$ 1,225,657	$ 2,130,282	$ 2,814,506
26						
27						
28						
29						
30	See supporting schedules (Appendix U, pages 2.2, 2.3, 2.5 to 2.12)					
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						

Sahuarita Water Co., L.L.C
Customer Counts
For Projected Years Ended

APPENDIX U
Page 2.2

Line No.		Year				
1						
2	**Year Ended**	**1**	**2**	**3**	**4**	**5**
3	Residential					
4	5/8 Inch	374	1,114	2,204	3,995	5,696
5	3/4 Inch					
6	1 Inch					
7	2 Inch					
8	3 inch					
9	Commercial					
10	5/8 Inch					
11	3/4 Inch					
12	1 Inch	2	4	6	8	10
13	2 Inch	3	6	9	12	15
14	3 inch					
15	Irrigation					
16	5/8 Inch					
17	3/4 Inch	1	1	2	2	3
18	1 Inch	1	1	2	2	3
19	2 Inch					
20						
21	Total	381	1,126	2,223	4,019	5,727
22						
23	1/2 Year Convention			Year		
24	**Year Ended**	**1**	**2**	**3**	**4**	**5**
25	Residential					
26	5/8 Inch	187.00	744.00	1,659.00	3,099.50	4,845.50
27	3/4 Inch					
28	1 Inch					
29	2 Inch					
30	3 inch					
31	Commercial					
32	5/8 Inch					
33	3/4 Inch					
34	1 Inch	1.00	3.00	5.00	7.00	9.00
35	2 Inch	1.50	4.50	7.50	10.50	13.50
36	3 inch					
37	Irrigation					
38	5/8 Inch					
39	3/4 Inch	0.50	1.00	1.50	2.00	2.50
40	1 Inch	0.50	1.00	1.50	2.00	2.50
41	2 Inch					
42	3 inch					
43						
44	Total	190.50	753.50	1,674.50	3,121.00	4,873.00

Sahuarita Water Co., L.L.C
Gallons Sold (1,000's)
For Projected Years Ended

Line No.		Year 1	2	3	4	5
1						
2	**Year Ended**					
3	Residential					
4	5/8 Inch	17,952	71,424	159,264	297,552	465,168
5	3/4 Inch					
6	1 Inch					
7	2 Inch					
8	3 inch					
9	Commercial					
10	5/8 Inch					
11	3/4 Inch					
12	1 Inch	300	900	1,500	2,100	2,700
13	2 Inch	810	2,430	4,050	5,670	7,290
14	3 inch					
15	Irrigation					
16	5/8 Inch					
17	3/4 Inch	450	900	1,350	1,800	2,250
18	1 Inch	1,080	2,160	3,240	4,320	5,400
19	2 Inch					
20						
21						
22						
23						
24						
25	Total	20,592	77,814	169,404	311,442	482,808
26						
27	Acre Feet	63.19	238.80	519.88	955.78	1481.68
28						

		Year	Replenishment Oblication	CAGRD Fee (per acre foot)	Note
29	CAGRD Costs				
30		2010	40.0%	$ 302.00	a
31		2011	43.3%	$ 327.00	a
32		2012	46.7%	$ 352.00	a
33		2013	50.0%	$ 377.00	b
34		2014	53.3%	$ 402.00	b
35	a - Published advisory costs				
36	b - Additional $25/year				
37					
38					
39					
40					
41					
42					
43					
44					

Sahuarita Water Co., L.L.C
Schedule for the Computation of Projected
Property Taxes for the Years Ended

Line No.		Year 1	2	3	4	5
1						
2						
3	Revenue Component 1	$ 286,271	$ 286,271	$ 286,271	$ 685,987	$ 1,225,657
4	Revenue Component 2	286,271	286,271	685,987	1,225,657	2,130,282
5	Revenue Component 3	286,271	685,987	1,225,657	2,130,282	2,814,506
6						
7	Average 3 years of revenue	286,271	419,510	732,638	1,347,308	2,056,815
8						
9	Average 3 years of revenue times 2	$ 572,543	$ 839,019	$ 1,465,276	$ 2,694,617	$ 4,113,630
10	Add:					
11	Construction Work in Progress at 10%	0	0	0	0	0
12	Deduct:					
13	Book Value of Transportation Equipment	0	0	0	0	0
14						
15	Full Cash Value	$ 572,543	$ 839,019	$ 1,465,276	$ 2,694,617	$ 4,113,630
16						
17						
18	Times Assessment Ratio	23.00%	22.50%	22.00%	21.50%	21.00%
19						
20	Assessed Value	$ 131,685	$ 188,779	$ 322,361	$ 579,343	$ 863,862
21						
22	Property Tax Rate	12.55%	12.55%	12.55%	12.55%	12.55%
23						
24	**Computed Property Tax**	$ 16,526	$ 23,692	$ 40,456	$ 72,708	$ 108,415
25						
26						
27						
28						
29						
30						

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.								Year 1	2	3	4	5
1												
2	**Projected Customers / Residential 5/8 Inch Meter**											
3												
4												
5												
6	Estimated connections installed by year end							374	1,114	2,204	3,995	5,696
7	(Cumulative)							374	740	1,090	1,791	1,701
8	Estimated connection installed during the year											
9												
10	1/2 Year Convention for Revenue							187.00	744.00	1,659.00	3,099.50	4,845.50
11												
12	**Projected Revenue**											
13												
14	Annual gallonage delivered (in 1,000's)							17,952	71,424	159,264	297,552	465,168
15	Assuming average usage per month of:						8,000					
16	Daily Gallons							49,867	198,400	442,400	826,533	1,292,133
17	Residential:											
18	Monthly Mins.		$ 16.00		Minimum Charge			$ 35,904	$ 142,848	$ 318,528	$ 595,104	$ 930,336
19	Commodity Rev.		-		Gals. in minimum							
20			$ 2.05		Charge per/1,000			39,943	158,918	354,362	662,053	1,034,999
21		from	-	gals	up to	6,000	gals					
22			$ 2.75		Charge per/1,000							
23		from	6,000	gals	up to	10,000	gals					
24			$ 2.75		Charge per/1,000							
25					Over	10,000	gals					
26												
27	Establishment Fees at				$	25.00		$ 9,350	$ 18,500	$ 27,250	$ 44,775	$ 42,525
28		Total Revenue						$ 85,197	$ 320,266	$ 700,140	$ 1,301,932	$ 2,007,860
29												
30												
31	AWWA factor used		1.00									
32												
33												
34												
35												
36												
37												
38												

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.								Year 1	2	3	4	5
1												
2	**Projected Customers / Irrigation 3/4 Inch Meter**											
3												
4												
5												
6	Estimated connections installed by year end							1	1	2	2	3
7	(Cumulative)							1	-	1	-	1
8	Estimated connection installed during the year											
9												
10	1/2 Year Convention for Revenue							0.50	1.00	1.50	2.00	2.50
11												
12	**Projected Revenue**											
13												
14	Annual gallonage delivered (in 1,000's)							450	900	1,350	1,800	2,250
15	Assuming average usage per month of:						75,000					
16	Daily Gallons							1,250	2,500	3,750	5,000	6,250
17	Commecial											
18	Monthly Mins. 1 Inch Meter	$	25.00		Minimum Charge			$ 150	$ 300	$ 450	$ 600	$ 750
19	Commodity Rev.		-		Gals. in minimum							
20		$	2.05		Charge per/1,000			1,212	2,425	3,637	4,849	6,062
21	from		-	gals	up to	6,000	gals					
22		$	2.75		Charge per/1,000							
23					Over	6,000	gals					
24												
25	Establishment Fees at				$	25.00		$ 25	$ -	$ 25	$ -	$ 25
26	Total Revenue							$ 1,387	$ 2,725	$ 4,112	$ 5,449	$ 6,837
27												
28												
29	AWWA Factor Used		1.50									
30												
31												
32												
33												
34												
35												
36												
37												
38												

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.						Year 1	2	3	4	5
1										
2	**Projected Customers / Irrigation 1 Inch Meter**									
3										
4										
5										
6	Estimated connections installed by year end					1	1	2	2	3
7	(Cumulative)					1	-	1	-	1
8	Estimated connection installed during the year									
9										
10	1/2 Year Convention for Revenue					0.50	1.00	1.50	2.00	2.50
11										
12	**Projected Revenue**									
13										
14	Annual gallonage delivered (in 1,000's)									
15	Assuming average usage per month of:					1,080	2,160	3,240	4,320	5,400
16	Daily Gallons				180,000					
17	Commecial					3,000	6,000	9,000	12,000	15,000
18	Monthly Mins. 1 Inch Meter	$	40.00		Minimum Charge	$ 240	$ 480	$ 720	$ 960	$ 1,200
19	Commodity Rev.		-		Gals. in minimum					
20		$	2.05		Charge per/1,000	2,945	5,890	8,834	11,779	14,724
21	from		-	gals	up to	6,000 gals				
22		$	2.75		Charge per/1,000					
23					Over	6,000 gals				
24										
25	Establishment Fees at				$	25.00	$ -	$ 25	$ -	$ 25
26	Total Revenue					$ 3,210	$ 6,370	$ 9,579	$ 12,739	$ 15,949
27										
28										
29	AWWA Factor Used		2.50							
30										
31										
32										
33										
34										
35										
36										
37										
38										

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.																
1																
2	**Projected Customers / Commercial 1 Inch Meter**															
3																
4																
5												Year				
6											1	2	3	4	5	
7	Estimated connections installed by year end (Cumulative)										2	4	6	8	10	
8	Estimated connection installed during the year										2	2	2	2	2	
9																
10	1/2 Year Convention for Revenue										1.00	3.00	5.00	7.00	9.00	
11																
12	**Projected Revenue**															
13																
14	Annual gallonage delivered (in 1,000's)										300	900	1,500	2,100	2,700	
15	Assuming average usage per month of:								25,000							
16	Daily Gallons										833	2,500	4,167	5,833	7,500	
17	Commecial															
18	Monthly Mins. 1 Inch Meter	$	40.00					Minimum Charge			$ 480	$ 1,440	$ 2,400	$ 3,360	$ 4,320	
19	Commodity Rev.		-					Gals. in minimum								
20		$	2.05					Charge per/1,000			699	2,097	3,495	4,893	6,291	
21		from	-	gals				up to	15,000	gals						
22		$	2.75					Charge per/1,000								
23		from	15,000	gals				up to	25,000	gals						
24		$	2.75					Charge per/1,000								
25		from	25,000	gals				up to	#########	gals						
26		$	2.75					Charge per/1,000								
27								Over	#########	gals						
28																
29	Establishment Fees at								$ 25.00		$ 50	$ 50	$ 50	$ 50	$ 50	
30	Total Revenue										$ 1,229	$ 3,587	$ 5,945	$ 8,303	$ 10,661	
31																
32																
33	AWWA Factor Used		2.50													
34																
35																
36																

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.								Year 1	2	3	4	5
1												
2	**Projected Customers / Commercial 2 Inch Meter**											
3												
4												
5												
6	Estimated connections installed by year end							3	6	9	12	15
7	(Cumulative)											
8	Estimated connection installed during the year							3	3	3	3	3
9												
10	1/2 Year Convention for Revenue							1.50	4.50	7.50	10.50	13.50
11												
12	**Projected Revenue**											
13												
14	Annual gallonage delivered (in 1,000's)							810	2,430	4,050	5,670	7,290
15	Assuming average usage per month of:						45,000					
16	Daily Gallons							2,250	6,750	11,250	15,750	20,250
17	Commecial											
18	Monthly Mins. 2 Inch Meter	$	120.00			Minimum Charge		$ 2,160	$ 6,480	$ 10,800	$ 15,120	$ 19,440
19	Commodity Rev.		-			Gals. in minimum						
20		$	2.05			Charge per/1,000						
21	from		-	gals		up to	48,000 gals	1,661	4,982	8,303	11,624	14,945
22		$	2.75			Charge per/1,000						
23	from		48,000	gals		up to	80,000 gals					
24		$	2.75			Charge per/1,000						
25	from		80,000	gals		up to	######## gals					
26		$	2.75			Charge per/1,000						
27						Over	######## gals					
28												
29	Establishment Fees at						$ 25.00	$ 75	$ 75	$ 75	$ 75	$ 75
30	Total Revenue							$ 3,896	$ 11,537	$ 19,178	$ 26,819	$ 34,460
31												
32												
33	AWWA Factor Used		8.00									
34												
35												
36												

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.								Year 1	2	3	4	5
1												
2	**Projected Customers / Irrigation 1 Inch Meter**											
3												
4												
5												
6	Estimated connections installed by year end							5	15	25	35	45
7	(Cumulative)											
8	Estimated connection installed during the year							5	10	10	10	10
9												
10	1/2 Year Convention for Revenue							2.50	10.00	20.00	30.00	40.00
11												
12	**Projected Revenue**											
13												
14	Annual gallonage delivered (in 1,000's)							11,520	46,080	92,160	138,240	184,320
15	Assuming average usage per month of:						384,000					
16	Daily Gallons							32,000	128,000	256,000	384,000	512,000
17	Commecial											
18	Monthly Mins. 1 Inch Meter	$	120.00				Minimum Charge	$ 3,600	$ 14,400	$ 28,800	$ 43,200	$ 57,600
19	Commodity Rev.		-				Gals. in minimum					
20		$	2.05				Charge per/1,000	30,672	122,688	245,376	368,064	490,752
21	from		-	gals			up to 48,000 gals					
22		$	2.75				Charge per/1,000					
23	from		48,000	gals			up to 80,000 gals					
24		$	2.75				Charge per/1,000					
25	from		80,000	gals			up to ######## gals					
26		$	2.75				Charge per/1,000					
27							Over ######## gals					
28												
29	Establishment Fees at						$ 25.00	$ 125	$ 250	$ 250	$ 250	$ 250
30								$ 34,397	$ 137,338	$ 274,426	$ 411,514	$ 548,602
31	Total Revenue											
32												
33	AWWA Factor Used		8.00									
34												
35												
36												

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.										
1										
2	**Projected Customers / Construction Water**									
3										
4										
5							Year			
6							1	2	3	4	5
7	Estimated connections installed by year end (Cumulative)					1	1	1	1	1	1
8	Estimated connection installed during the year						-	-	-	-	-
9											
10	1/2 Year Convention for Revenue						1.00	1.00	1.00	1.00	1.00
11											
12	**Projected Revenue**										
13											
14	Annual gallonage delivered (in 1,000's)						57,150	111,750	164,550	269,400	256,200
15	Assuming average usage per unit added per month of:				150,000						
16	Daily Gallons						4,762,500	9,312,500	13,712,500	22,450,000	21,350,000
17	Commecial						158,750	310,417	457,083	748,333	711,667
18	Monthly Mins. 1 Inch Meter	$	120.00		Minimum Charge		$ 1,440	$ 1,440	$ 1,440	$ 1,440	$ 1,440
19	Commodity Rev.		-		Gals. in minimum						
20		$	2.75		Charge per/1,000						
21		from	- gals		up to ######## gals		157,163	307,313	452,513	740,850	704,550
22											
23											
24											
25											
26											
27											
28											
29	Establishment Fees at				$ 25.00		$ -	$ -	$ -	$ -	$ -
30	Total Revenue						$ 158,603	$ 308,753	$ 453,953	$ 742,290	$ 705,990
31											
32											
33	AWWA Factor Used		8.00								
34											
35											
36											

APPENDIX "V"

(Modification of Designation of Assured Water Supply Application, and the November 23, 2007 Assured Water Supply and Supporting Hydrology Report for Sahuarita Water Company, L.L.C., as prepared by Brown and Caldwell)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

ARIZONA DEPARTMENT OF WATER RESOURCES OFFICE OF ASSURED AND ADEQUATE WATER SUPPLY 3550 NORTH CENTRAL AVENUE, 2nd FLOOR PHOENIX, ARIZONA 85012 (602) 771-8585 Fax: (602) 771-8689	DATE RECEIVED:
APPLICATION NO:	

DESIGNATION OR MODIFICATION OF DESIGNATION OF ASSURED WATER SUPPLY APPLICATION

PART A - GENERAL INFORMATION

1. This is an application for: ☐ New Designation ☒ Modification of an existing designation

2. Name of municipal provider: Sahuarita Water Company, LLC AMA: Tucson

   ADWR No. 56-000373.0000

3. Name and address of person representing the municipal provider:
   Name: Mark Seamans
   Title: General Manager E-Mail: mseamans@ranchosahuarita.com
   Address: PO Box 1520, Sahuarita, AZ 85629 Phone: 520-399-1105 Fax: 520-399-1095

4. Contact person for questions regarding this application:
   Name: Kristen Whatley
   Company: WestLand Resources, Inc. E-Mail: kwhatley@westlandresources.com
   Address: 4100 E. Paradise Falls Drive, Tucson, AZ 85712 Phone: 520-206-9585 Fax: 520-206-9518

5. If not already on file with the Department, provide a map of the service area that includes the current and proposed distribution system and any treatment or storage facilities and reference as an attachment.

Up to date service area map on file with the Department	☐	
Hard copy of service area map attached	☒	Attachment: Attachment A
Electronic copy of service area map attached	☐	Attachment:

I DO HEREBY certify that the information contained in **this application and all information accompanying it is true and correct to the best of my knowledge and belief. NOTE:** If the applicant is a city or town, include a resolution of the governing body of the city or town authorizing the person to sign the application.

J.V.C. Chalfant — **Senior Vice-President, Sahuarita Water Company**
Printed Name — Title

Signature — 11-8-07
Date

PART B - DEMAND ESTIMATE

Please use and attach the Designation Demand Spreadsheet provided by the Department (*See* http://www.azwater.gov/WaterManagement_2005/Content/OAAWS/Designation_Demand_Spreadsheet.xls) **OR** provide and reference an attachment detailing the assumptions used in estimating water demand. Include projections of population and demand for each calendar year for at least ten years from the date of this application. **Attachment B**

CURRENT ANNUAL DEMAND: 1,348 acre-feet per year **YEAR:** 2007

COMMITTED DEMAND: 1,241 acre-feet per year

PROJECTED DEMAND: 10,983 acre-feet per year **YEAR:** 2034

Note: Projected demand should be for the 10th calendar year from the date of the application.

PART C- PHYSICAL AVAILABILITY OF SOURCE WATER

A comprehensive hydrologic study must be submitted with this application, unless the Department has previously reviewed the hydrologic conditions for this area and has issued a valid Letter of Water Availability or Physical Availability Determination. Please indicate the evidence of physical availability and reference as an attachment: Attachment C

- ☐ Water Availability Letter
- ☐ Physical Availability Determination
- ☒ New Hydrologic Study
- ☐ Other, please specify: _____

PART D- CONTINUOUS AVAILABILITY AND LEGAL AVAILABILITY OF SOURCE WATER

1. If the municipal provider has not yet established a service area right, please attach a copy of the Initial Petition to Establish New Water Service Area as submitted to the AMA.

2. If applicant is a private water company, attach a copy of the existing Certificate of Convenience and Necessity or a copy of the Decision and Order from the Arizona Corporation Commission establishing the CC&N or extension of CC&N. Reference as attachment: Pending review and approval

3. To complete the table below, multiply the Total Annual Demand computed in Part B by 100 to obtain the 100-year demand and enter at the bottom of the chart. Enter the appropriate 100-year demands for each type of water delivered to the subdivision for each category.

Source of Supply	**100 Year Volume (ac-ft)**
Groundwater	1,098,300
Central Arizona Project Water ☐ Direct treatment and delivery ☐ Recovered water	
Surface Water ☐ Direct treatment and delivery ☐ Recovered water	
Effluent ☐ Direct treatment and delivery ☐ Recovered water	
Other	
Total 100-yr Volume	1,098,300

4. See A.A.C. R12-15-717 and R12-15-718 for documentation that should be submitted as evidence of continuous availability and legal availability (respectively) for each source of supply. Please reference attachment(s): Attachment D

PART E - FINANCIAL CAPABILITY

Please check one of the following and include attachments as necessary:

☐ The applicant has constructed adequate delivery, storage, and treatment works.

☐ The applicant has entered into written agreements requiring a potential developer to construct adequate delivery, storage, and treatment works.
Attachment: _____

☐ If the applicant is a city or town, the applicant has:

☐ Adopted a five year capital improvement plan that provides for the construction, or the commencement of construction, of adequate delivery, storage, and treatment works in a timely manner, and has submitted a certification by the applicant's chief financial officer that finances are available to implement that portion of the five-year plan; or

☐ Submitted evidence demonstrating that financing mechanisms are in place to construct adequate delivery, storage, and treatment works in a timely manner.

☒ If the applicant is a private water company, the applicant has received approval from the Arizona Corporation Commission for financing the construction of adequate delivery, storage, and treatment works.

PART F - CONSISTENCY WITH MANAGEMENT GOAL

Please check all that apply below:

☒ Enrollment of the water provider as a member service area in the Central Arizona Groundwater Replenishment District (Phoenix, Tucson and Pinal AMAs **ONLY**).
A separate application for membership must be filed with the Central Arizona Water Conservation District, and the membership documents **must be executed and recorded before** the Designation will be issued.

☐ Extinguishment of grandfathered groundwater rights dedicated to the municipal provider's water service area.
Provide evidence and reference the attachment: _____

☐ Other. Please specify: _____

PART G - WATER QUALITY

1. Are the well or wells from which water will be withdrawn by the municipal provider within one mile of a Water Quality Assurance Revolving Fund (WQARF) or Superfund site? ☐ Yes ☒ No.

   If "Yes", please submit a contaminant migration and mitigation analysis demonstrating that the water supply will continue to meet the water quality requirements in A.A.C. Title 18, Chapter 4, and reference as attachment: _____

2. ☒ Municipal provider is or will be regulated by the Arizona Department of Environmental Quality (ADEQ) or another governmental entity with equivalent jurisdiction. If this applies, independent proof of adequate water quality is not required, please skip to Part H.

3. If the municipal provider serves or will serve 15 customers or less, provide current (within the last 60 days) analytical results on water samples taken from a well or wells constructed *within the service area*, demonstrating that the water meets the water quality requirements in A.A.C. Title 18, Chapter 4, and reference as attachment: _____

   NOTE: Information on the required water quality analyses may be found at the ADEQ website http://www.adeq.gov.

PART H - CONSISTENCY WITH MANAGEMENT PLAN

1. For the municipal or county jurisdiction within which the service area is located, list any water conservation ordinances and briefly describe the sections that apply to the water service area. If they will serve as evidence of your demand projections, please reference as attachment.

Arizona Revised Statue 45.312 (State Plumbing Code Standards for Low Flow Fixtures)

2. Generally describe any other current or proposed conservation practices, rates, fees, restrictions, policies and devices to be utilized within the service area to meet the conservation requirements of the Management Plan:

Low water use plumbing fixtures for commercial and residential, non-invasive arid-tolerant landscape plants for residential front yards and commercial landscaping. Reclaimed water re-use on park landscaping, school yards, athletic fields, road medians and trails.

NOTE: If demand estimates rely on these conservation requirements, please reference attachment: _____

PART I – FEES

Please calculate fees by completing the appropriate items below, and include the total fees with your application. Payment may be made by cash, check, or credit card. Checks should be made payable to the Department of Water Resources. **Failure to enclose the required fees will cause the application to be returned. Fees for designations of assured water supply are authorized by A.R.S. § 45-113.**

IF THIS WATER PROVIDER HAS NOT BEEN DESIGNATED PREVIOUSLY, OR IF THIS APPLICATION IS A MODIFICATION OF AN EXISTING DESIGNATION THAT INCLUDES EVALUATION OF PHYSICAL, LEGAL, AND CONTINUOUS AVAILABILITY OR CONSISTENCY WITH MANAGEMENT GOAL, USE THE FEE CALCULATION METHOD BELOW:

1.	Basic Application fee (includes first 1,000 acre-feet)	$ **1000.00**
2.	Per-acre-foot review fee (for water use in excess of the first 1,000 acre-feet):	
	Total acre-feet of current demand in this application	1,348
	Less first 1,000 acre-feet	-1000
	Acre-feet subject to additional review fees 348 x $.50 per acre-foot:	$174.00
3.	**Subtotal (add items #1 and #2) NOT TO EXCEED $10,000**	$1174.00
4.	Indicate the appropriate AMA and enter the associated **Public Notice Fee**:	$ 225.00

- ☐ Phoenix AMA $ 52.00
- ☒ Tucson AMA $ 225.00
- ☐ Pinal AMA $ 125.00
- ☐ Prescott AMA $ 75.00
- ☐ Santa Cruz AMA $ 50.00

5. TOTAL FEE DUE (add items #3 and #4 - NOT TO EXCEED $10,000): $1,399

IF THIS IS A MODIFICATION OF AN EXISTING DESIGNATION APPLICATION AND DOES NOT INCLUDE AN EVALUATION OF PHYSICAL, LEGAL, AND CONTINUOUS AVAILABILITY OR CONSISTENCY WITH MANAGEMENT GOAL, USE THE FEE CALCULATION METHOD BELOW:

1.	Basic Application fee (includes first 1,000 acre-feet)	$ **500.00**
2.	Indicate the appropriate AMA and enter the associated **Public Notice Fee**:	$

- ☐ Phoenix AMA $ 52.00
- ☒ Tucson AMA $ 225.00
- ☐ Pinal AMA $ 125.00
- ☐ Prescott AMA $ 75.00

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

(ATTACHMENT C OF MODIFICATION OF DESIGNATION OF AN ASSURED WATER SUPPLY APPLICATION)

Prepared for

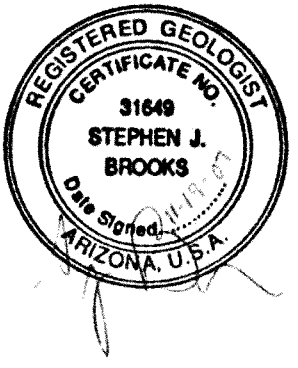
SAHUARITA WATER COMPANY,
SAHUARITA, ARIZONA

November 21, 2007

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

SAHUARITA WATER COMPANY, SAHUARITA, ARIZONA

November 21, 2007



BROWN AND CALDWELL

110 South Church Avenue, Suite 2300,
Tucson, Arizona 85701

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ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

EXECUTIVE SUMMARY

The hydrogeologic analysis presented herein demonstrates the physical availability of 10,983 acre-feet per year (AF/yr) of local groundwater resources for 100 years for the existing and planned expansion of Sahuarita Water Company's (SWC) water service area. The physical availability demonstration provided by the hydrogeologic analyses supports a Modification of a Designation of an Assured Water Supply application for the Water Company. The planned expansion will serve potable groundwater resources to two proposed development projects including the Mission Peaks and Sahuarita Mission development projects, and an existing school site. Mission Peaks may also include development on an adjacent State Land parcel. Additional potable groundwater resources may also be served (bulk sales) to 500 existing off-site units at the adjacent Magee Ranch by a stand-pipe system. The existing school site includes the existing Sahuarita Unified School District Campus (K through 12). Additional development is also planned within the existing water service area including the Rancho Sahuarita Master-Planned Community. A total population of about 82,700 will be served potable groundwater resources by the Water Company in 2034, scheduled build out year, to about 32,400 housing units and associated commercial development.

Groundwater development from the local basinfill groundwater aquifer beneath SWC's existing water service area will be the principal source of water to meet projected SWC water demands. As of the date of this report, the SWC owns six wells and leases one well from the Town of Sahuarita. Groundwater is currently being withdrawn from two active wells, Well Nos. 14 and 18. Well No. 14, the leased Town of Sahuarita well, is also used to maintain lake levels of the Sahuarita Town Lake. The SWC has plans to install 10 new potable water supply wells to serve potable groundwater resources. Well No. 14 will be phased out for domestic use in 2009, but will continue to be used to maintain lake levels of the Sahuarita Town Lake by applying Type 1 water rights associated with the property area.

To demonstrate the physical availability of an Assured Water Supply (AWS) within the Tucson Active Management Area (AMA) utilizing groundwater resources, it is required that current, committed and projected groundwater withdrawals over 100 years will not result in the depth-to-water to exceed 1,000 feet from ground surface or depth to bedrock, whichever is less. Furthermore, groundwater must also be of acceptable quality for potable use. Lastly, the proposed water uses must be consistent with the Rules and Regulations of the Arizona Department of Water Resources (ADWR) pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

The methods applied for the analyses were pre-approved by staff of the ADWR Hydrology Division, and Assured and Adequate Water Supply offices during a pre-application meeting held in mid-2007. Interim water demand analyses were also performed at the request of ADWR staff. The hydrologic study area agreed to by ADWR staff at the pre-application meeting covers an area of about 500-square miles south to the Santa Cruz County line and north to southern portions of the City of Tucson just northeast of Interstate 10.

Compilation and analyses of current, committed and projected water demands within the hydrologic study area indicate that future net groundwater withdrawals within the hydrologic study area will not increase significantly as a result of significant reductions in projected agricultural pumpage. Current water demands within the hydrologic study area total about 105,000 AF/yr. These current demands include municipal, agricultural and industrial demands including mine pumpage. Of the total, about 32 percent is attributed to agricultural pumpage and about 33 percent is attributed to mining and industrial pumpage. The total includes

1,259 acre-feet (AF) of municipal water demand in 2006 for SWC or about 1 percent of total groundwater pumped with the hydrologic study area.

Projected demands within the hydrologic study area, which include current and committed water demands, total about 111,500 AF/yr. This is an increase of only about 6 percent from current pumpage. This total includes 10,983 AF/yr of projected pumpage for SWC in 2034, which is the scheduled build-out year, or about 10 percent of projected pumpage. Committed water demands associated with approved or pending study area AWS analyses on record with ADWR totals about 18,500 AF/yr. The insignificant increase from current water demand totals is attributed to a reduction of about 22,000 AF/yr of agricultural pumpage for Farmers Water Company, located adjacent east to SWC, as agricultural lands are retired and developed for residential uses. This projected reduction of agricultural groundwater usage for Farmers Water Company is documented in the hydrology study submitted to ADWR in 2006, along with an application of an Analysis of an AWS for the water company.

To assess the future hydrologic impacts of future groundwater development by SWC, a three-dimensional, numerical groundwater flow model ("SWC model") was constructed for the southern portion of the Tucson AMA. In order to ensure consistency with current modeling efforts by ADWR, the primary source of information and guidance in the development of the model was ADWR's Modeling Report No. 13 by Dale Mason and Liciniu Bota, *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Simulation and Application*, 2006 (ADWR, 2006) as well as the digital model files for the Tucson AMA model ("TAMA model"). The TAMA groundwater model was modified to incorporate new hydrogeologic data gathered from exploratory boring analyses and aquifer testing programs performed by Brown and Caldwell for the SWC in 2006 and 2007.

The groundwater model, incorporating current, committed and projected groundwater demands within an approximate 500-square mile hydrologic study area, was applied to project water-level conditions in 2107, a 100 year period. Computer simulations were performed including only 5 percent of about 20,000 AF of annual artificial recharge of Central Arizona Project water at the Pima Mine Road Recharge Project and with no recharge for the North Borrow Pit, both located just north of SWC. The hydrologic simulations analyses demonstrated that maximum depth-to-water in the vicinity of SWC's water supply wells is projected to range from 610 to 785 feet below land surface in 100 years. These projected depths meet the requirement for AWS analyses for the Tucson AMA in that depth-to-water in 100 years cannot exceed 1,000 feet from the ground level or depth-to-bedrock, whichever is less.

Groundwater quality analyses performed on groundwater samples collected from active wells and exploratory borings reveal favorable groundwater quality for potable use based on current regulatory limits. The proposed water uses will be consistent with the Rules and Regulations of ADWR, pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

The hydrologic analyses presented invoke a number of conservative elements in demonstrating the physical availability of sufficient groundwater resources. The principal elements are as follows:

- New wastewater treatment plant will be constructed for the new developments. No effluent reuse or artificial recharge of effluent generated by the new developments was included in the hydrologic simulations. Potentially up to 60 percent of equivalent volume of pumpage may be available for future reuse or recharge.

- Mine and agricultural water usage in the hydrologic study area will likely not be at current levels for 100 years. Hydrologic simulations assume current levels of pumpage will remain constant. Mine life will likely be exhausted, and agriculture usage will likely be retired and transferred to municipal uses. A significant net reduction in overall water usage will likely occur.

- Artificial recharge of Central Arizona Project (CAP) water at the Pima Mine Road Recharge Project will likely continue into the distant future and potentially be augmented in the future. Currently annual recharge totals about 20,000 AF/yr. Hydrologic simulations only applied 5 percent of the total as required by ADWR. North Borrow pit may also be in operation within the simulated period.

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

1. INTRODUCTION

This report is submitted to the Arizona Department of Water Resources (ADWR) to support a Modification of a Designation of an Assured Water Supply for the Sahuarita Water Company (SWC) (formerly Rancho Sahuarita Water Company) in Sahuarita, Arizona. The SWC's Certificate of Convenience and Necessity (CC&N) water service area is located in Pima County, Arizona within the Tucson Active Management Area (Tucson AMA). AMAs are areas designated by the ADWR as areas deemed to require active groundwater management by the State of Arizona. The SWC's water service area is included in the Upper Santa Cruz River groundwater basin.

In 1996, hydroLOGIC Consultants, LLC prepared the original application and supporting hydrology study for a Designation of an Assured Water Supply for Interchange Water Company for a total of 10,800 single family housing units. Interchange Water Company was the former name of SWC. The study demonstrated the physical availability of 3,551 acre-feet per year (AF/yr) of groundwater for 100 years. In 2003, hydroLOGIC Consultants, LLC conducted a subsequent hydrology study to support a Modification of an Assured Water Supply application for an additional 3,000 single-family housing units and associated commercial development. This study demonstrated the physical availability of an additional 1,149 AF/yr of groundwater, with a total physical availability of 4,700 AF/yr of groundwater for 100 years.

The SWC is concurrently, as of the date of this report, in the process of expanding the current limits of the CC&N water service area under the regulatory authority of the Arizona Corporation Commission (ACC). The intent of the proposed expansion is to serve potable groundwater resources to two proposed residential and commercial development projects west of the existing CC&N area and an existing school site surrounded by the existing CC&N area. The two proposed developments include the Mission Peaks and Sahuarita Mission projects. The existing school site includes the Sahuarita Unified School District Campus (K through 12). Figure 1.1 illustrates the locations of these proposed developments and the school site. Mission Peaks may also include development on an adjacent State Land parcel. Additional groundwater resources may also be served (bulk sales) to 500 existing off-site units at the adjacent McGee Ranch by a stand-pipe system. The existing school site includes the Sahuarita Unified School District Campus (K through 12). Additional development is also planned within the existing water service area that includes the Rancho Sahuarita Master-Planned Community. A total population of about 82,700 will be served potable groundwater resources by the SWC in 2034, scheduled build-out year, to about 32,400 housing units and associated commercial development.

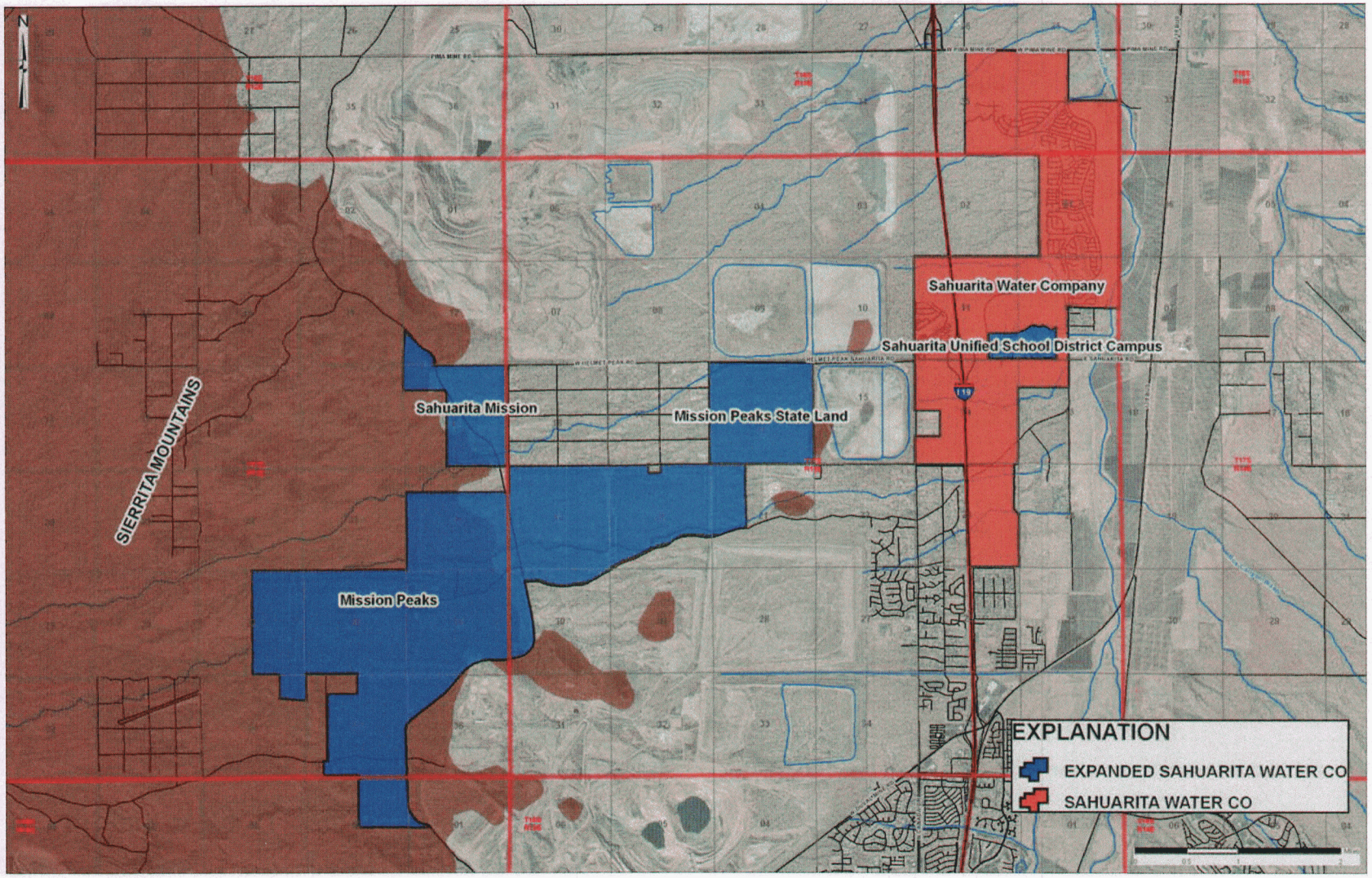


Figure 1-1 – Sahuarita Water Company's Certificate of Convenience and Necessity Current and Proposed Expanded Water Service Areas

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

2. SCOPE OF WORK

The purpose of the analysis presented in this report is to demonstrate that sufficient local groundwater resources are physically available for the proposed water uses for the next 100 years. The report presents sections describing elements of water demand, supply, and adequacy. The proposed water uses will be consistent with the Rules and Regulations of ADWR, pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576). To demonstrate the physical availability of an AWS within the Tucson AMA utilizing groundwater resources, it is required that current, committed and projected groundwater withdrawals over 100 years will not result in depth-to-water to exceed 1,000 feet from ground surface or depth to bedrock, whichever is less. Furthermore, groundwater must also be of acceptable quality for potable use. Methods applied for the analyses were presented and were in concurrence with staff of the ADWR Hydrology Division and Assured and Adequate Water Supply offices at a pre-application meeting held in mid-2007. Interim study area water demand analyses were performed at the request of ADWR staff. The hydrologic study area extent agreed to by ADWR at the pre-application meeting covers an area of about 500-square miles south to the Santa Cruz County line and north to southern portions of the City of Tucson just northeast of Interstate 10.

The scope of work for the hydrology study includes elements of demand, supply, and adequacy. Elements of demand include the compilation of past, current, committed, and projected water demands for SWC, including the new projected demand within the expanded CC&N area, other major water providers, and other water users within the defined hydrologic study area. The hydrologic study area with the locations of the principal water providers is shown on Figure 2.1. Elements of supply include an evaluation of the current hydrogeologic conditions to assess local groundwater resource availability. Elements of adequacy include calculations of physical availability of groundwater resources by quantifying projected water-level impacts in 100 years by three-dimensional groundwater computer modeling methods.

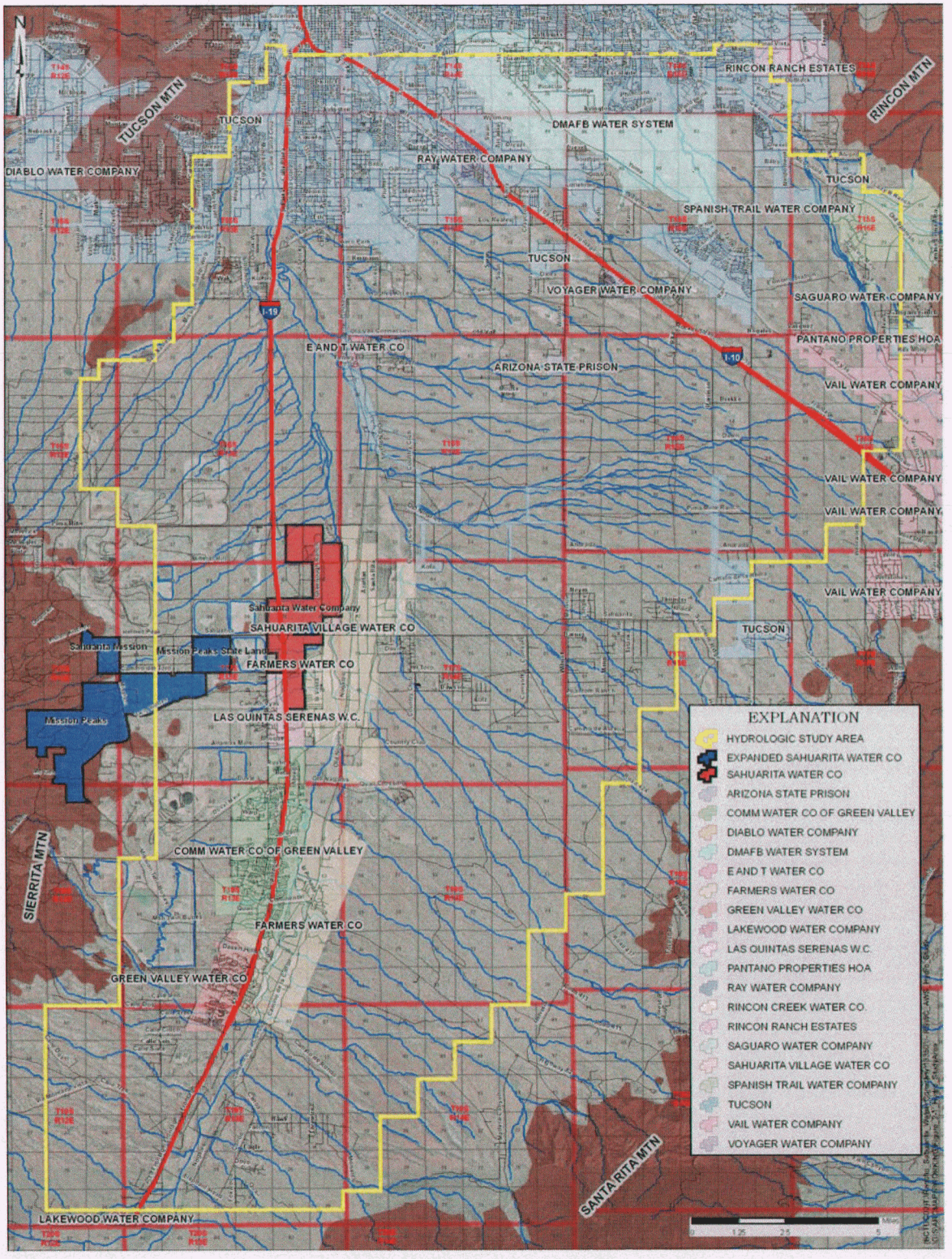


Figure 2-1 – Hydrologic Study Area

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

3. ELEMENTS OF DEMAND

3.1 SAHUARITA WATER COMPANY WATER DEMANDS

3.1.1 Current Water Demands

Potable water demands for SWC have grown in the past few years as a result of a strong housing market. By 2006, approximately 3,650 single-family and active-family adult housing units were served potable groundwater by the SWC. Table 3-1 below tabulates groundwater withdrawals for 2002 through 2006.

Table 3-1. SAHUARITA WATER COMPANY GROUNDWATER WITHDRAWALS (2002-2006) (AF)

2002	2003	2004	2005	2006
433.55	621.1	732.1	983.8	1259.8

From ADWR "55"File database, 2007 for Rancho Sahuarita Water Company Wells No. 14 (ADWR Registration No. 55-611142) and Well No. 18 (ADWR Registration No. 55-611144)

3.1.2 Projected Water Demands

As stated in Section 1.0, the SWC has plans to serve potable groundwater resources to an expanded water service area, as well as additional developments within the existing water service area of the Rancho Sahuarita Master-Planned Community. The expanded service area consists of two proposed residential and commercial development projects and an existing school site. The two proposed development projects include Mission Peaks and Sahuarita Mission development projects. The school site is the Sahuarita Unified School District Campus (K through 12). The locations of the proposed developments are shown on Figure 1.1. Mission Peaks development may also include development on an adjacent State Land parcel indicated on Figure 1.1. Additional potable water resources may also be served (bulk sales) to 500 existing off site units at the adjacent Magee Ranch by a stand-pipe system and is included in the water demand calculations.

The proposed developments will be built in phases. Build-out for all of these developments is projected for 2034. Table 3-2 below summarizes planned number and types of housing units, estimated square footage of associated commercial development, anticipated year of commencement of water service for the initial phase, and projected build-out year.

Table 3-2. SAHUARITA WATER COMPANY PROJECTED NEW DEVELOPMENTS AT BUILD-OUT (2034)

			Residential				Schools	
Development	Commence Water Service -Initial Phase Year	Anticipated Build-out Year	Single-Family Units	Active-Adult Units	Multi-Family Units	Commercial (sq feet)	Elem. & Middle School (students)	High Schools (students)
Rancho Sahuarita	NA	2018	10,086	1,460		3,072,935	1,226	3,150
Mission Peaks & State Land Parcel	2010	2034	13,923[1]	2,371	1,506	1,105,336	956	5,343
Sahuarita Mission	2011	2023	3,000					
		Sub Total	27,009	3,831	1,506			
		Total	32,346 housing units			4,178,271 sq feet of commercial development		
1 = includes 500 units for the Magee Ranch								

Water demands were calculated with ADWR water demand constants from the Tucson Active Management Area Third Management Plan. Summary of water demand constants are tabulated in Table 3-3 below.

Table 3-3. SUMMARY OF WATER DEMAND CONSTANTS

Development Type	Residential Occupancy Rate	Residential Water Demand Rate	Commercial Water Demand Rate	Elementary and Middle School Water Demand Rate	High School Water Demand Rate
	Capita Per Housing Unit (c/u)	Gallons Per Capita Per Day (gpcd)	Acre-feet Per Acre Per Year (AF/Ac/yr)	Gallons Per Student Per Day (gpsd)	Gallons Per Student Per Day (gpsd)
Single-Family Units	2.7	101			
Active-Adult Units	1.8	123			
Multi-Family Units	1.9	68			
Schools				25	43
Commercial			2.25		
Construction Water Use Rate = 10,000 gallons per lot					
Lost and Unaccounted for Water = 10 percent					

Based on the water demand constants in Table 3-3 and development parameters in Table 3-2, the total projected water demand at build-out year of 2034 for the SWC, including the expanded water service area, is calculated as 10,983 AF/yr. A water demand calculation spreadsheet is included as Appendix A.

3.2 HYDROLOGIC STUDY AREA WATER DEMANDS

3.2.1 Other Current Water Demands

Other current water demands (not including SWC) for the hydrologic study area were compiled from ADWR databases (2007a, 2007c and 2007c). Average recorded pumpage for 2002 to 2006 was considered representative of other current water demands. These water demands include water providers, agriculture and non-agriculture demands and are illustrated on Figure 3-1. These other current water demands total 103,072.5 AF/yr pumping from 335 wells within the hydrologic study area. Summary of water usage by sector for the hydrologic study area is tabulated in Table 3-4 below based on ADWR's water-use coding of water production wells (ADWR, 2007a).

Table 3-4. CURRENT WATER USAGE PER SECTOR

SECTOR[1]	WATER USAGE (AVERAGE 2002 TO 2006) AF/yr	PRECENT OF TOTAL
IRRIGATION	32,988.1	32.0%
MUNICIPAL	22,132.8	21.5%
MINING	20,358.2	19.8%
INDUSTRIAL	13,741.0	13.3%
MONITORING	5,706.1	5.5%
DOMESTIC	4,079.2	4.0%
OTHER - MINERAL EXPL.	1,215.4	1.2%
OTHER – PRODUCTION	1,135.7	1.1%
UTILITY (WATER CO)	715.4	0.7%
UNKNOWN	441.5	0.4%
NONE	228.7	0.2%
COMMERCIAL	207.3	0.2%
TEST	87.4	0.1%
STOCK	35.6	0.0%
TOTAL	**103,072.5**	100.0%

1 – Sector Data from ADWR Wells "55" Database, 2007A.

Exempt well pumpage was also included in the current demands, as requested by ADWR AWS staff to cover any "wildcat" subdivisions in the hydrologic study area. It was assumed that each exempt well in the hydrologic study area pumps about 1 AF/yr. A total of 1,041 exempt wells are included within the hydrologic study area and are also illustrated on Figure 3-1. As a result, an additional 1,041 AF/yr of exempt well pumping was included within the hydrologic study area.

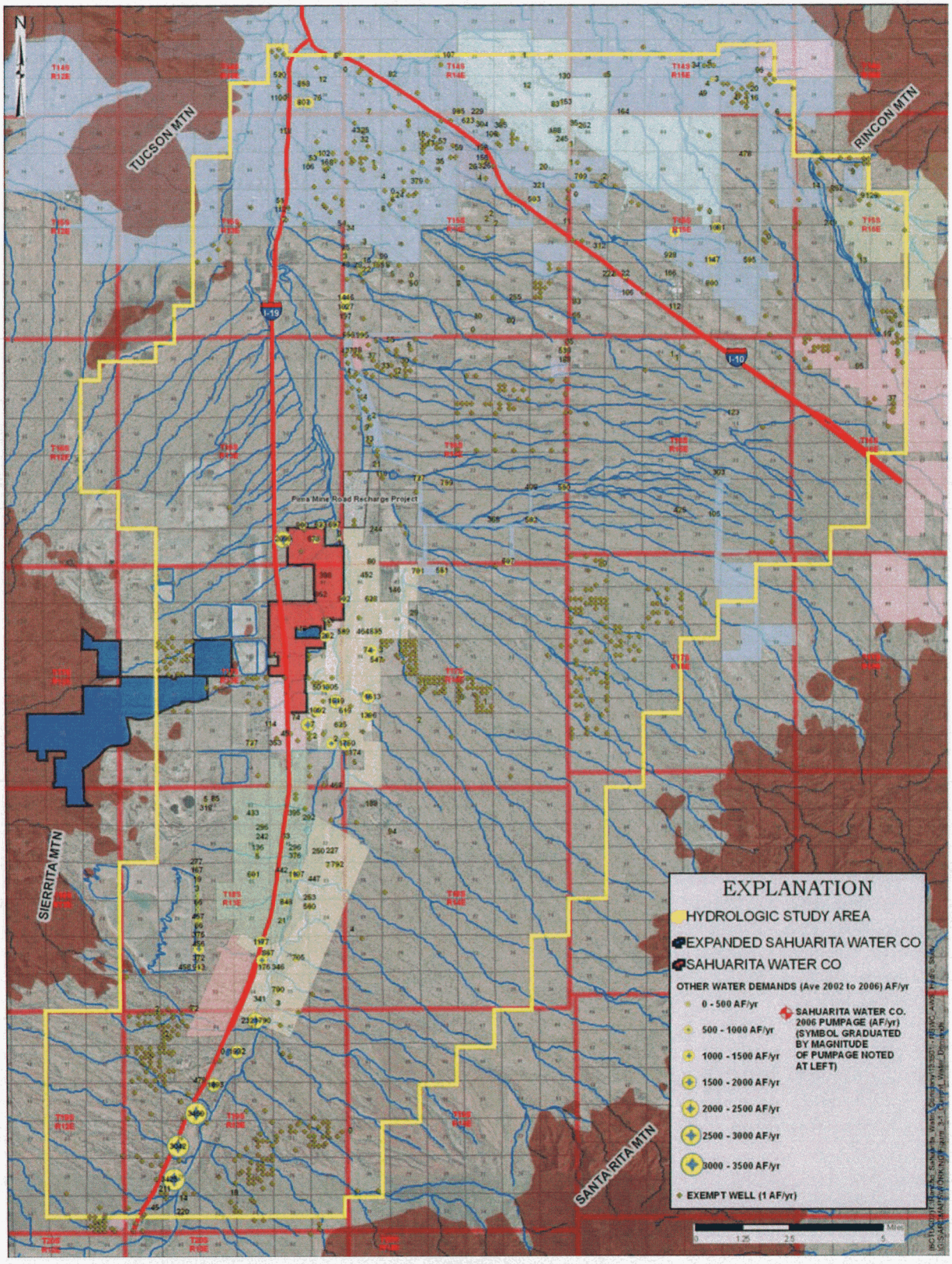


Figure 3-1 – Current Water Demands of the Hydrologic Study Area

3.2.2 Other Projected Water Demands

Projected water demands (not including SWC's current and expanded water service area water demands) include current and committed demands within the hydrologic study area. Current demands also include exempt well pumping, as mentioned in Section 3.2.1. Committed demands include approved and pending AWS demands not yet being served.

Based on interim discussions with ADWR AWS staff, ADWR requested that Brown and Caldwell quantify the full allotment of all active non-irrigation groundwater rights and unallocated service area rights within the hydrologic study area. Brown and Caldwell conducted an interim analysis by compiling the water rights within the hydrologic study area and comparing the total with average recorded pumpage for 2002 to 2006, which includes agricultural pumping.

ADWR provided Brown and Caldwell a listing of water rights in the study area from ADWR's Registry of Groundwater Rights (ROGR) database (2007b). Irrigation and Type 2 Non-Irrigation GFR were removed for the analysis, because it was conjectured that retirement of these irrigation rights will occur as growth of potable uses continue, and Type 2 Non-Irrigation may be moved anywhere throughout the Tucson AMA. Based on the analysis, total recorded pumpage for 2002 to 2006 was generally in agreement to total of groundwater rights. ADWR concurred that an average of 2002 to 2006 pumpage fully accounts for active non-irrigation groundwater water rights and could be utilized representing a portion of projected pumpage related to current demands.

An analysis of unallocated potable water demand was performed using ADWR's Assured and Adequate Water Supply database (2007c) to evaluate committed demands within the hydrologic study area. It was assumed that approved AWS analyses on record from 1975 through 2004 is part of the current demand being served and not part of committed demands. To evaluate this assumption, current 2006 recorded pumpage was compared to approved-AWS subdivision water demands from 1975 to 2004 within the hydrologic study area. If lot or demand information was not available in this database, Pima County Assessors information was reviewed for the information. ADWR water use constants were used to estimate water demands for these subdivisions. Similarly, approved applications associated with commercial demands were calculated by the acreage of the commercial project and utilizing a demand factor of 2.25 acre-feet per acre per year (AF/acre/year). The analysis determined that the total estimated water demands of approved AWS analyses through 2004 were approximately equivalent to the current demand, indicating that these demands can reasonably be assumed to part of the current demands.

As a result, committed demands are assumed to be any AWS analyses on record and approved or pending approval by ADWR from 2005 to the present. These data were compiled from ADWR Assured and Adequate Water Supply database (ADWR, 2007b). Water demands associated with applications approved prior to the year 2005 are considered currently being served and built-out, and therefore part of the current water demands. Water demands associated with applications approved from 2005 to present are classified as committed demands and are included in Table 3-5 below. These demands total to 15,008 AF/yr. Table 3-6 presents pending applications as of the date of this report totaling 479 AF/yr, also considered committed water demands.

Based on a review of Farmers Water Company AWS submittal for Sahuarita Farms (north half) and Continental Farms (south half) (Clear Creek Associates, 2006), much of the agricultural lands currently irrigated will become retired and be developed into residential subdivisions. Residential water demand based on Table 3-5 is 14,438 AF/yr. No build-out schedule for the residential development was noted. Continued irrigation demand will total 5,000 AF/yr. Current water demand for the water company based on average of 2002 to 2006 pumpage records totals 27,094 AF/yr. Assuming all current pumpage is attributed to agricultural uses, agricultural demands will be reduced by about 22,094 AF/yr.

Projected water demands within the hydrologic study area are illustrated on Figure 3-2.

Table 3-5. APPROVED ASSURED WATER SUPPLY APPLICATIONS (2005 TO PRESENT)

Water Provider	Application Name (Subdivision, Master Plan, Water Company, etc.)	Lots	Department File Number	Township		Range		Section	Demand (AF/yr)	Date Issued
Community Water Company of Green Valley	Las Campanas Blocks D & E, Lots 1-268 & Common Area A	268	27-401825	18	S	13	E	10	78.20	01/03/06
Community Water Company of Green Valley	La Joya Verde		27-401602	17	S	13	E	27	31.38	
Community Water Company of Green Valley	Las Campanas Blocks D & E, Lots 1-268 & Common Area A	268	27-401825	18	S	13	E	10	78.20	1/3/2006
Community Water Company of Green Valley	La Joya Verde		27-401602	17	S	13	E	27	31.38	
Community Water Company of Green Valley	La Joya Verde II		27-401633	17	S	13	E	35	14.86	
Community Water Company of Green Valley	La Joya Verde III		27-400885	17	S	13	E	35	42.76	
Community Water Company of Green Valley	La Joya Verde III		27-400886	17	S	13	E	35	46.26	
Community Water Company of Green Valley	La Joya Verde III		27-400887	17	S	13	E	35	26.24	
Farmers Water Company	De Anza Links II, Lots 1-17 and Common Areas A & B	17	27-401810	18	S	13	E	27 & 34	6.52	01/30/06
Farmers Water Company	Sahuarita Acres, Lots 1-71 and Common Area "A"	71	27-500023	17	S	14	E	8	21.81	04/09/07
Farmer's Water Company	Sahuarita Farms (N. half) and Continental Farms (S. half)[1]		28-500050						14,438.46	07/30/07
Green Valley Water District	Solar Del Viejo, Lots 1-81, Common Areas A & B	81	27-401607	18	S	13	E	22	26.65	03/17/05
Quail Creek Water	Stone House	222	27-401424	18	S	14	E	8	84.66	01/25/05
Ray Water Company	Cantera, an RCP Subdivision, Lots 1-143; Common Areas A, B & C; Blocks A & B	143	27-401727	15	S	14	E	10	57.06	11/15/05
Ray Water Company	Desert Point 2, Lots 1 - 45 and Common Areas "A" & "B"	45	27-402265	15	S	14	E	10	15.83	03/30/07
Undetermined	Swan Southlands Development	8525	28-401840	16	S	14	E		3117.36	06/12/06
								Total	**18,008 AF/yr**	

1 – Sahuarita Farms and Continental Farms developments to retire agricultural uses.

Table 3-6. PENDING ASSURED WATER SUPPLY APPLICATIONS

Department File Number	Application Name (Subdivision, Master Plan, Water Company, etc.)	Water Provider	Location	Demand (AF/yr)
27-700295.0000	La Joya Verde Rancho Abrego III, Lots 1-15 and Common Area "A"	Community Water Company of Green Valley	T17S, R13E, Sec 35	4.79
27-700275.0000	Las Campanas, Block C, Lots 1-283 and Common Area "A"	Community Water Company of Green Valley	T18S, R13E, Sec 10	91.14
27-700391.0000	La Jolla Verde Commercial	Community Water Company of Green Valley		16.00
27-401781.0000	Canoa Preserve	Farmers Water Company	T18S, R13E, Sec 35	36.38

Table 3-6. PENDING ASSURED WATER SUPPLY APPLICATIONS

Department File Number	Application Name (Subdivision, Master Plan, Water Company, etc.)	Water Provider	Location	Demand (AF/yr)
27-700354.0000	Madera Highlands, Villages 27 and 29, Common Areas "D", "E", "F" and "G"	Farmers Water Company	T18S, R13E Sec 12, 13; T18S, R14E, Sec 18	70.52
27-500014.0000	Canoa Ranch, Block 27 South, Lots 1-356 and Common Areas "A" and "B"	Green Valley Water Company	T19S, R13E, Sec 8, 9, 16, 17	108.08
51-402270.0000	Elephant Head Partnership LLC	N/A	T19S, R14E. Sec 30	63.70
27-700397	Ridgeline	New Water Provider	T19S, R14E. Secs 18-20, 29-30	88.49
			Total	**479 AF/yr**

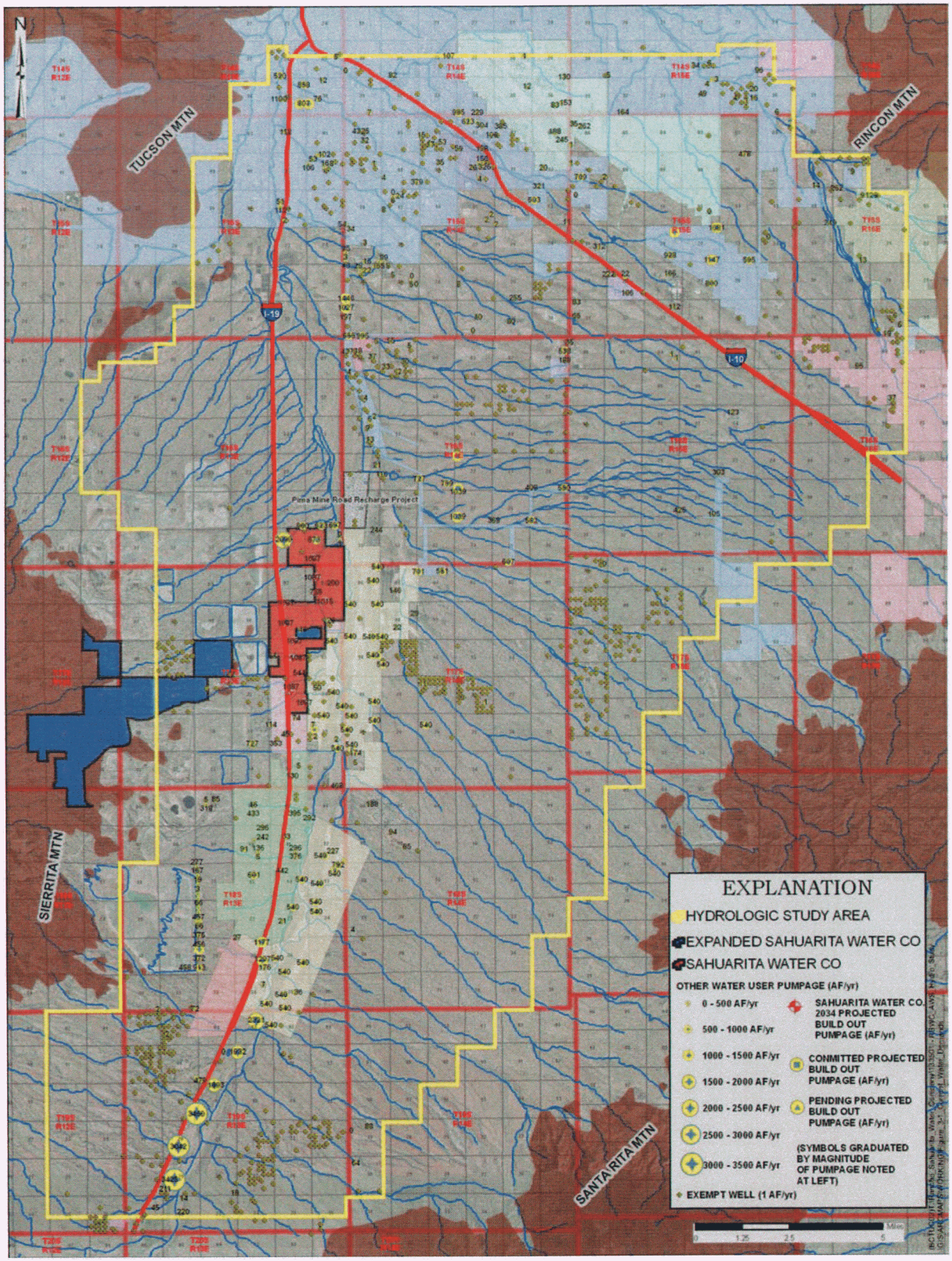


Figure 3-2 – Projected Future Water Demands of the Study Area

3.3 TOTAL WATER DEMANDS

Total water demands compiled for the hydrologic study area are tabulated in Table 3-7 below.

Table 3-7. SUMMARY OF TOTAL WATER DEMANDS WITHIN THE HYDROLOGIC STUDY AREA

Water Demands	Sahuarita Water Company (AF/yr)	Other Water Demands (AF/yr)	Exempt Wells (AF/yr)	Total (AF/yr)
Current	1,259.8	103,072.5	1,041	105,373.3
Projected	10,983	80,978.5[1]	1,041	93,002.5
Committed				18,008[2]
Pending Committed				479
Total Projected & Committed Water Demands in Hydrologic Study Area = 111,489.5 AF/YR				

1 – Includes reduction of agricultural pumpage for Farmers Water Company from 27,094 AF/yr to 5,000 AF/yr, an estimated reduction of 22,094 AF/yr.
2 – Includes 14,438 AF/yr future potable water demands for Farmers Water Company.

3.4 WATER SOURCE

Groundwater development from the local basinfill groundwater aquifer beneath the existing SWC's water service area will be the principal source of water to meet projected SWC water demands. The SWC, as of the date of this report, owns six wells and leases one well from the Town of Sahuarita. Information regarding these wells is included in Table 3-8 below. Groundwater is currently withdrawn from two active wells, Well Nos. 14 and 18. Well No. 14 is leased to the SWC by the Town of Sahuarita and is also used to maintain lake levels in the Sahuarita Town Lake.

Table 3-8. SAHUARITA WATER COMPANY WELLS

Well No.	ADWR Well Registration No.	Cadastral Location	Casing Diameter (inches)	Casing Materials	Well Depth (feet)	Upper Screen Depth (ft bls)	Lower Screen Depth (ft bls)	Drill Date
1	55-562962	D(17-13)11 dcd	8	Steel, Milled Slots, 12 cuts per foot, 3/16"x3" Slots	500	430	490	9/26/1997
12	55-611141	D(17-13)01 abb	24	Steel, Milled Slots, 24 rows, ¼"x3"	982	273	970	5/27/1970
14	**55-611142**	**D(17-13)01 acc**	**24**	**Steel, Milled Slots, 20 rows, ¼"x3"**	**1135**	**435**	**1135**	**10/9/1970**
17	55-611143	D(16-13)36 cbc	24	Steel, Milled Slots, 24 rows, ¼"x3"	1053	247	1030	12/20/1974
18	**55-611144**	**D(17-13)01 cdd**	**20**	**Steel, Slotted**	**905**	**424**	**890**	**4/18/1975**
19	55-611145	D(17-13)01 bac	24	Steel, Milled Slots, 24 rows, ¼"x3"	990	210	972	5/5/1981
20	55-611146	D(16-13)36 ddd	24	Steel, Milled Slots, 26 rows, ¼"x3"	975	240	975	9/22/1969

Note: Wells in bold are active wells as of the date of this report

Based on recent groundwater sampling and analysis, both wells, Well Nos. 14 and 18, produce potable groundwater. Other wells not utilized are considered to be beyond service life and plans are in place to abandon the wells. Well No. 1 has recently been converted to a monitoring well.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and phase out use of Well No. 14 for domestic use in 2009. This well will continue to be used to

maintain lake levels in the Sahuarita Town Lake by applying Type 1 water rights associated with the property area.

In 2006 and 2007 Brown and Caldwell conducted pilot hole and exploratory boring analyses programs to evaluate potential future well sites for the SWC. Groundwater production potential and groundwater quality were evaluated at 6 sites, and currently, as of the date of this report, evaluating 2 additional well sites. This pilot hole analysis conducted for Well Site No. 24 concluded that the well site is not a viable based on groundwater quality. This analysis is documented in a report titled *Well Site No. 24 Pilot Hole Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007b). Exploratory boring analyses were conducted at 5 additional well sites, Well Site Nos. 21, 22, 23, 25, and 26. Exploratory boring analyses at Well Site Nos. 21, 23, 25 and 26 revealed favorable groundwater production potential and groundwater quality. The exploratory boring analyses program is documented in a report titled *Well Site Nos. 21, 22, 23, 25, and 26 Exploratory Boring Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007c).

Table 3-9 tabulated water supply wells and future well sites to be utilized through build-out in year 2034 and beyond. As noted above, Well No. 14 will be phased out in 2009. Table 3-4 indicates whether groundwater production potential and groundwater quality has been confirmed or not as of the date of this report. Confirmation is noted where a well is existing or an exploratory boring analysis has been completed and verifying favorable groundwater production potential and groundwater quality for potable use. Well sites where confirmation has yet to be determined is slated for future exploratory boring analyses.

Figure 3-3 shows the location of these wells and future well sites. Other wells owned by the SWC, also noted on Figure 3-3, Well Nos. 1, 12, 17, 19, and 20, will not be used as a result of age and poor conditions of the wells.

Table 3-9. SAHUARITA WATER COMPANY ACTIVE AND FUTURE PLANNED WATER SUPPLY WELLS

Well	Active or Future Wells	ADWR Registration No.	Cadastral Location	Current or Anticipated Pump Capacity (gpm)	Groundwater Production Potential and Groundwater Quality Confirmed?	Projected Groundwater Production at Build-out (2034) (AF/yr)
Well No. 14	Active	55-611142	D-17-13 1ACC	1,900	Yes	0
Well No. 18	Active	55-611144	D-17-13 1CDD	1,400	Yes	1,014.9
Well Site No. 17R	Future	NA	D-16-13 36CCA	1,500	No	1,087.4
Well Site No. 19R	Future	NA	D-17-13 1BDB	1,500	No	724.9
Well Site No. 21	Future	NA	D-17-13 1CDB	1,000	Yes	1,087.4
Well Site No. 23	Future	NA	D-17-13 11BAA	1,500	Yes	1,087.4
Well Site No. 24B	Future	NA	D-17-13 11CAA	1,500	Yes	1,087.4
Well Site No. 25	Future	NA	D-17-13 14ABA	1,500	No	1,087.4
Well Site No. 26	Future	NA	D-17-13 14DDC	750	Yes	543.7
Well Site No. 27	Future	NA	D-17-13 23ACC	1,500	No	1,087.4
Well Site No. 28	Future	NA	D-17-13 23DDA	1,500	No	1,087.4
Well Site No. 30	Future	NA	D-17-13 14DBA	1,500	No	1,087.4
						Total = 10,983 AF/yr

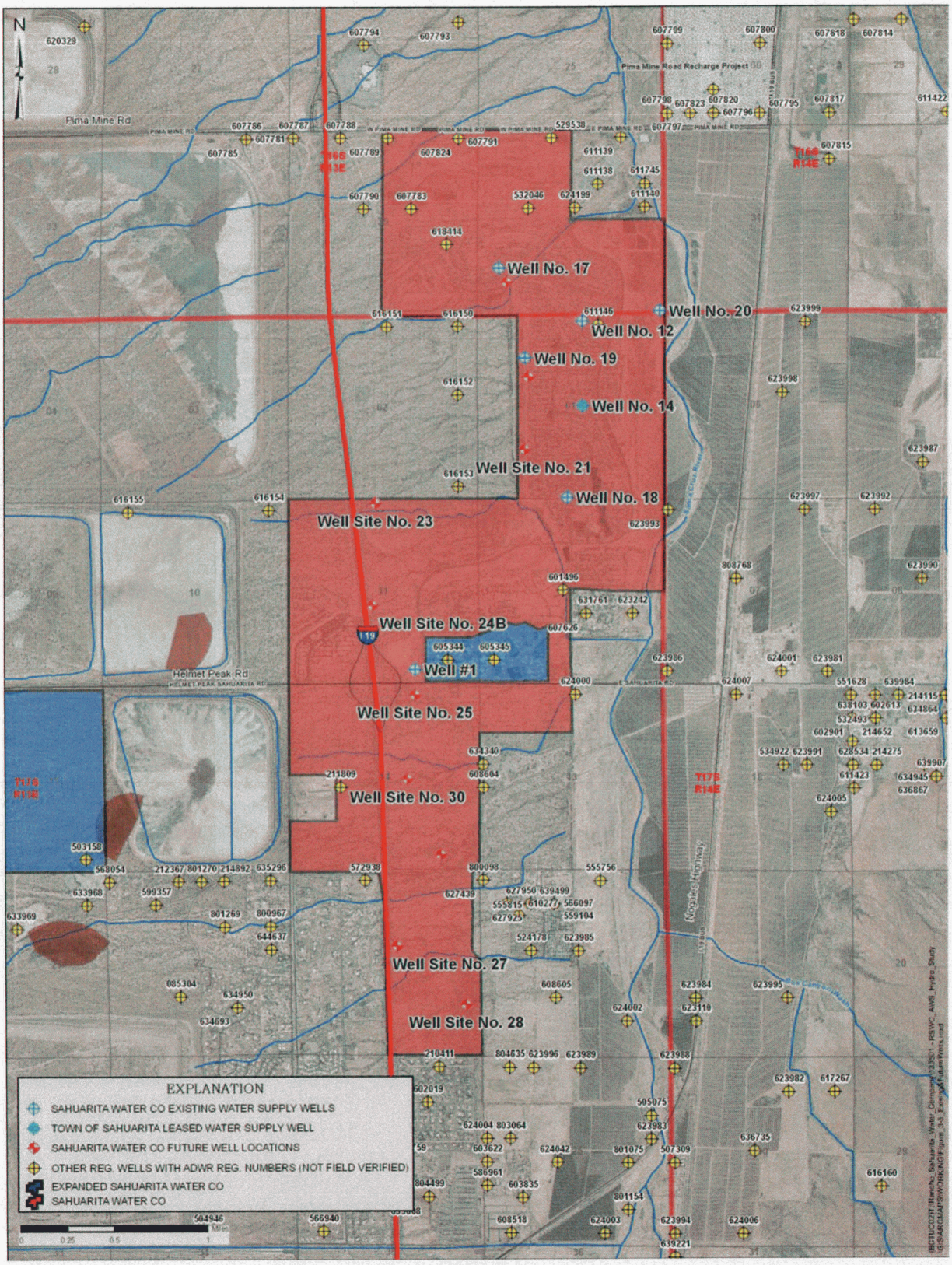


Figure 3-3 – Sahuarita Water Company's Existing and Future Planned Water Supply Well Locations

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

4. ELEMENTS OF SUPPLY

4.1 TOPOGRAPHY AND CLIMATE

The hydrologic study area consists of a moderately, southward sloping valley. The valley is defined to the southeast and west of the study area by the Santa Rita and Sierrita Mountains, respectively. Surface drainage is directed northward in the Santa Cruz River located east of the water service area. Land surface elevations within the study area range from about 2,900 feet above mean sea level (ft amsl) in the southern portion in the Green Valley area to 2,500 ft amsl north of the SWC's existing water service area near Tucson. The land surface slopes northward along the Santa Cruz River at an average rate of approximately 16 feet per mile in the existing water service area. Land surface also slopes eastward toward the river at an average rate of approximately 80 feet per mile within the existing water service area. Land surface altitudes rise to over 9,000 ft amsl in the Santa Rita Mountains southeast of the hydrologic study area, and to about 6,200 feet west of the hydrologic study area in the Sierrita Mountains.

Climate information was compiled from a weather station in the Sahuarita area (WRCC, 2007). Average annual high and low temperatures are reported at 84.7 and 48.1 degrees Fahrenheit, respectively. Average annual precipitation for 1956 to 1972 is reported as 10.62 inches.

4.2 GEOLOGIC SETTING

The hydrogeologic setting of the Upper Santa Cruz Valley in the Sahuarita area is composed of an aquifer system which is hydraulically bounded to the southeast by bedrock of the Santa Rita Mountains and to the west by bedrock of the Sierrita Mountains. The Santa Rita and Sierrita Mountains consist of low-permeable sedimentary, metamorphic and intrusive igneous rocks (Davidson, 1973). Bedrock of the Santa Rita Mountains outcrops approximately 12 miles southeast of the water service area. Bedrock of the Sierrita Mountains outcrops approximately 0.5 mile west of the central portion of the existing water service area.

Based on a regional geophysical study (Oppenheimer and Sumner, 1980) and exploratory boring analyses performed by Brown and Caldwell [2007b and 2007c]), depth to bedrock in the vicinity of the SWC existing water service area ranges from less than 800 feet in the southwestern portion of the water service to greater than 1,600 feet in the northeastern portion. For most of the water service area, depth to bedrock is generally between 1,000 and 1,600 feet in depth. A depth-to-bedrock map is presented as Figure 4-1.

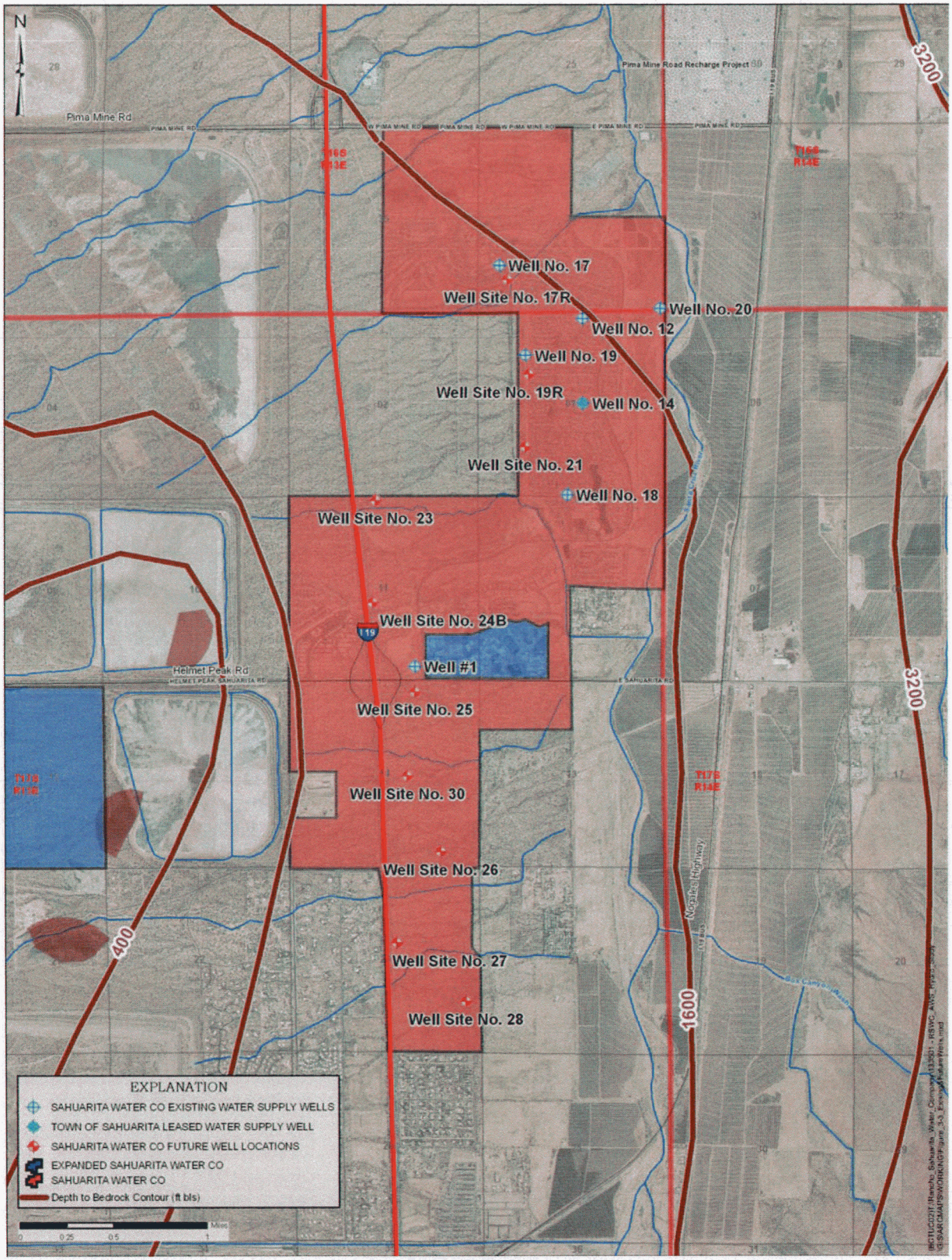


Figure 4-1 – Depth to Bedrock

4.3 HYDROGEOLOGIC CONDITIONS

4.3.1 Occurrence of Groundwater

The main aquifer beneath SWC's existing water service area penetrated by water supply wells in the area consists of saturated portions of the Fort Lowell formation (Qf) and upper and lower Tinaja beds (Tsu). These formations are basin-fill deposits. The Pantano formation (Tos) and underlying bedrock are relatively impermeable in comparison to overlying sediments. The Pantano formation (Tos) is suspected to be penetrated by some wells in the area and indicate favorable permeability characteristics where fracturing is suspected.

Groundwater flow is dictated by topography and by the spatial distribution of recharge and discharge, and generally flows to the north, northwest and west. Figure 4-2 depicts water level elevation contours constructed from 2005 to 2007 static water levels compiled from an ADWR (2007b) database and recent measurements performed by Brown and Caldwell (2007a and 2007b). Contours suggest a groundwater gradient of about 25 to 75 feet per mile. Northeast of the water service area, water level elevations are locally affected by artificial recharge of Central Arizona Project (CAP) water at the Pima Mine Road Recharge Project (PMRRP).

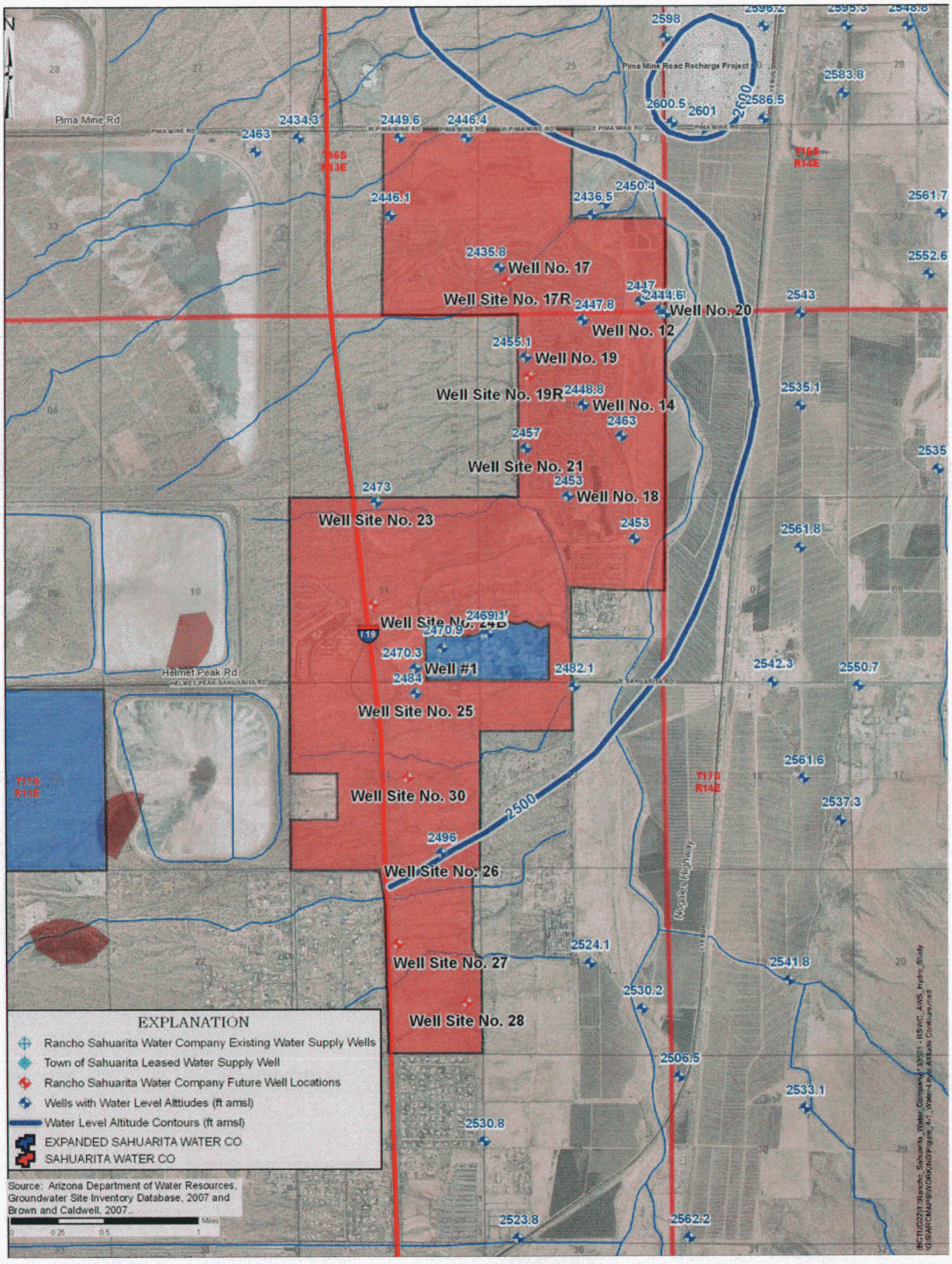


Figure 4-2 – Observed Water-Level Altitude Contours (2005-2007)

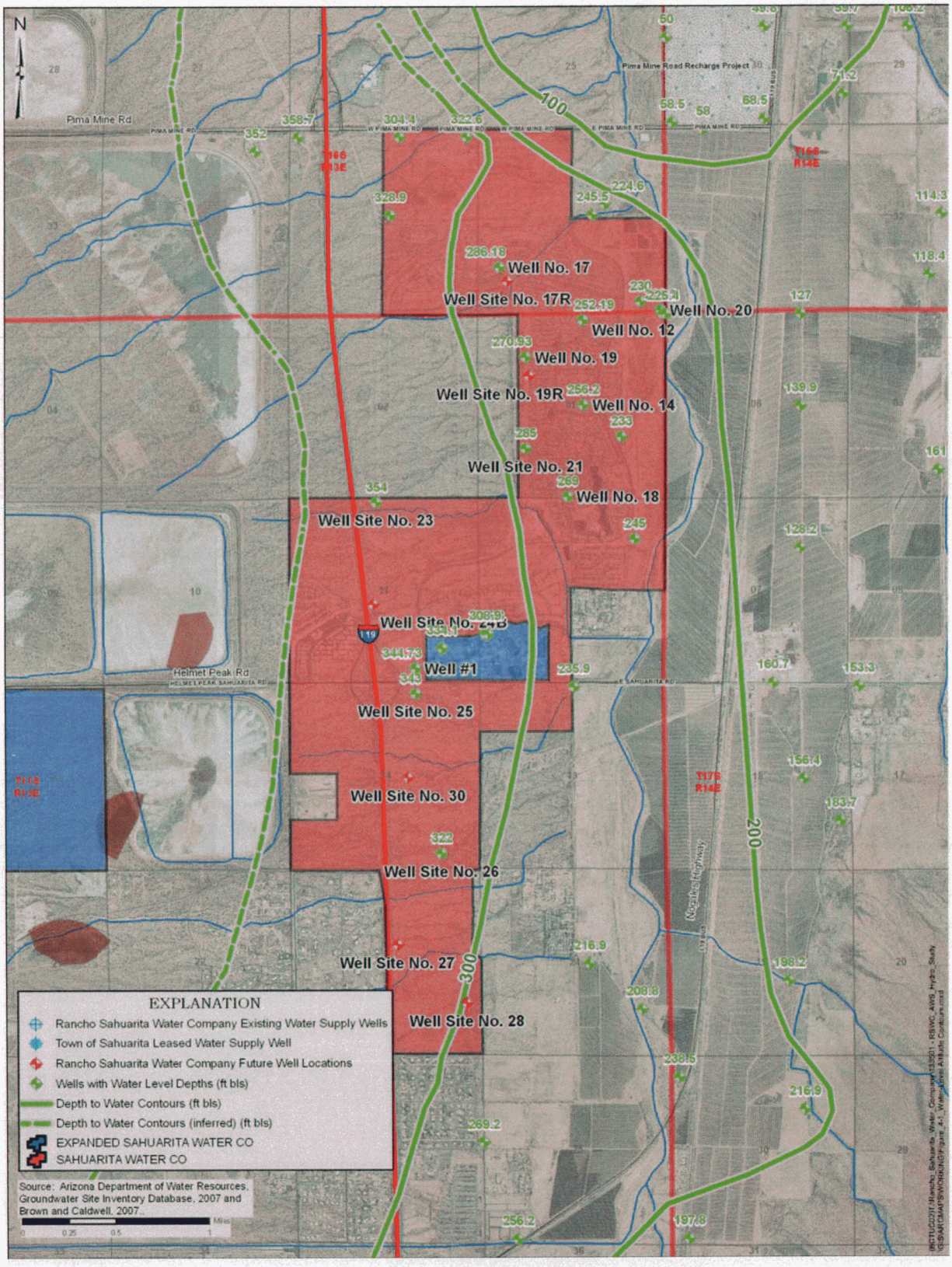


Figure 4-3 – Observed Water-Level Depth Contours (2005-2007)

Pilot testing of the PMRRP occurred between 1997 to 1999 when about 20,000 acre-feet (AF) of CAP water was artificially recharged in spreading basins. Full-scale operation of the facility began in December, 2001 when artificial recharge totaled about 30,000 AF/yr. Figure 4-3 depicts depth to water contours constructed from the same static water level data utilized in Figure 4-2 and indicates that depth to water ranges from less than 100 feet in the vicinity of the PMRRP. Along the Santa Cruz River, depth to water is between 200 and 300 feet. Depth to water increases to the west within the existing water service area from 200 to greater than 400 feet.

Hydrographs for a number of wells were constructed based on historical water level data to evaluate the historical groundwater conditions of SWC water service area. Hydrographs are included on Figure 4-4. Hydrographs generally indicate that in much of the area water levels have declined greater than 150 feet since the early 1960s. Since the 1980s, decline rates have reduced. In the vicinity of the PMRRP, water levels have increased or have been generally stable since about 2000.

Natural recharge to the aquifer system in the area occurs along the mountain front, as underflow from southern parts of the upper Santa Cruz River basin, and as stream channel recharge along the Santa Cruz River. The Santa Cruz River is an ephemeral stream east of SWC water service area, which only flows in response to significant precipitation events. Discharge of the aquifer system in the area occurs at water supply wells and as underflow to the central portion of the Tucson basin to the north.

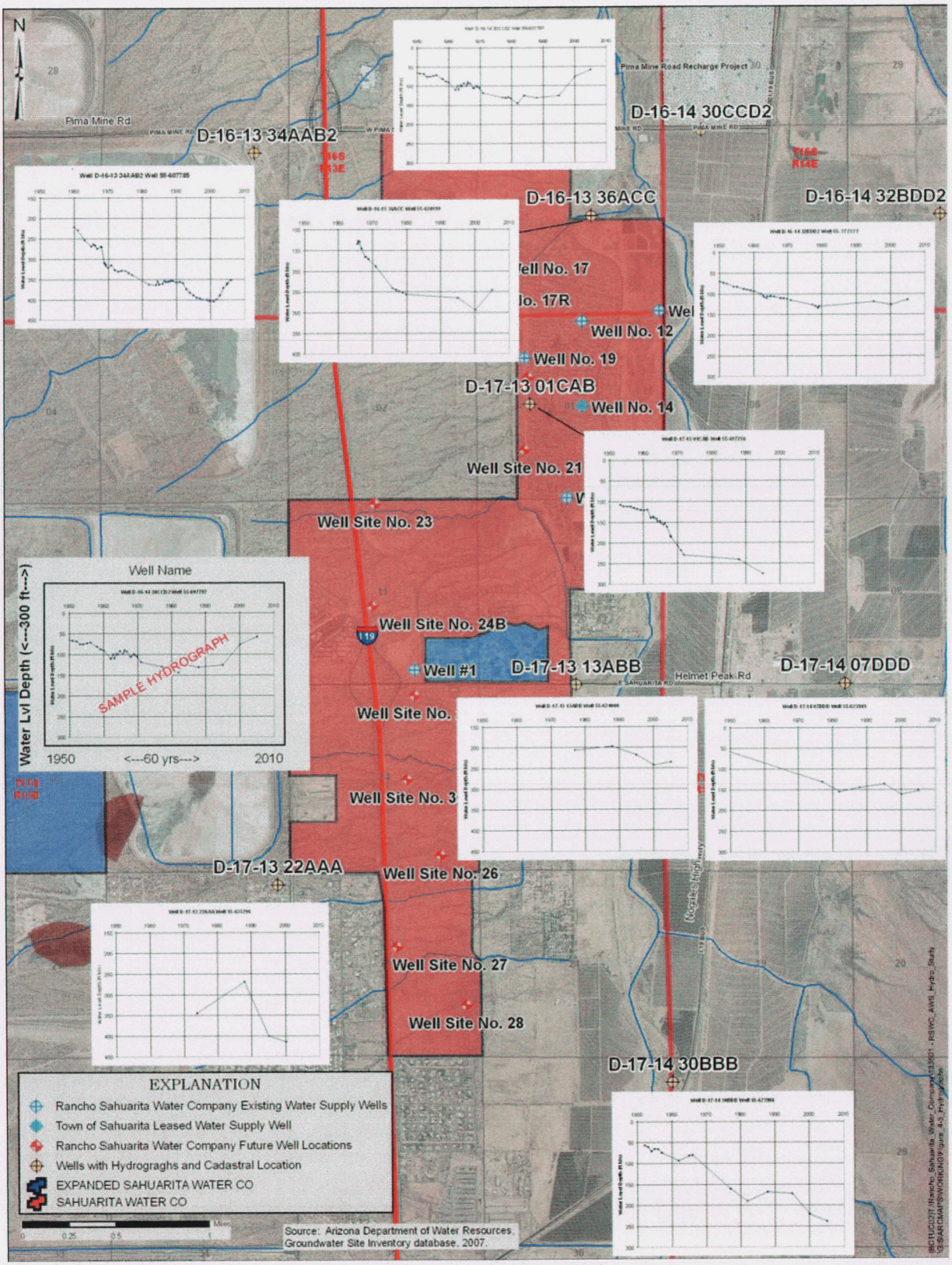


Figure 4-4 – Hydrographs

Based on Osterkamp (1973), rates of natural groundwater recharge at the mountain fronts and stream channels in the area range from 200 to 400 acre-feet (AF) per mile of mountain front or stream-channel. Based on these values and lengths of mountain front and ephemeral stream channels within the existing SWC water service area, annual local natural groundwater recharge is calculated at about 3,000 to 6,000 AF.

4.3.2 Aquifer Characteristics

Aquifer tests have recently been performed on four water supply wells within the vicinity of SWC. Brown and Caldwell conducted an aquifer test and analysis on the SWC's Well No. 14 in May 2006. This aquifer test and analysis is documented in a memorandum report, "Well Spacing/Well Impact Investigation –Rancho Sahuarita Water Company's Well #21 – D-17-13 01CDB," dated December 22, 2006. In addition, Brown and Caldwell conducted aquifer test and spinner flow meter survey analyses on the SWC's Well Nos. 12 and 19 in July 2007. These tests are documented in a report *Well Nos. 12 and 19 Aquifer Test Analyses and Well Production Evaluations* dated July 16, 2007 (Brown and Caldwell, 2007a). Lastly, Brown and Caldwell conducted an aquifer test and spinner flow meter survey analyses on Anamax Well No. 1 owned by Phelps Dodge Corporation and operated by Community Water Company of Green Valley. This test was performed in 2005. This aquifer test is documented in a memorandum report included as Appendix B.

Transmissivity (T-values) evaluated and specific capacities measured from these aquifer tests are summarized on Table 4-1, along with pertinent information regarding the test and well. Location of the wells and noted T-values and specific capacities are included on Figure 4-5.

Table 4-1. WELLS WITH AQUIFER TEST AND SPINNER FLOW METER SURVEYS

Well	ADWR Registration No.	Cadastral Location	Surface Elevation (ft amsl)	Date of Test	Duration (hr)	Static Water Level (ft bls)	Tested Rate (gpm)	Pumping Water Level (ft bls)	Measured Specific Capacity (gpm/ft)	T-Value (gpd/ft)	Analysis T	Upper Perforations (ft bls)	Lower Perforations (ft bls)
Well No. 12	55-611142	D-17-13 1ABB	2700	5/3/2007	24	252.2	536	269	32.7	65,325	Ave DD/Rec	273	970
Well No. 14	55-611144	D-17-13 1ACC	2706	5/25/2006	24	256.4	1811	331	24.3	73,300	Rec	435	1,135
Well No. 19	55-611145	D-17-13 1BAC	2726	5/10/2007	24	270.92	520	283	44.4	134,900	Ave DD/Rec	210	972
Anamax No. 1	55-608518	D-17-13 25CCD	2781	7/27/2005	10	270	1885	297	69.9	227,000	Rec	601	1,885

Notes: ft amsl = feet above mean sea level
hr = hour
ft bls = feet below land surface
gpm = gallons per minute
gpm/ft = gallons per minute per foot of drawdown
gpd/ft = gallons per day per foot of drawdown
DD = water-level drawdown analysis
Rec = water-level recovery analysis

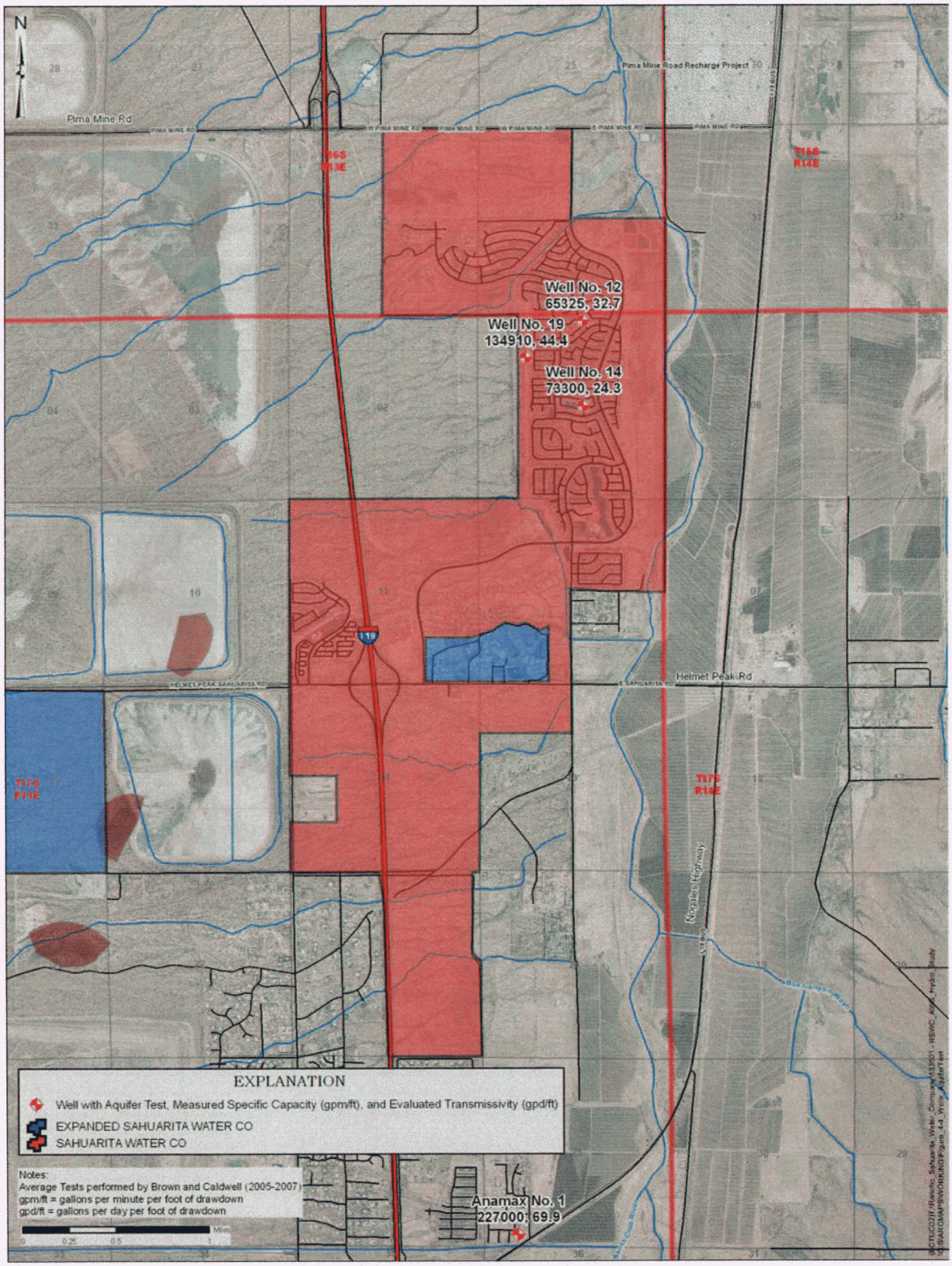


Figure 4-5 – Wells with Aquifer Tests

Spinner flow meter surveys provided information on hydraulic characteristics of basin-fill deposits penetrated by the wells. Tables 4-2, 4-3 and 4-4 provide a summary of spinner flow meter survey analyses for Well Nos. 12 and 19 and the Anamax Well No. 1, respectively, including an estimation of hydraulic conductivity (K-values) of depth intervals in the well.

Table 4-2. WELL NO. 12 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[2]
273 to 340[1]	179	33.3	67	2.67	43
355 to 475	156	29.2	120	1.30	21
525 to 875	201	37.5	350	0.57	9

Note:

1 – Upper depth interval represents top of the screened interval. Survey evaluated flow below a depth of 318 feet, depth of access port, therefore flow characteristics of well not evaluated above this depth. Calculated hydraulic parameters for this zone are considered minimum values.

2 – Calculated by applying the average transmissivity value of drawdown and recovery analyses.

Table 4-3. WELL NO. 19 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[2]
282 to 430[1]	197	37.9	148	1.33	46
460 to 480	66	12.6	20	3.30	114
665 to 800	257	49.5	135	1.90	66

Notes:

1 – Upper depth of interval represents the dynamic pumping level during the survey. Survey evaluated flow below a depth of 318 feet, depth of access port, therefore flow characteristics of well not evaluated above this depth. Calculated hydraulic parameters for this zone are considered minimum values.

2 – Calculated by applying the average transmissivity value of drawdown and recovery analyses.

Table 4-4. ANAMAX NO. 1 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[1]
600 to 780	473	25	180	2.62	42
820 to 900	600	32	80	7.50	121
940 to 980	165	9	20	8.25	66

Table 4-4. ANAMAX NO. 1 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[1]
1,020 to 1,075	282	15	55	5.13	83
1,135 to 1,160	149	8	25	5.96	96
1,235 to 1,760[2]	214	11	525	0.41	7

Notes:
1 – Calculated by applying the transmissivity value of recovery analyses.
2 – Penetrates conglomerate likely associated with Pantano formation not basin fill deposits.

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR
RANCHO SAHUARITA WATER COMPANY

5. ELEMENTS OF ADEQUACY

5.1 GROUNDWATER MODELING ANALYSES

To assess the future hydrologic impacts of future groundwater development by SWC, a three-dimensional, numerical groundwater flow model ("SWC model") was constructed for the southern portion of the Tucson AMA. In order to ensure consistency with current modeling efforts by ADWR, the primary source of information and guidance in the development of the model was ADWR's Modeling Report No. 13 by Dale Mason and Liciniu Bota, *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Simulation and Application*, 2006 (ADWR, 2006), as well as the digital model files for the Tucson AMA model ("TAMA model"). Model construction, parameterization, and groundwater inflows and outflows adhere strictly to the information provided in the above report for the SWC model domain. Digital model files for the steady-state, transient, and predictive model simulations developed by ADWR were used directly to generate the SWC model to avoid any potential deviations from ADWR's model development and construction. ADWR's Tucson AMA modeling report should be referenced for information regarding the hydrogeologic conceptualization for the SWC numerical model (ADWR, 2006).

The following discussion presents the details of the numerical groundwater model, methods used in its construction, and the results of two coupled transient simulations. The groundwater flow model was constructed using the MODFLOW 2000 computer code (Harbaugh et al, 2000). Development and Quality Assurance/Quality Control (QA/QC) of this numerical model was fully integrated with a Geographic Information System (GIS) (ARCGIS 9.1, ESRI, 2005) and standard format data sets to ensure that all results and compiled information will be fully compatible with current spreadsheet, database, GIS, and modeling software packages. All relevant hydrogeologic and groundwater demand data collected during the course of these analyses were also stored within the GIS and were imported directly into the modeling software. Groundwater Vistas, version 5.05 build 2 (ESI, 2007), was used to facilitate pre- and post-processing of the numerical model files. A digital version of this update to the Groundwater Vistas software is included in Appendix C, the compact disk containing the model files and supporting digital materials for this study.

5.2 DEVELOPMENT OF THE NUMERICAL FLOW MODEL

Two, coupled, transient groundwater simulations were developed to simulate past, current, and future groundwater conditions; however, both were based upon the same general numerical framework and have identical model grid construction and hydraulic parameterization. The simulations vary only in the modeled timeframes and allocation of groundwater pumping and PMRRP artificial recharge.

The first simulation ("base simulation") is based upon ADWR's transient TAMA groundwater model and simulates groundwater conditions from 1941 through 1999. Simulated water levels from ADWR's TAMA steady-state model were imported and used as initial conditions. Three main modifications were made to ADWR's TAMA model to create the SWC model: 1) model cell dimensions were refined to uniform ¼ mile by ¼ mile spacings, 2) the model domain was limited to the southern portion of the Tucson AMA, and 3) transmissivity values in the immediate vicinity of the SWC service area were updated in model layer 3 (representing the middle and lower Tinaja beds and the Pantano Formation) to reflect recent aquifer testing

data within and adjacent to the SWC service area. Additional information regarding these modifications to ADWR's TAMA model is presented in the following sections.

The second simulation ("AWS simulation") simulates the time period from 2000 through the end of 2107. This timeframe includes the 100-year projection period required for the purposes of this AWS hydrology study. Initial water level conditions were taken directly from the end of the last stress period for the base simulation (end of 1999). Table 5-1 presents the specifications of the SWC model. Specific details of the model construction including full inputs and water budget components can be found in Appendix C, as well as in ADWR's TAMA model report (ADWR, 2006).

Table 5-1. SPECIFICATIONS OF THE NUMERICAL FLOW MODEL

Model Characteristics	Specifications
Active Model Domain	~470 square miles, ~301,000 acres
Units	Time: Days Length: Feet
Coordinate System	UTM 1927, NAD 12N GIS: lateral units in meters, vertical units in feet
Model Grid	130 rows by 96 columns, 37440 total cells, 18732 active cells
Cell Size	1320 feet by 1320 feet ¼ mile by ¼ mile
Layering – 3 Layers	Layer 1: Younger Alluvium and Fort Lowell Formation; Type 1 Unconfined Aquifer Layer 2: Upper Tinaja Beds; Type 3 Unconfined/Confined Aquifer Layer 3: Middle and Lower Tinaja Beds and Pantano Formation; Type 2 Unconfined/Confined Aquifer
Hydraulic Parameters	Distribution of hydraulic conductivity and storage values for Layers 1 and 2 identical to those from the Tucson AMA model Vertical Leakance values identical to those from the Tucson AMA model. Regional transmissivity values for Layer 3 based upon the Tucson AMA model. Local transmissivity values (vicinity of SWC service area) based upon interpolated/kriged distribution within 2-mile radius of recent aquifer testing locations.
MODFLOW Packages	Basic, Block-Centered Flow, Discretization, Output Control, Solver, Well, Constant Head, Evapotranspiration, Recharge
Base Simulation Stress Periods	1941 through 1999, 59 years 59 Transient, 1-year stress periods, 12 time steps per stress period. 1.2 multiplier

Table 5-1. SPECIFICATIONS OF THE NUMERICAL FLOW MODEL	
AWS Simulation Stress Periods	2000 through 2107, 108 years 108 stress periods, 12 time steps per stress period, 1.2 multiplier
Recharge	Base Simulation: Identical to TAMA Model AWS Simulation: Based upon TAMA Base Case Future Model Simulation (Pima Mine Road recharge curtailed, recharge held at ADWR year 2025 estimates elsewhere)
Wells	Base Simulation: 1316 flux cells, identical to TAMA Model AWS Simulation: Imported as 1625 separate, grid independent, multi-layer analytical features (~1500 active pumping wells) (compiled as standard MODFLOW well file)
Boundary Conditions	Constant head boundaries along northern and southern edges of model domain for all layers
Initial Conditions	Base Simulation: TAMA Steady-state model heads AWS Simulation: Heads from end of Base Simulation (end of 1999)
Solution Method	Preconditioned Conjugate Gradient Solver Package version 2

5.2.1 Model Grid

The model grid was georeferenced to exactly match the alignment and location of ADWR's TAMA model domain and was uniformly refined to ¼ mile by ¼ mile spacings, producing for four model cells per original ADWR cell. The full extent of the model grid is shown on Figure 5-1 and was generated by removing the northernmost 59 rows from ADWR's TAMA model and refining the cell spacings by half. The location for the northern boundary of the RSWC model is located within Township 14 North, and was selected based upon the following criteria:

- It is a suitable distance (more than 13 miles) away from the northern boundary of the SWC service area; thus, limiting boundary effects
- It is just south of the historic, central Tucson groundwater basin pumping area, limiting the number of pumping wells with uncertain future pumping rates within the model domain and reducing the potential effects of sharp spatial (gradient) or temporal water level changes on boundary cell inputs
- It is just south of a major shift in the direction of groundwater flow from south to north, towards the northeast following the path of the Rillito River.

The location of the southern boundary of the model domain overlies that of the TAMA model. Moving upwards from Layer 3, model layers are regionally less extensive, representing the exposure of deeper hydrostratigraphic units at ground surface. The lateral extent of active cells for each model layer exactly matches those defined by ADWR for the southern portion of the Tucson AMA (ADWR, 2006).

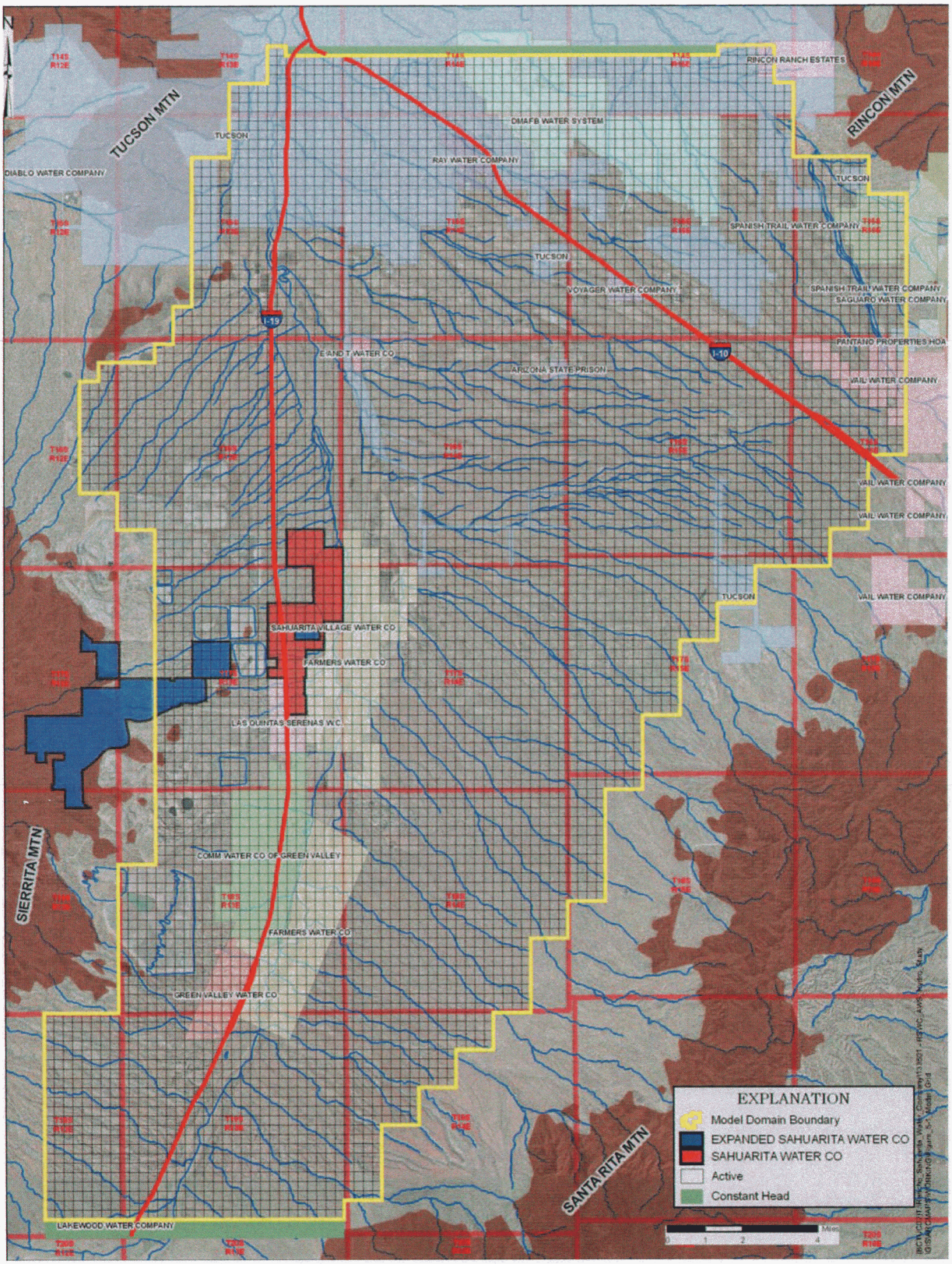


Figure 5-1 – Model Grid

5.2.2 Layering

General layer information is presented above in Table 5-1 and provided digitally in Appendix C. Elevations for layer top and bottom contacts are identical to those estimated by ADWR for the TAMA model, and were not modified for the SWC model domain.

5.2.3 Aquifer Parameters

All hydraulic conductivity, vertical leakance, and storage parameters are identical to those estimated by ADWR for the TAMA model. However, Layer 3 transmissivity values in the vicinity of the SWC service area were modified based upon recent aquifer test information for four wells screened within the deep aquifer system. Section 4.3.2 provides information for these tests, well information, and the resultant transmissivity and hydraulic conductivity estimates. Figure 4-5 shows the locations of the tested wells.

The following methodology was used to assign updated transmissivity values to Layer 3. The screened intervals for each tested well were compared to the estimated top elevations of Layer 3 (or bottom of Layer 2) from the TAMA model for each well site. Depth specific hydraulic conductivity values derived from spinner flow meter surveys were then multiplied by the thickness of each tested well's screened interval within Layer 3. This produced transmissivity values reflective of the aquifer characteristics of only Layer 3. Note that Well No. 14 did not have a spinner flow meter survey performed at its location, so the estimated transmissivity value for Layer 3 was based upon the overall hydraulic conductivity value from the aquifer test and the portion of the screened interval penetrating Layer 3. Table 5-2 presents the well-specific transmissivity values used to develop a local distribution for Layer 3.

Table 5-2. ESTIMATED LAYER 3 TRANSMISSIVITY VALUES

Well	TESTED TRANSMISSIVITY VALUE (feet squared per day)	GENERALIZED DEPTH TO TOP OF LAYER 3 ADWR TAMA Model (feet bls)[1]	ESTIMATED TRANSMISSIVITY VALUE FOR LAYER 3 (feet squared per day)[2]
Well No. 12	8,732	~600	2,475
Well No. 14	9,798		8,572
Well No. 19	18,032		13,200
Anamax No. 1	30,344		27,000

Notes:
1 – Model cells at and near these wells show a depth to the top of Layer 3 of generally 600'.
2 – Calculated using results of aquifer testing presented in Section 4.3.2. The estimated value from the Anamax well was conservatively rounded downwards due to the high productivity of the deepest aquifer units at that location.

These estimated transmissivity values were then kriged along with bounding transmissivities from the TAMA model Layer 3. The bounding values were located approximately two miles away from the north-south trend of the tested wells to produce a smoothed distribution of local transmisivity estimates within the regional array. The new kriged estimates were imported into the SWC model and used in both the base and AWS simulations. Note that these estimates were not allowed to influence Layer 3 model transmissivities more than 2 miles away from the linear trend of the test wells, and throughout the remainder of Layer 3 the original TAMA model transmissivity values were maintained. Incorporation of these transmissivity values were not deemed to adversely affect the TAMA model calibration, as discussed below in Section 5.2.8. The full distribution of all Layer 3 transmissivity values can be seen in the digital files provided in Appendix C.

5.2.4 Boundary Conditions

Transient proscribed head cells were used as boundary conditions for both the northern and southern boundaries of the model domain with no-flow boundaries to the east and west. Boundary conditions for the SWC model can be viewed on Figure 5-1.

Southern Proscribed Head Boundary Conditions

The locations of the southern proscribed head boundary cells are identical to those in ADWR's TAMA model. For the base simulation (1941-1999), the southern proscribed head values are identical to those in ADWR's TAMA transient model. For the AWS simulation (2000-2107), the southern proscribed head values are identical to those specified in ADWR's TAMA Base Case Future Model simulation through year 2025. Beyond this time frame the head values are held constant at the estimated 2025 value.

Northern Proscribed Head Boundary Conditions

In order to conservatively estimate the future impact of pumping in the northern portions of the Tucson AMA on water levels in the SWC model domain, the following methodology was followed. Initially, ADWR's TAMA Base Case Future Model simulation was run with the final stress period extended through 2107. From the year 2000 on, SWC existing and future pumping were updated and simulated explicitly within the model at their reported and projected pumping rates and proper locations. This essentially updated the TAMA Future model to reflect SWC's most recent projected pumping volumes. This approach also allowed for conservatively high water level decline estimates in the central Tucson basin for the next 100 years. As previously stated, the northern boundary of the SWC model is located along row 59 of ADWR's TAMA model grid. Head values from this row from the updated TAMA Future model simulation were exported for the full model period (1941-2107) and used as proscribed head values for the both the SWC base and AWS simulations. This methodology produced continuous proscribed head declines along the northern AWS model boundary throughout the AWS model time frame and also incorporated any impact of SWC's own future pumpage upon the proscribed head inputs.

5.2.5 Wells

For the base simulation, a total of 1316 pumping wells were included as flux cells. Pumping was applied at the same locations, layers, and magnitudes as those specified in the TAMA model. By the end of the simulation (end of 1999), approximately 116,000 AF/yr of pumping is simulated within the model domain.

For the AWS simulation, a total of 1625 individual pumping well locations were included in the model domain as grid independent analytical wells, which are compiled as standard flux cells during model runs. Table 5-3 below summarizes the various methods used to assign pumping in the AWS simulation. For the time period from year 2000 through 2006, all annual demands were imported directly from the tabulated groundwater withdrawals recorded in ADWR's "pumpyear" database at the appropriate registered well locations. Future committed demands were tabulated in two separate ways. Demands approved prior to 2005 were calculated by averaging the recorded annual pumping for the five year period from 2002 through 2006. These average pumping values were applied for the time period from 2007 through 2107 with the exception of future pumping for SWC and Farmers Water Company, which were both replaced with new AWS demands from recent permits. This approach is conservative in that it accounts for a total future committed demand in excess of both the approved amount as well as exceeding the amount of pumping recorded for only 2006. For all committed AWS demands approved after 2005 within the model domain, the permitted annual pumping was included in the model at "new" wells at the location of the new developments. All pending AWS demands were also simulated at their full requested demand amounts beginning in 2008 at the locations of the planned developments. Additionally, all exempt wells within the model domain were pumped at 1 AF/yr (1041 wells). Pumping by demand type can be found in Table 3-6, and total pumping

applied to the model at build-out totals 111,489.5 AF/yr. By then end of year 2107 of the AWS simulation, approximately 111,000 AF/yr of pumping is still sustained in the model, accounting for 98 percent of the total demand and including 100 percent of the SWC build-out demand. Detailed pumping information regarding well locations, pumping schedules, and demand type is provided in GIS format in Appendix Z.

Table 5-3. ALLOCATION OF GROUNDWATER PUMPING

AWS SIMULATION TIME PERIOD	ASSIGNED GROUNDWATER PUMPING
2000 – 2006	Recorded pumping from ADWR records
2007 – 2107	Average of recorded pumping for 2002-2006 Committed Demands since 2005 Pending Demands Projected SWC Demand Exempt Well Pumping

5.2.6 Recharge and Evapotranspiration

For the base simulation, the magnitude and distribution of recharge is identical to that of the TAMA model. For the AWS model, groundwater recharge was imported from the TAMA Future model simulation, with the exception of future recharge at the Pima Mine Road Recharge Project (PMRRP) and the North Borrow Pit, both located north of SWC. The reported average annual recharge volume at PMRRP since the onset of full scale operations (2000 through 2005) was calculated and only 5 percent of this value was allowed to recharge at the site, representing the "cut to the aquifer" as specified by the A.R.S. § 45-852.01C. The average of reported recharge volumes for the PMRRP was approximately 21,386 AF/yr, and the simulated future recharge rate for the facility from 2008 through 2107 was approximately 1,069 AF/yr. No recharge was simulated for the North Borrow Pit.

5.2.7 Stress Periods and Initial Conditions

For the base simulation, 59 annual stress periods with 12 time steps each were used to simulate the time period from 1941 through 1999, matching the design of the TAMA model. Heads from the TAMA steady state model were used as the initial conditions. For the AWS simulation, 108 annual stress periods with 12 time steps each were used to simulate the time period from 2000 through 2107. Initial conditions were imported from the end of the base simulation.

5.2.8 Calibration

Because the SWC model was based strictly upon the framework of the ADWR TAMA model, the base simulation and early stress periods of the AWS model were qualitatively calibrated by comparing the groundwater contours and cell specific water levels with those from ADWR's transient TAMA model (ADWR, 2006). The SWC model accurately reproduced ADWR's water level conditions throughout the model domain during the 1941-1999 time periods; thus, the model was deemed to adhere to the appropriate calibration standards met by the TAMA model. Figure 5-2 presents a comparison of the simulated water levels in 2006 versus recently observed water levels.

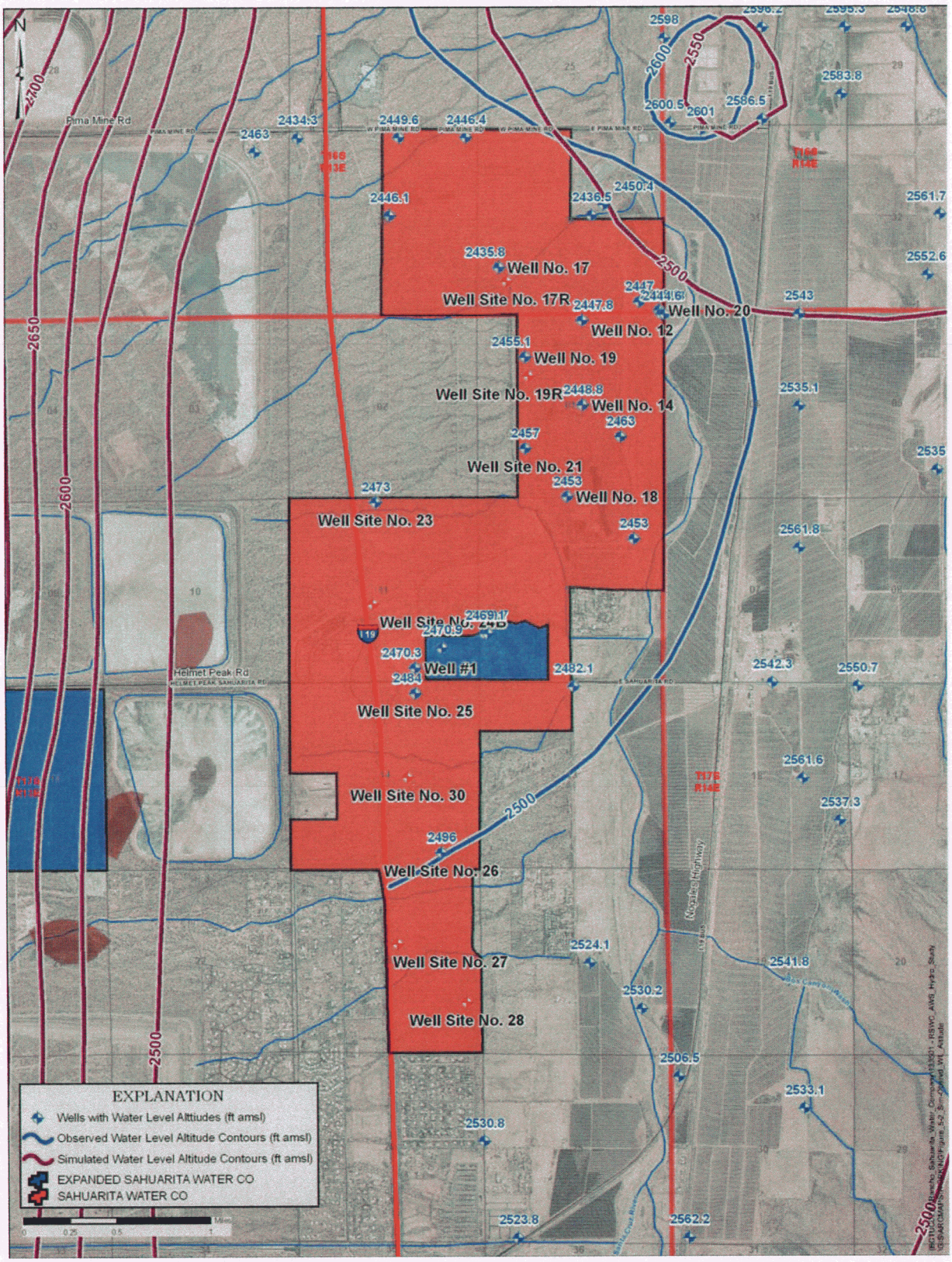


Figure 5-2 – Simulated and Observed Water Level Altitudes (2005-2007)

5.3 MODEL RESULTS

Detailed model simulation results are provided in MODFLOW and GIS formats in Appendix Z.

5.3.1 Water Levels Altitudes

Figure 5-3 presents model predicted groundwater altitudes in 2107 in the vicinity of SWC. In order to remove any potential bias due to effects of the inclusion of updated Layer 3 transmissivity values on the overall model calibration, the drawdown from the SWC model (from 1999 to 2107) was subtracted from ADWR's TAMA model simulated water levels for the end of 1999 to produce a final simulated head distribution. Groundwater elevations range from 2,001 to 2,072 ft amsl at the SWC service area, and flow generally proceeds from all directions towards the pumping center comprised by SWC, Community Water Company of Green Valley, and Farmers Water Company.

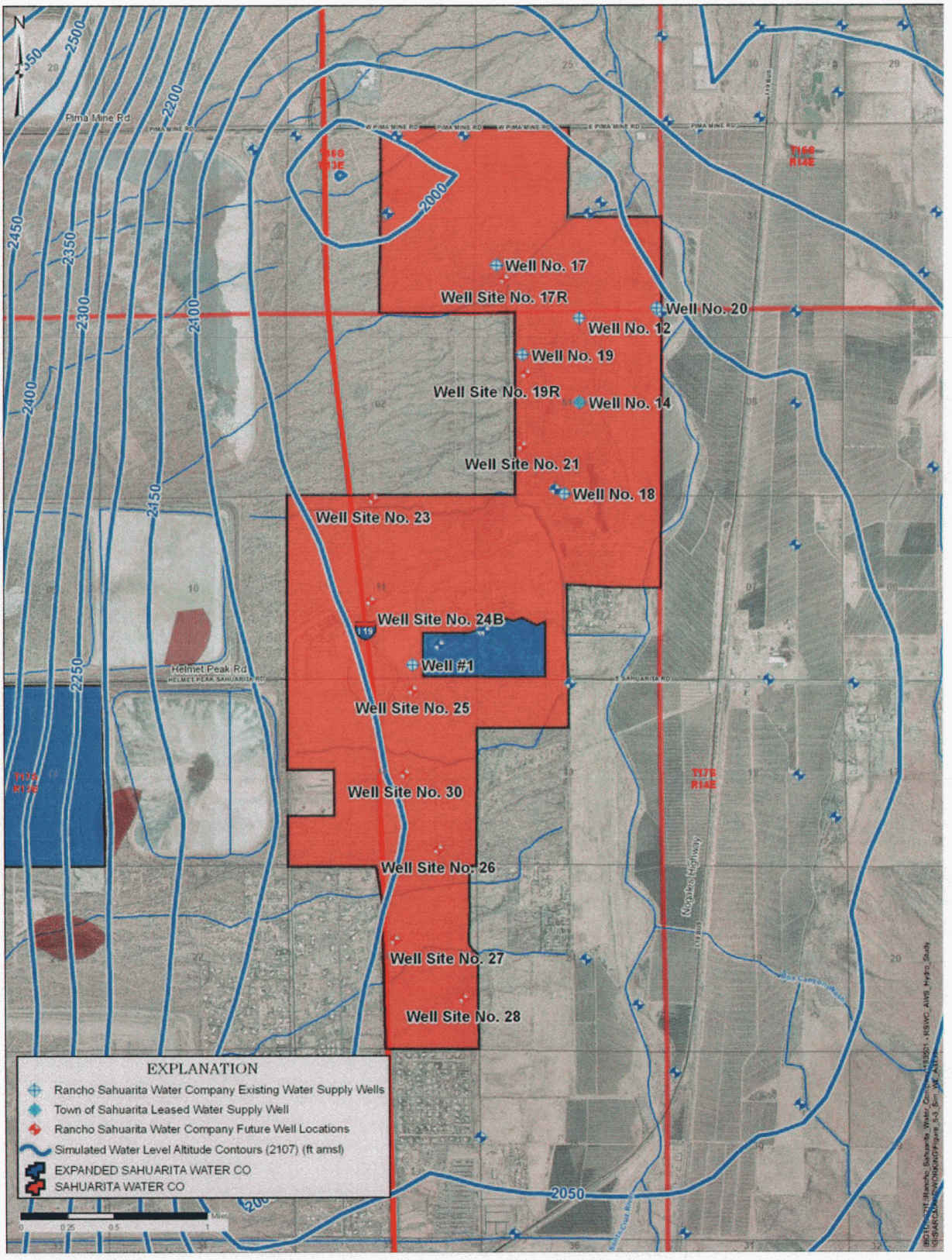


Figure 5-3 – Simulated Water Level Altitudes (2107)

5.3.2 Depth to Water

Figure 5-4 presents model simulated depths to water in 2107 in the vicinity of SWC. As described above, these depths-to-water were calculated by subtracting the final 100-year simulated head distribution discussed above from ground surface elevations for each model cell. Estimated depths-to-water at the SWC service area range from 610 to 785 feet below land surface (ft bls), with the greatest depths occurring in the eastern and southern portions.

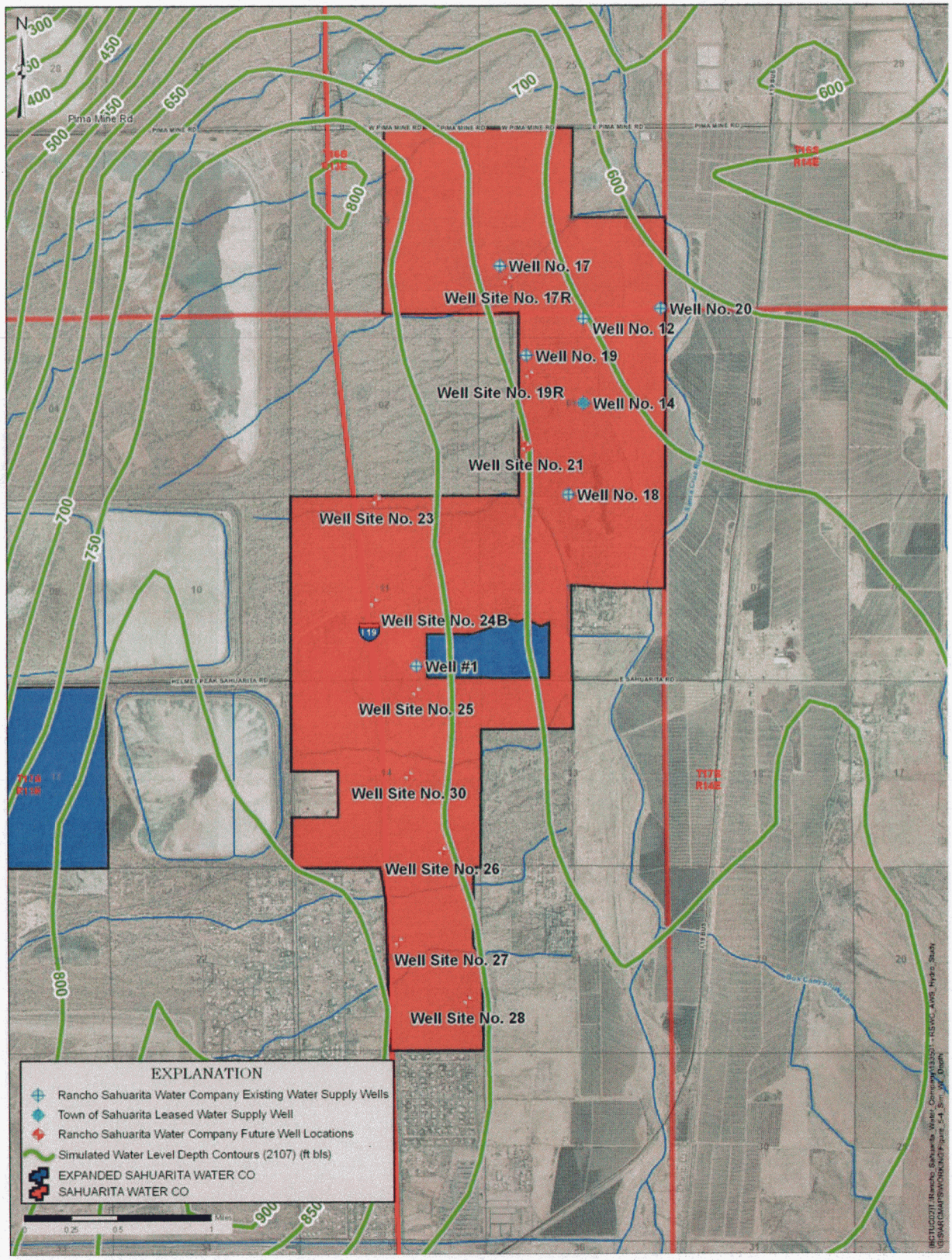


Figure 5-4 – Simulated Water Level Depths (2107)

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

6. CONCLUSIONS

The hydrogeologic analyses presented herein demonstrate the physical availability of 10,983 AF/yr of local groundwater resources for 100 years for the existing and planned expansion of SWC's water service area. The planned expansion is to serve potable groundwater resources to two proposed development projects including the Mission Peaks and Sahuarita Mission development projects, and an existing school site. The school site includes the Sahuarita Unified School District Campus (K through 12). Mission Peaks development may also include development on an adjacent State Land parcel. Additional potable groundwater resources may also be served (bulk sales) to 500 existing off site units at the adjacent Magee Ranch by a stand-pipe system. Additional development is also planned within the existing service area within the Rancho Sahuarita Master Planned Community.

To demonstrate the physical availability of an Assured Water Supply within the Tucson AMA utilizing groundwater resources, it is required that current, committed and projected groundwater withdrawals over 100 years will not result in depth-to-water to exceed 1,000 feet from ground surface or depth-to-bedrock, whichever is less. Furthermore, groundwater must also be of acceptable quality for potable use. Lastly, the proposed water uses must be consistent with the Rules and Regulations of ADWR pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

To assess the future hydrologic impacts of future groundwater development by SWC, a three-dimensional, numerical groundwater flow model ("SWC model") was constructed for the southern portion of the Tucson AMA. In order to insure consistency with current modeling efforts by ADWR, the primary source of information and guidance in the development of the model was ADWR's Modeling Report No. 13 by Dale Mason and Liciniu Bota, *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Simulation and Application*, 2006 (ADWR, 2006) as well as the digital model files for the Tucson AMA model ("TAMA model"). The groundwater model was modified to incorporate new hydrogeologic data gathered from exploratory boring analyses and aquifer testing programs performed by Brown and Caldwell for the SWC in 2006 and 2007.

The groundwater model, incorporating current, committed and projected groundwater water demands within an approximate 500-square mile hydrologic study area were applied to project water-level conditions in 2107, a 100 year period. Computer simulations were performed with only 5 percent of about 20,000 AF of annual artificial recharge of Central Arizona Project water at the Pima Mine Road Recharge Project and with no recharge for the North Borrow Pit, both located just north of SWC. The hydrologic simulations analyses demonstrated that maximum depth-to-water in the vicinity of SWC's water supply wells will range from 610 to 785 ft bls in 100 years. These projected depths meet the requirement for AWS analyses for the Tucson AMA in that depth to water in 100 years can not exceed 1,000 feet from the ground level or depth-to-bedrock, which ever is less.

Groundwater quality analyses performed on groundwater samples collected from active wells and exploratory borings reveal favorable groundwater quality for potable use based on current regulatory limits. The proposed water uses will be consistent with the Rules and Regulations of ADWR, pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

The hydrologic analyses presented invoke a number of conservative elements in demonstrating the physical availability of sufficient groundwater resources. The principal elements area as follows:

- New wastewater treatment plant will be constructed for the new developments. No effluent reuse or artificial recharge of effluent generated by the new developments was included in the hydrologic simulations. Potentially up to 60 percent of equivalent volume of pumpage may be available for future reuse or recharge.

- Mine and agricultural water usage in the hydrologic study area will likely not be at current levels for 100 years. Hydrologic simulations assume current levels of pumpage will remain constant. Mine life will likely be exhausted, and agriculture usage will likely be retired and transferred to municipal uses. A significant net reduction in overall water usage will likely occur.

- Artificial recharge of Central Arizona Project (CAP) water at the Pima Mine Road Recharge Project will likely continue into the distant future and potentially augmented in the future. Currently annual recharge totals about 20,000 AF/yr. Hydrologic simulations only applied 5 percent of the total as required by ADWR. North Borrow pit may also be in operation within the simulated period.

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR RANCHO SAHUARITA WATER COMPANY

7. LIMITATIONS

Report Limitations

This document was prepared solely for SWC in accordance with professional standards at the time the services were performed and in accordance with the contract between SWC and Brown and Caldwell, dated February 12, 2007. This document is governed by the specific scope of work authorized for SWC; it is not intended to be relied upon by any other party, except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by SWC and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

APPENDIX A

Sahuarita Water Company Projected Water Demand Calculations

Rancho Sahuarita Water Company Modification of Assured Water Supply Designation Demands

Demand Criteria

2.7	pphu	Single-family
1.8	pphu	Active-Adult
1.9	pphu	Multi-family
101	gpcd	Single-family
123	gpcd	Active-Adult
68	gpcd	Multi-family

2.25	af/ac/yr	Commercial
25	gpsd	Elementary and Middle School
43	gpsd	High School
10,000	gal/lot	construction water
10	%	Lost and unaccounted for water

			Residential										Non-Residential								
			Mission Peaks			Rancho Sahuarita			huarita Mission				Mission Peaks			Rancho Sahuarita					
	Phase	Year	Single Family Units	Active Adult Units	Multi-Family Units	Single Family Units	Active Adult Units	Multi-Family Units	Single Family Units	Residential Demand (af/yr)	Total Units	Construction Water (ac/yr)	Commercial (Sq. Ft)	High Schools (students)	Elem. & Middle School (students)	Commercial (Sq. Ft.)	High Schools (students)	Elem. & Middle School (students)	Non-Residential Demand (af/yr)	Total Water Use (af/yr)	Lost and Unaccounted for Water (af/yr)	Total with Lost and unaccounted for (ac/yr)
		2006				3251	404	0		1093	3655					89000	1159		5	1098	110	1208
		2007				3732	489			1261	4221	17				353196	1226		77	1356	136	1492
		2008				5116	654			1725	5770	48				441305	1226	2900	163	1936	194	2129
		2009				5373	687			1812	6060	9				947252	1226	3044	193	2014	201	2215
1	I	2010	100	100	174	5,895	731			2063	7000	29	30000	478	2028	1503252	1226	3150	306	2398	240	2637
2	I	2011	400	300	174	6261	785		240	2402	8160	36	60000	478	2028	1849738	1226	3150	326	2764	276	3040
3	I	2012	950	600	174	6790	785		480	2880	9779	50	90000	478	2028	1979630	1226	3150	334	3263	326	3590
4	I	2013	1775	900	600	7390	785		720	3524	12170	73	120000	478	2028	2159630	1226	3150	345	3942	394	4337
5	I	2014	2375	1361	1000	7990	785		960	4136	14471	71	150000	478	3315	2363986	1226	3150	393	4600	460	5060
6	I	2015	2975	1561	1226	8590	785		1200	4658	16337	57	180000	478	3315	2639935	1226	3150	409	5125	512	5637
7	I	2016	3574	1761	1506	9190	785		1440	5188	18256	59	340000	478	3315	2827935	1226	3150	427	5674	567	6241
8	I	2017	3692	1961	1506	9790	785		1680	5530	19414	36	500000	478	3315	3072935	1226	3150	448	6014	601	6615
9	I	2018	3692	2161	1506	10086	1089		1920	5819	20454	32	640855	478	3315	3072935	1226	3150	455	6306	631	6937
10	II	2019	4192	2371	1506	10086	1460		2160	6189	21775	41	815210	956	5343	3072935	1226	3150	544	6774	677	7451
11	II	2020	4692	2371	1506	10086	1460		2400	6415	22515	23	1034481	956	5343	3072935	1226	3150	555	6993	699	7692
12	II	2021	5192	2371	1506	10086	1460		2640	6641	23255	23	1034481	956	5343	3072935	1226	3150	555	7219	722	7941
13	II	2022	5692	2371	1506	10086	1460		2880	6867	23995	23	1034481	956	5343	3072935	1226	3150	555	7445	745	8190
14	II	2023	6192	2371	1506	10086	1460		3000	7057	24615	19	1034481	956	5343	3072935	1226	3150	555	7631	763	8394
15	II	2024	6692	2371	1506	10086	1460		3000	7209	25115	15	1034481	956	5343	3072935	1226	3150	555	7780	778	8558
16	II	2025	7192	2371	1506	10086	1460		3000	7362	25615	15	1034481	956	5343	3072935	1226	3150	555	7933	793	8726
17	II	2026	7692	2371	1506	10086	1460		3000	7515	26115	15	1034481	956	5343	3072935	1226	3150	555	8085	809	8894
18	III	2027	8681	2371	1506	10086	1460		3000	7817	27104	30	1105336	956	5343	3072935	1226	3150	559	8406	841	9247
19	III	2028	9431	2371	1506	10086	1460		3000	8046	27854	23	1105336	956	5343	3072935	1226	3150	559	8628	863	9491
20	III	2029	10181	2371	1506	10086	1460		3000	8275	28604	23	1105336	956	5343	3072935	1226	3150	559	8857	886	9743
21	III	2030	11431	2371	1506	10086	1460		3000	8657	29854	38	1105336	956	5343	3072935	1226	3150	559	9254	925	10180
22	III	2031	12181	2371	1506	10086	1460		3000	8886	30604	23	1105336	956	5343	3072935	1226	3150	559	9468	947	10415
23	III	2032	12931	2371	1506	10086	1460		3000	9115	31354	23	1105336	956	5343	3072935	1226	3150	559	9697	970	10667
24	III	2033	13681	2371	1506	10086	1460		3000	9344	32104	23	1105336	956	5343	3072935	1226	3150	559	9926	993	10919
25	III	2034	13923	2371	1506	10086	1460		3000	9418	32346	7	1105336	956	5343	3072935	1226	3150	559	9984	998	**10983**

Assumptions

Sahuarita Mission
Based on 600 Acres at 5 RAC
Buildout 240 units/yr starting 2011

Mission Peaks
3,624 SF units added per Matt Lawsons request (6/21/07)
Based on Water Master Plan prepared July 2006
Estimated 25 yr Buildout, starting April 2010

Rancho Sahuarita
Residential and Commerical uses revised per Cort's projections (6/15/07)
Based on Water Master Plan Prepared November 2006
Estimated 10 yr Buildout
School estimates based on current and max number of students at Sahuarita and DeAnza Schools

Updated 10/24/07

APPENDIX B

Anamax No. 1 Aquifer Test Letter Report

Suite 2300, 110 South Church Avenue
Tucson, Arizona 85701

Tel: (520) 624-5744
Fax: (520) 791-2738

September 26, 2005

BROWN AND CALDWELL

Mr. Norris West
Community Water Company of Green Valley
1501 South La Cañada Drive
Green Valley, Arizona 85622

128730.001.003

Subject: Evaluation at Anamax No. 1 Well

Dear Mr. West:

Brown and Caldwell conducted a well evaluation at the existing Anamax No.1 well in Green Valley, Arizona. Work completed included: 1) video logging after completion of well rehabilitation by brushing and bailing, 2) test pumping, 3) constant rate pumping accompanied by spinner logging and zonal groundwater sampling, and 4) measurement of water level recovery after completion of step 2. All pump removal and installation, well rehabilitation, and video logging were completed by Layne Christensen. Spinner logging and depth-discrete sampling were completed by Welenco. Laboratory analysis of water samples were completed by Legend Laboratories.

Results from the 10-hr constant rate pumping test indicate a transmissivity of approximately 227,000 gallons per day per foot (gpd/ft). Results from the spinner test indicate that approximately 87 percent of the total flow is contributed from the basin-fill alluvial aquifer, which based on well lithologic information extends to a depth of approximately 1,300 feet below ground surface (bgs). Zonal groundwater samples were collected from four different depths and one composite sample. The arsenic concentrations exceeded the maximum contaminant level (MCL) that will be effective in January 2006 for all five samples collected. However, the arsenic concentrations are not believed to be representative of zone-specific conditions in the aquifer but rather the result of long-term vertical mixing of water qualities from different depths. A detailed summary of all the associated well evaluation activities and findings are summarized below.

WELL EVALUATION AND DOWNHOLE TESTING

A well production evaluation was conducted on the Anamax No.1 well on July 27, 2005. The evaluation consisted of test pumping, spinner flowmeter survey, zonal groundwater sampling, and a water level recovery test.

The Anamax No. 1 well was originally completed to a total depth of 2,516 feet with the perforated interval from 601 to 2,516 feet. The well penetrated basin-fill alluvium to a depth of 1,300 feet, conglomerate from 1,300 to 1960 feet, and arkose and siltstone to the total depth (Montgomery 2005). Currently the Anamax No. 1 well is open to a depth of approximately 1,885 feet.

Prior to conducting the downhole testing, a test pump was installed to a depth of approximately 560 feet bgs. A series of increasing pumping rates were conducted to evaluate the well specific capacity. At a pumping rate of approximately 3,280 gallons-per-minute (gpm) a drawdown of approximately 49 feet was measured resulting in a specific capacity of 67 gpm/foot of drawdown. Although only pumped for approximately 120 minutes at this rate, this indicated that Anamax No.1 well was a highly productive well. Based on this result it was decided to conduct the spinner-logging at a pumping rate of 2,000 gpm.

Geophysical Logging

Geophysical logging consisted of a spinner flowmeter survey. The spinner flowmeter survey is used to measure the groundwater flow rates (velocities) within a producing well. These measurements identify the more permeable zones and their relative contribution to the total flow of the production well. The flowmeter survey consisted of three logging runs, each at different line speeds. Because the spinner output is directly proportional to the fluid movement past the impeller, three different logging profiles are obtained to provide comparison of velocity profiles and increase the accuracy of flow rate calculations.

Analysis of the spinner log data indicates that at a pumping rate of 1,885 gpm, the basin-fill alluvial aquifer from the top of the perforations at 600 feet bgs to 1,300 feet bgs contributes approximately 87 percent (1,639 gpm) of the total flow. Thirteen percent (246 gpm) of the production then comes from the conglomerate. Within the alluvial aquifer, six main intervals of groundwater influx were identified, differentiated partly by hydraulic conductivity values. Two discrete water-bearing intervals were apparent within the conglomerate aquifer. The distribution of the groundwater production intervals in the Anamax No. 1 well and corresponding lithology is shown in Table 1.

TABLE 1. SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (FEET, BLS)	PERCENTAGE OF FLOW (PERCENT)	GENERALIZED GEOLOGY
601 to 750	9	Alluvium
750 to 900	43	
940 to 1,040	10	
1,040 to 1,075	12	
1,130 to 1,160	7	
1,235 to 1,260	6	
1,350 to 1,410	6	Conglomerate
1,520 to 1,760	7	

Groundwater Sampling

Following the flowmeter survey, depth-specific groundwater samples were collected in the Anamax No.1 well with a wire-line sampling tool. The samples were collected to characterize the water quality throughout the screened portion of the aquifer, and were obtained from specific depths in the well based on analysis of the spinner flowmeter log and reported geologic strata penetrated by the well. The zonal samples were collected at depths of 790, 1,000, 1,100, and 1,270 feet. A composite sample from the pump discharge was also collected. All five samples were analyzed for arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, fluoride, nitrate, nitrite, sulfate, and total dissolved solids (TDS). Results of the laboratory analysis for each sample are presented in Appendix A. Results for selected constituents are summarized in Table 2.

TABLE 2. DEPTH-SPECIFIC SAMPLING ANALYTICAL RESULTS

SAMPLE INTERVAL (feet bls)	CONSTITUENT				
	TOTAL DISSOLVED SOLIDS	SULFATE	ARSENIC	FLUORIDE	CHROMIUM
Composite	275	64.3	0.017	1.74	<0.005
790	244	61.5	0.017	1.81	<0.005
1,000	283	73.1	0.015	2.28	<0.005
1,100	282	61.1	0.014	2.19	0.006
1,270	331	88.3	0.014	1.48	0.008
MCL	500a	250a	0.010	4	0.1

All concentrations in milligrams per liter (mg/L)
bls = below land surface
MCL = maximum contaminant level (Federal Standard)
aSecondary Maximum Contaminant Level (not enforceable)
Arsenic MCL as of January 23, 2006

Similar to all constituents that were analyzed (Appendix A), concentrations of the selected constituents shown on Table 2 for each depth-specific sample and the pump discharge sample appear to be moderately consistent. TDS concentrations ranged from 331 to 244 milligrams per liter (mg/L), sulfate from approximately 61 to 88 mg/L, arsenic from 0.014 to 0.017 mg/L, fluoride from 1.48 to 2.28 mg/L and chromium from less than 0.005 to 0.008.

Aquifer Test

During the flowmeter survey and sampling activities, the well was pumped for approximately 10 hours at a constant average rate of 1,885 gallons per minute (gpm). A plot of the water level decline within the well is presented on Figure 1. Based on this data a total of 27 feet of drawdown occurred resulting in a specific capacity of 70 gpm/ft of drawdown. This value is slightly lower than the specific capacity measured the previous day at a pumping rate of over 3,200 gpm, indicating that the well is well-developed. Following the cessation of pumping, a water level recovery test was conducted to obtain an estimate of aquifer transmissivity. A semi-log plot of the aquifer test data is presented as Figure 2. Review of the Theis Recovery Plot indicates a transmissivity of approximately 227,000 gallons per day per foot (gpd/ft).

Findings

Based on the zonal sampling results, the high arsenic concentrations encountered in the Anamax No. 1 well would appear to be distributed throughout the entire portion of the alluvial and conglomerate aquifers screened. However, several conditions indicate that most likely that the zonal sampling results do not reflect ambient conditions in the local aquifer regarding vertical distribution of water quality. These include:

- The consistency of the analytical results for each constituent in all samples,
- The length of the perforated interval in the well (i.e. groundwater production from potentially multiple aquifer units and variable litholgy), and
- Historic well use (non-pumping for an extended period of time).

Recognized throughout many developed alluvial basins within the Basin and Range Physiographic Province in Arizona, an important hydrogeologic characteristic to consider that appears to prevail in the local aquifer system comprising the Anamax No. 1 well is the occurrence of a vertical hydraulic gradient. Hydraulic gradients can develop due to differences in the hydraulic conductivity of alluvial deposits together with long-term groundwater level declines from over-pumping or increases from recharge. The vertical hydraulic gradient would occur in the perforated portion of the well casing and potentially the annulus. Thus, under static conditions, water in the upper portion of the screened aquifer will migrate downward within the well casing and then, deeper in the well, horizontally into adjacent strata. The presence of

significant arsenic concentrations in the upper-most sample (790 feet bgs) combined with high percentage of flow originating from the 750 – 900 feet bgs portion of the well suggests that this interval may be a primary source of the arsenic. Further studies would be needed to more definitively address this.

Conclusions

Although relatively old and unused for a number of years, Anamax No. 1 well is a highly productive well. Based on the well production evaluation it could likely sustain a pumping rate of over 3,000 gpm with a pump setting, using current depths to water, of approximately 375 to 400 feet below ground surface. Water quality appears to be very consistent for the constituents analyzed throughout the screened portion of the Anamax No. 1 well. However, the results do not appear to be representative of local aquifer conditions due to the reasons stated above. Long-term continuous pumping of the well could result in changes in water quality as water from the upper portions of the aquifer are purged from the system and further diluted from groundwater produced throughout lower sections of the well. It is unknown if the concentration of arsenic would be significantly reduced. Historic water quality data from the Anamax No. 1 well, if available, could be an indication. Conversely, operating the well on an intermittent or seasonal basis could result in no significant changes in water quality due to the current suggested hydraulic conditions within the well.

If you have any questions please do not hesitate to contact either of the undersigned at 520-624-5744.

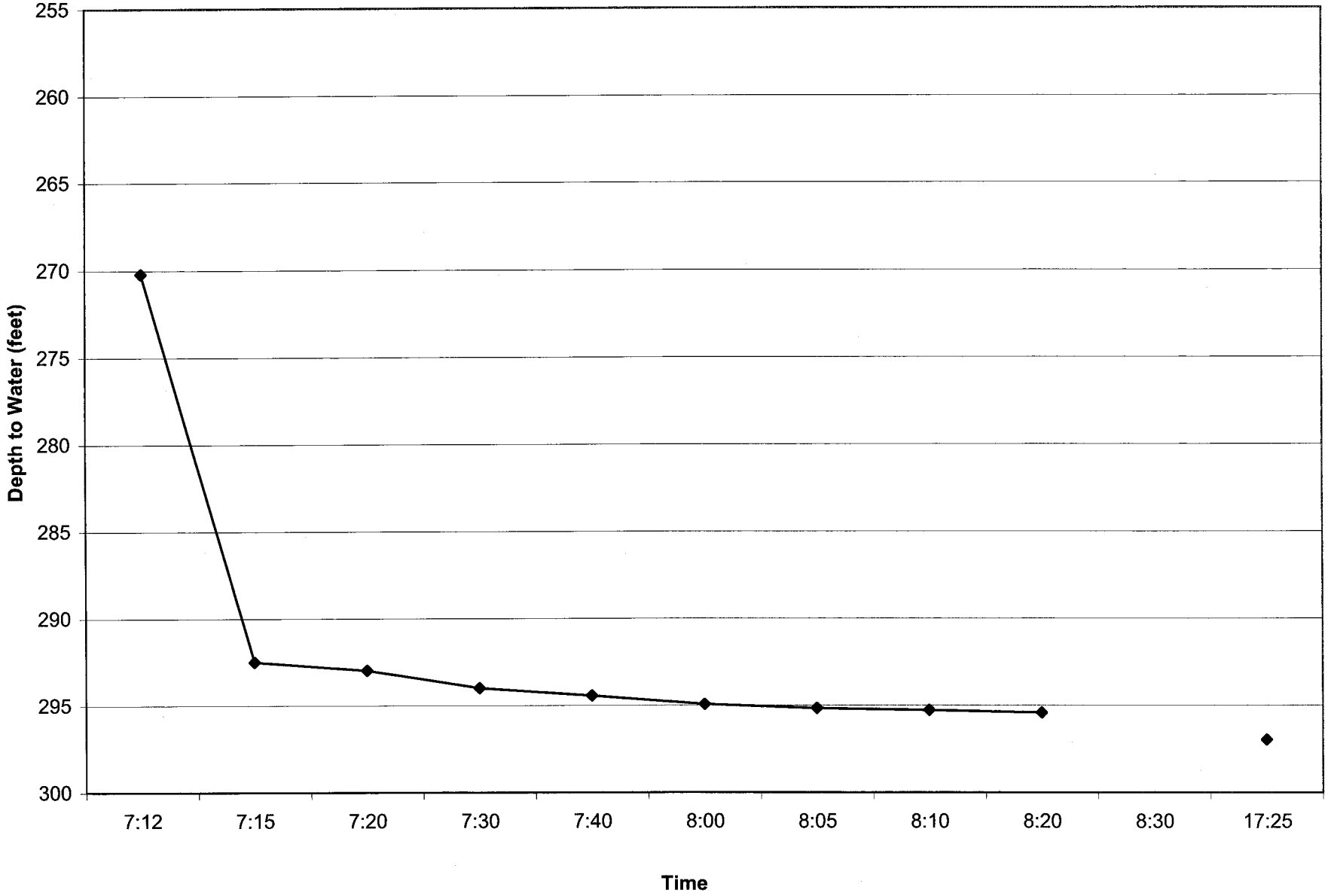
Very truly yours,

BROWN AND CALDWELL

Steve Brooks, R.G.
Supervising Hydrologist

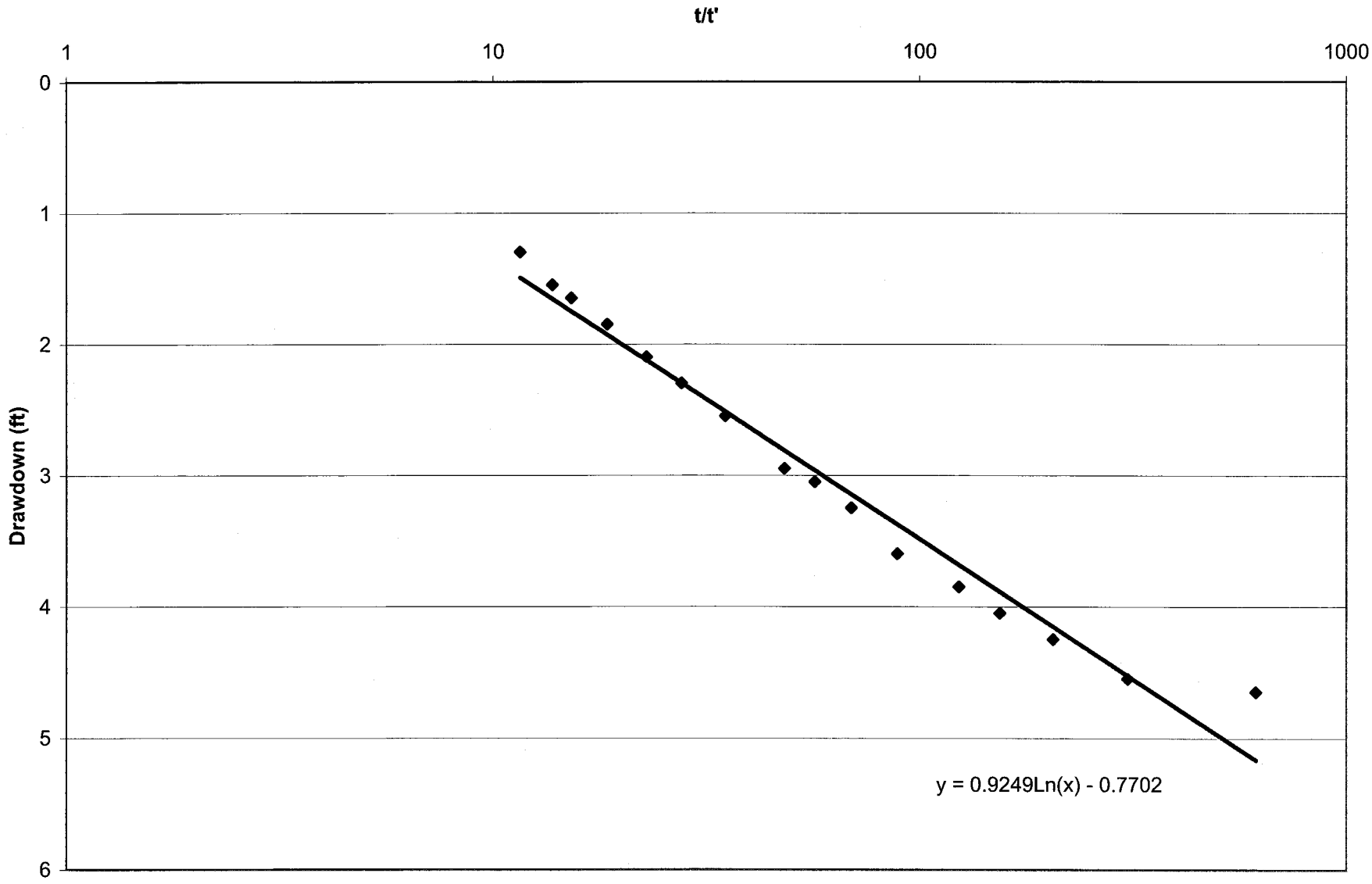
Michele Mahal
Staff Scientist II

Figure 1
Anamax #1 Well - Spinner Test Drawdown Data at Q = 1,885 gpm



P:\CommunityWtr_Green Valley\128730_AnamaxWell\DELIVERABLES\Reports\to CWCGV\Figure 1.xls

FIGURE 2
Anamax No. 1 Well - Recovery Data



P:\CommunityWtr_Green Valley\128730_AnamaxWell\DELIVERABLES\Reports\to CWCGV\Figure 2.xls

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APPENDIX Z

MODFLOW and GIS Formats Data Files (Compact Disk Only in ADWR and SWC Submitted Reports)

APPENDIX "W"

(December 5, 2007 Well Impact Study Report for Sahuarita Water Company, as prepared by Brown and Caldwell)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

WELL IMPACT STUDY REPORT FOR SAHUARITA WATER COMPANY

Prepared for

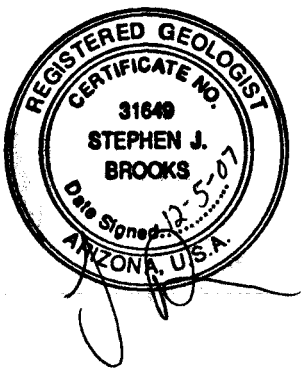
SAHUARITA WATER COMPANY,
SAHUARITA, ARIZONA

December 5, 2007

WELL IMPACT STUDY REPORT FOR SAHUARITA WATER COMPANY

SAHUARITA WATER COMPANY, SAHUARITA, ARIZONA

December 5, 2007



BROWN AND CALDWELL

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WELL IMPACT STUDY REPORT FOR SAHUARITA WATER COMPANY

EXECUTIVE SUMMARY

This report documents a well impact study conducted for the Sahuarita Water Company (SWC) to evaluate potential groundwater level impacts on neighboring wells not owned or operated by SWC from an augmentation of local groundwater development to serve potable water resources to an expanded water service area. The SWC is in the process of expanding the current limits of the Certificate of Convenience and Necessity (CC&N) water service area under the regulatory authority of the Arizona Corporation Commission (ACC). In 2006 the SWC developed about 1,260 acre-feet (AF) of groundwater to meet water demands. By 2034, the SWC has plans to develop about 11,000 AF annually to meet future potable water demands. More information on the development plans of SWC can be reviewed in the *Assured Water Supply Hydrology Report for Sahuarita Water Company* dated November 21, 2007 compiled by Brown and Caldwell.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and utilize one existing well into the future. Potential well sites were carefully selected with great emphasis in limiting water level impacts on neighboring wells not owned by SWC. To evaluate the potential water level impacts, the Arizona Department of Water Resources' (ADWR) well spacing rule R12-15-1302 *"Well Spacing Requirements - Applications to Construct New Wells or Replacement Wells in New Locations Under A.R.S. § 45-599"* was applied in the analysis.

The WINFLOW™ analytical element groundwater flow model was used to simulate two-dimensional, transient groundwater flow for the well impact study. The 10-foot drawdown radii contours that are projected to develop around each SWC well after five years of continuous pumping at the build-out production rates were calculated using the analytical groundwater model. The water-level drawdown radii contours are then compared to the locations of existing neighboring wells not owned by SWC.

The analytical model was used because a multi-well analysis is required (image well) to also simulate the projected hydrogeologic affects of shallow bedrock of the Sierrita Mountains to the west of the existing water service area. Image well theory provides a mechanism to create a "no flow" boundary at the shallow bedrock zone where the orientation of the boundary is near perpendicular to the pumping well.

Based on the well impact analyses presented, water-level drawdown impacts on neighboring wells from the augmentation of pumping of SWC wells will likely be nominal and will be in compliance with ADWR's well spacing requirements and well spacing regulations. All 10-foot drawdown radii calculated are 850 feet or less from the planned wells. No existing exempt and non-exempt wells are affected by greater than 10 feet or greater of additional water-level drawdown after 5 years of continuous pumping.

1. INTRODUCTION

This report documents a well impact study conducted for the Sahuarita Water Company (SWC) to evaluate potential groundwater level impacts on neighboring wells not owned or operated by SWC from an augmentation of local groundwater development to serve potable water resources to a proposed expanded water service area. The SWC is in the process of proposing to expand the current limits of the Certificate of Convenience and Necessity (CC&N) water service area under the regulatory authority of the Arizona Corporation Commission (ACC). The current CC&N and proposed expanded area is shown on Figure 1-1. In 2006 the SWC developed about 1,260 acre-feet (AF) of groundwater to meet water demands. By 2034, the SWC has plans to develop about 11,000 AF annually to meet future potable water demands. More information on the development plans of SWC can be reviewed in the *Assured Water Supply Hydrology Report for Sahuarita Water Company* dated November 21, 2007 compiled by Brown and Caldwell.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and utilize one existing well into the future. Potential well sites were carefully selected with great emphasis on avoiding any regulatory water level impacts on neighboring wells not owned by SWC. To evaluate the potential water level impacts, the Arizona Department of Water Resources' (ADWR) well spacing rule R12-15-1302 *"Well Spacing Requirements - Applications to Construct New Wells or Replacement Wells in New Locations Under A.R.S. § 45-599"* was applied. Relevant excerpt of Section D of the rule is stated as follows:

> "If the director determines under subsection (B)(1) of this Section that the probable impact of the withdrawals from the proposed well or wells on one or more wells of record in existence as of the date of receipt of the application will exceed 10 feet of additional drawdown after the first five years of operation of the proposed well or wells, the director shall notify the applicant in writing of the location of the wells of record and the names and addresses of the owners of the wells as shown in the Department's well registry. "

This criterion formed the basis of the well impact study. In summary the rules require that no neighboring water wells can be impacted by more than 10 feet of additional water-level drawdown from operation of each well over a 5 year period.

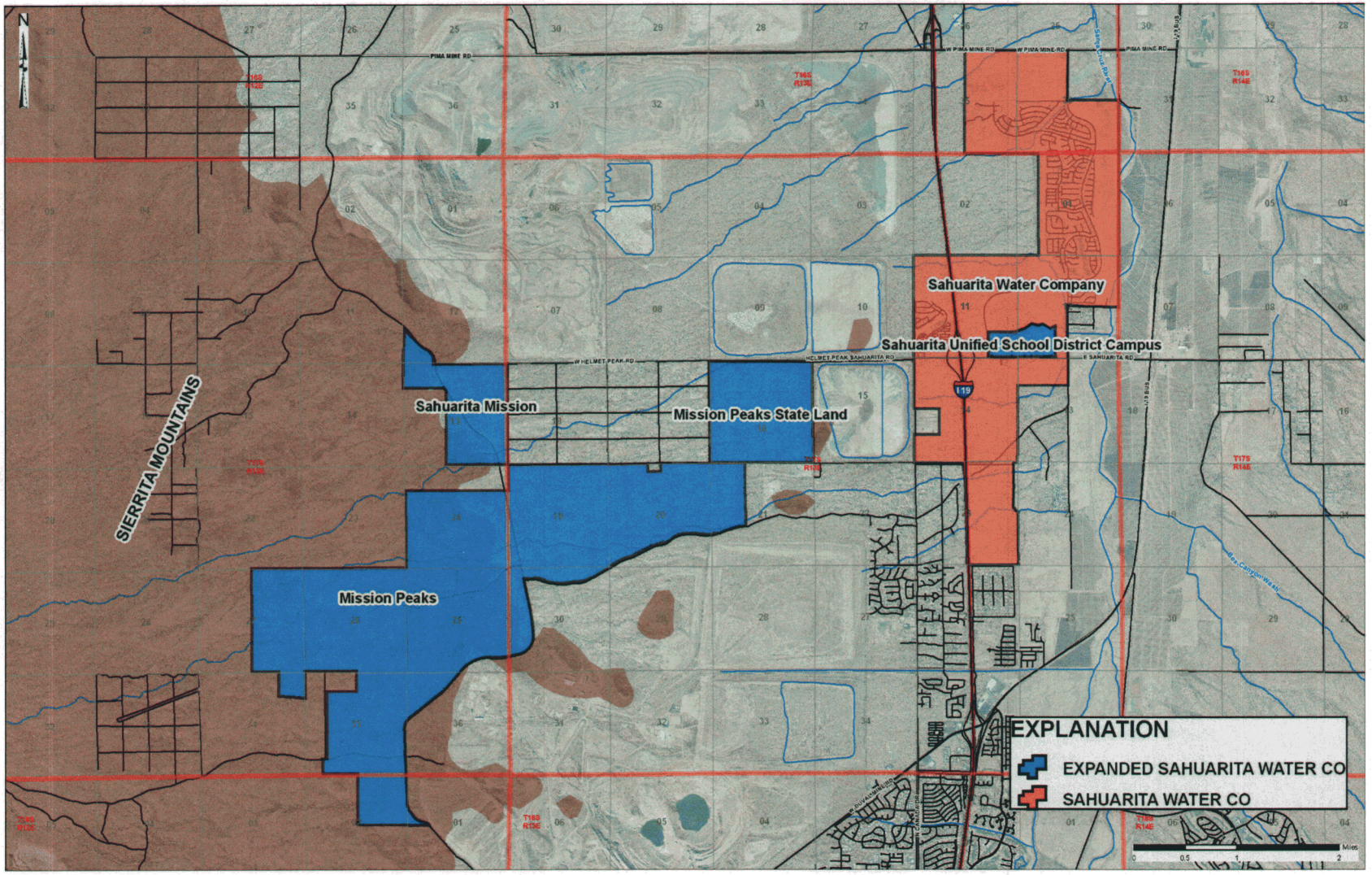

Figure 1-1 – Sahuarita Water Company's Certificate of Convenience and Necessity Current and Proposed Expanded Water Service Areas

2. CURRENT AND FUTURE GROUNDWATER DEVELOPMENT

Groundwater development from the local basinfill groundwater aquifer beneath the existing SWC's water service area will be the principal source of water to meet projected SWC water demands. The SWC, as of the date of this report, owns six wells and leases one well from the Town of Sahuarita. Information regarding these wells is included in Table 2-1 below. Groundwater is currently withdrawn from two active wells, Well Nos. 14 and 18. Well No. 14 is leased to the SWC by the Town of Sahuarita and is also used to maintain lake levels in the Sahuarita Town Lake.

Table 2-1. SAHUARITA WATER COMPANY WELLS

Well No.	ADWR Well Registration No.	Cadastral Location	Casing Diameter (inches)	Casing Materials	Well Depth (feet)	Upper Screen Depth (ft bls)	Lower Screen Depth (ft bls)	Drill Date
1	55-562962	D(17-13)11 dcd	8	Steel, Milled Slots, 12 cuts per foot, 3/16"x3" Slots	500	430	490	9/26/1997
12	55-611141	D(17-13)01 abb	24	Steel, Milled Slots, 24 rows, ¼"x3"	982	273	970	5/27/1970
14	**55-611142**	**D(17-13)01 acc**	**24**	**Steel, Milled Slots, 20 rows, ¼"x3"**	**1135**	**435**	**1135**	**10/9/1970**
17	55-611143	D(16-13)36 cbc	24	Steel, Milled Slots, 24 rows, ¼"x3"	1053	247	1030	12/20/1974
18	**55-611144**	**D(17-13)01 cdd**	**20**	**Steel, Slotted**	**905**	**424**	**890**	**4/18/1975**
19	55-611145	D(17-13)01 bac	24	Steel, Milled Slots, 24 rows, ¼"x3"	990	210	972	5/5/1981
20	55-611146	D(16-13)36 ddd	24	Steel, Milled Slots, 26 rows, ¼"x3"	975	240	975	9/22/1969

Note: Wells in bold are active wells as of the date of this report

Based on recent groundwater sampling and analysis, both wells, Well Nos. 14 and 18, produce potable groundwater. Other wells not utilized are considered to be beyond service life and plans are in place to abandon the wells. Well No. 1 has recently been converted to a monitoring well.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and phase out use of existing Well No. 14 for domestic use in 2009. Well No. 14 is leased to SWC from the Town of Sahuarita. This well will continue to be used to maintain lake levels in the Sahuarita Town Lake by applying Type 1 water rights associated with the property area. Well No. 18 will be utilized into the future but will likely be replaced on-site before the build-out year 2034.

In 2006 and 2007 Brown and Caldwell conducted pilot hole and exploratory boring analyses programs to evaluate potential future well sites for the SWC. Potential well sites were carefully selected with great emphasis on avoiding regulatory water level impacts on neighboring wells not owned by SWC. Groundwater production potential and groundwater quality were evaluated at 6 sites, and currently, as of the date of this report, evaluating 2 additional well sites. The pilot hole analysis conducted for Well Site No. 24 concluded that the well site is not viable based on groundwater quality. This analysis is documented in a report titled *Well Site No. 24 Pilot Hole Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007b). Exploratory boring analyses were conducted at 5 additional well sites, Well Site Nos. 21, 22, 23, 25, and 26. Exploratory boring analyses at Well Site Nos. 21, 23, 25 and 26 revealed favorable groundwater production potential and

groundwater quality. The exploratory boring analyses program is documented in a report titled *Well Site Nos. 21, 22, 23, 25, and 26 Exploratory Boring Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007c).

Table 2-2 tabulates water supply wells and future well sites planned to be utilized through build-out in year 2034 and beyond by SWC. Projected annual groundwater withdrawals and anticipated well capacities are indicated for each planned well. Well No. 14 will be phased out in 2009 and Well No. 18 will be utilized into the future but will likely be replaced before the build-out year 2034. Table 2-2 also indicates whether groundwater production potential and groundwater quality has been confirmed or not as of the date of this report. Confirmation is noted where a well is existing or an exploratory boring analysis has been completed verifying favorable groundwater production potential and groundwater quality for potable use. Well sites where confirmation has yet to be determined are slated for future exploratory boring analyses.

Figure 2-1 shows the location of these wells, future well sites and neighboring wells. Other wells owned by the SWC, also noted on Figure 2-1 and designated as Well Nos. 1, 12, 17, 19, and 20, will not be used as a result of age and poor conditions of the wells. Neighboring wells are registered wells compiled from ADWR well registry database (ADWR, 2007a) not owned by the SWC and location symbols denote wells as either exempt or non-exempt wells.

Table 2-2. SAHUARITA WATER COMPANY ACTIVE AND FUTURE PLANNED WATER SUPPLY WELLS

Well	Active or Future Wells	ADWR Registration No.	Cadastral Location	Current or Anticipated Pump Capacity (gpm)	Groundwater Production Potential and Groundwater Quality Confirmed?	Projected Groundwater Production at Build-out (2034) (AF/yr)
Well No. 14	Active	55-611142	D-17-13 1ACC	1,900	Yes	0
Well No. 18	Active	55-611144	D-17-13 1CDD	1,400	Yes	1,014.9
Well Site No. 17R	Future	NA	D-16-13 36CCA	1,500	No	1,087.4
Well Site No. 19R	Future	NA	D-17-13 1BDB	1,500	No	1,087.4
Well Site No. 21	Future	NA	D-17-13 1CDB	1,000	Yes	724.9
Well Site No. 23	Future	NA	D-17-13 11BAA	1,500	Yes	1,087.4
Well Site No. 24B	Future	NA	D-17-13 11CAA	1,500	No	1,087.4
Well Site No. 25	Future	NA	D-17-13 14ABA	1,500	Yes	1,087.4
Well Site No. 26	Future	NA	D-17-13 14DDC	750	Yes	543.7
Well Site No. 27	Future	NA	D-17-13 23ACC	1,500	No	1,087.4
Well Site No. 28	Future	NA	D-17-13 23DDA	1,500	No	1,087.4
Well Site No. 30	Future	NA	D-17-13 14DBA	1,500	No	1,087.4
						Total = 10,983 AF/yr

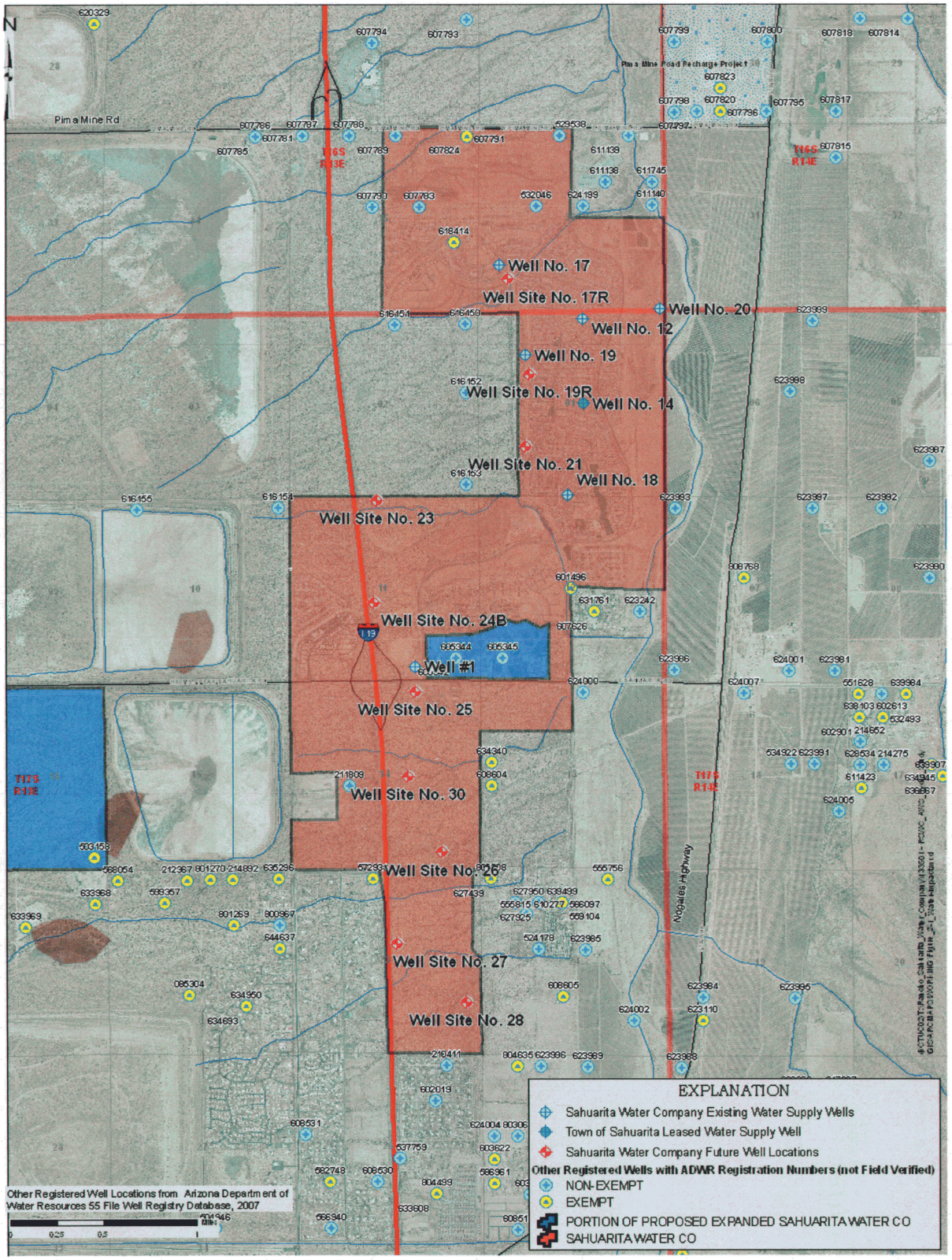

Figure 2-1 – Sahuarita Water Company's Existing and Future Planned Water Supply Well Locations, and Other Exempt and Non-Exempt Wells with ADWR Registration Numbers

3. WELL IMPACT ANALYSES

3.1 METHODOLOGY

The WINFLOW™ analytical element groundwater flow model was used to simulate two-dimensional, transient groundwater flow for the well impact analyses. The 10-foot drawdown radii contours that are projected to develop around each well after five years of continuous pumping at the build-out production rates were calculated using the analytical groundwater model. The water-level drawdown radii contours are then compared to the locations of existing neighboring wells not owned by SWC.

The analytical model was used because a multi-well analysis is required (image well) to also simulate the projected hydrogeologic effects of shallow bedrock of the Sierrita Mountains to the west of the existing water service area. Image well theory provides a mechanism to create a "no flow" boundary at the shallow bedrock zone where the orientation of the boundary is near perpendicular to the pumping well.

The steady-state module of the model simulates groundwater flow in a horizontal plane using analytical functions developed by Strack (1989). The transient module uses equations developed by Theis (1935) and by Hantush and Jacob (1955) for confined and leaky aquifers, respectively. Each module uses the principle of superposition to evaluate the effects from multiple analytical functions (wells, etc.) in a uniform, regional flow field. An image well was used to simulate the negative hydrologic boundary associated with bedrock of the nearby Sierrita Mountains. The input parameters for the model include: (1) aquifer hydraulic conductivity, (2) aquifer thickness, (3) aquifer storage coefficient, (4) pumping rate from the aquifer and (5) pumping duration.

Representative aquifer parameters are required to develop the model. These aquifer parameters were evaluated from aquifer tests recently performed on three water supply wells operated by SWC. Brown and Caldwell conducted an aquifer test and analysis on the SWC's Well No. 14 in May 2006. This aquifer test and analysis is documented in a memorandum report, "Well Spacing/Well Impact Investigation –Rancho Sahuarita Water Company's Well #21 – D-17-13 01CDB," dated December 22, 2006. In addition, Brown and Caldwell conducted aquifer test and spinner flow meter survey analyses on the SWC's Well Nos. 12 and 19 in July 2007. These tests are documented in a report *Well Nos. 12 and 19 Aquifer Test Analyses and Well Production Evaluations* dated July 16, 2007 (Brown and Caldwell, 2007a).

Transmissivity (T-values) evaluated and specific capacities measured from these aquifer tests are summarized on Table 3-1, along with pertinent information regarding the tests and wells.

Table 3-1. WELLS WITH AQUIFER TESTS

Well	ADWR Registration No.	Cadastral Location	Surface Elevation (ft amsl)	Date of Test	Duration (hr)	Static Water Level (ft bls)	Tested Rate (gpm)	Pumping Water Level (ft bls)	Measured Specific Capacity (gpm/ft)	T-Value (gpd/ft)	Analysis T	Upper Perforations (ft bls)	Lower Perforations (ft bls)
Well No. 12	55-611142	D-17-13 1ABB	2700	5/3/2007	24	252.2	536	269	32.7	65,325	Ave DD/Rec	273	970
Well No. 14	55-611144	D-17-13 1ACC	2706	5/25/2006	24	256.4	1811	331	24.3	73,300	Rec	435	1,135
Well No. 19	55-611145	D-17-13 1BAC	2726	5/10/2007	24	270.92	520	283	44.4	134,900	Ave DD/Rec	210	972

Notes: ft amsl = feet above mean sea level
hr = hour
ft bls = feet below land surface
gpm = gallons per minute
gpm/ft = gallons per minute per foot of drawdown
gpd/ft = gallons per day per foot of drawdown
DD = water-level drawdown analysis
Rec = water-level recovery analysis

Effective hydraulic conductivity (K-value) of the local aquifer is required for the model and was evaluated by the following relationship between transmissity and saturated thickness of the well under pumping conditions:

$$T = Kb$$

where

T = transmissivity of the aquifer perforated by the well;

b = saturated thickness of the aquifer perforated by the well under pumping conditions; and

K = effective hydraulic conductivity of the aquifer perforated by the well.

Table 3-2 below summaries the effective K-values calculated for the three wells that were tested and presents the average value used for all well impact analyses.

Table 3-2. EFFECTIVE HYDRAULIC CONDUCTIVITY (K-VALUE) CALCULATIONS

Well	Aquifer Thickness (b) (ft)[1]	T-Value (gpd/ft)	Effective K-Value (ft/d)
Well No. 12	697	65,325	12.5
Well No. 14	700	73,300	14.0
Well No. 19	689	134,900	26.2
		Average Effective K-Value =	17.6

Notes: 1 – Based on saturation of perforated interval of well under pumping conditions during aquifer test.
ft = feet
gpd/ft = gallons per day per foot of drawdown
ft/d = feet per day

Based on the average effective K-value and projected screen interval designs of the new wells that provide the saturated thickness of the local aquifer, estimated T-values for each well were calculated. Projected screen intervals of the wells are based in exploratory boring analyses performed at well sites and neighboring well sites (Brown and Caldwell, 2007c). The estimated T-values are tabulated in Table 3-3 below.

Table 3-3. ESTIMATED TRANSMISSIVITY VALUES FOR SAHUARITA WATER COMPANY FUTURE PLANNED WATER SUPPLY WELLS

Well	Screen Top Depth (ft/bls)	Screen Bottom Depth (ft bls)	Pump Gallary Top (ft bls)	Pump Gallary Bottom (ft bls)	Satuared Screen Thickness (ft)	Estimated T-Value of Sat. Screen Interval (gpd/ft)
Well No. 18	424	890	0	0	466	61,237
Well Site No. 17R	450	1050	600	630	570	74,903
Well Site No. 19R	450	1050	600	630	570	74,903
Well Site No. 21	440	760	590	620	290	38,109
Well Site No. 23	450	1050	570	600	570	74,903
Well Site No. 24B	450	1050	780	810	570	74,903
Well Site No. 25	500	980	640	670	450	59,134
Well Site No. 26	700	980	800	830	250	32,852
Well Site No. 27	500	980	600	630	450	59,134
Well Site No. 28	500	980	600	630	450	59,134
Well Site No. 30	500	980	600	630	450	59,134

Notes: ft bls = feet below land surface
gpd/ft = gallons per day per foot of drawdown

Specific yield (or aquifer storage coefficient) of the local aquifer was estimated based on regional groundwater modeling investigations of the area (Mason and Bota, 2006 and Brown and Caldwell, 2007d). The models include specific yield values for Layer 2 of the models associated with the Fort Lowell formation and upper Tinaja beds, and Layer 3 of the models associated with the lower Tinaja beds and Pantano formation. Value for the Layer 2 was assigned at 0.16. Value for Layer 3 was assigned 0.08. Since the proposed well designs will produce groundwater mostly from Layer 3, but not the Pantano formation, a conservative estimate 0.10 was adopted. More detailed information regarding the geologic formations that makeup the local aquifer can be reviewed in the *Assured Water Supply Hydrology Report for Sahuarita Water Company* dated November 21, 2007 compiled by Brown and Caldwell.

3.2 RESULTS

The WINFLOW™ analytical element groundwater flow model results of projected 10-foot water-level drawdown radii contour distances are tabulated in Table 3-4 and illustrated on Figure 3-1, along with exempt and non-exempt wells not operated by SWC. Model input and output files for each analysis of each planned SWC well are included as Appendix A. Table 3-4 also indicates the approximate boundary location orientation used to define the extent of shallow bedrock of the Sierrita Mountains to the west. These boundary orientations are defined as Nos. 1, 2 and 3 and are illustrated on Figure 3-1. As noted previously, a near perpendicular orientation is desired to define the boundary relative to the pumping well locations. An

image well pumping at a rate equal of the pumping well was placed in the model at a "mirror" image location west of the boundary to effectively create a "no-flow" boundary.

Table 3-4. ESTIMATED 10-FOOT WATER-LEVEL DRAWDOWN RADII AFTER 5 YEARS OF CONTINUOUS PUMPING AT BUILD-OUT PRODUCTION RATE FOR SAHUARITA WATER COMPANY FUTURE PLANNED WATER SUPPLY WELLS

Well	Sierrita Mtn Boundary No.	Projected 10-Foot Water-Level Drawdown Radius Distance From Well After 5 years of Continuous Pumping at Build-Out Production Rate (ft)
Well No. 18	1	~375
Well Site No. 17R	1	~175
Well Site No. 19R	1	~175
Well Site No. 21	1	~400
Well Site No. 23	1	~350
Well Site No. 24B	2	~400
Well Site No. 25	2	~650
Well Site No. 26	3	~200
Well Site No. 27	3	~650
Well Site No. 28	3	~500
Well Site No. 30	2	~850

Notes: ft = feet
gpd/ft = gallons per day per foot of drawdown

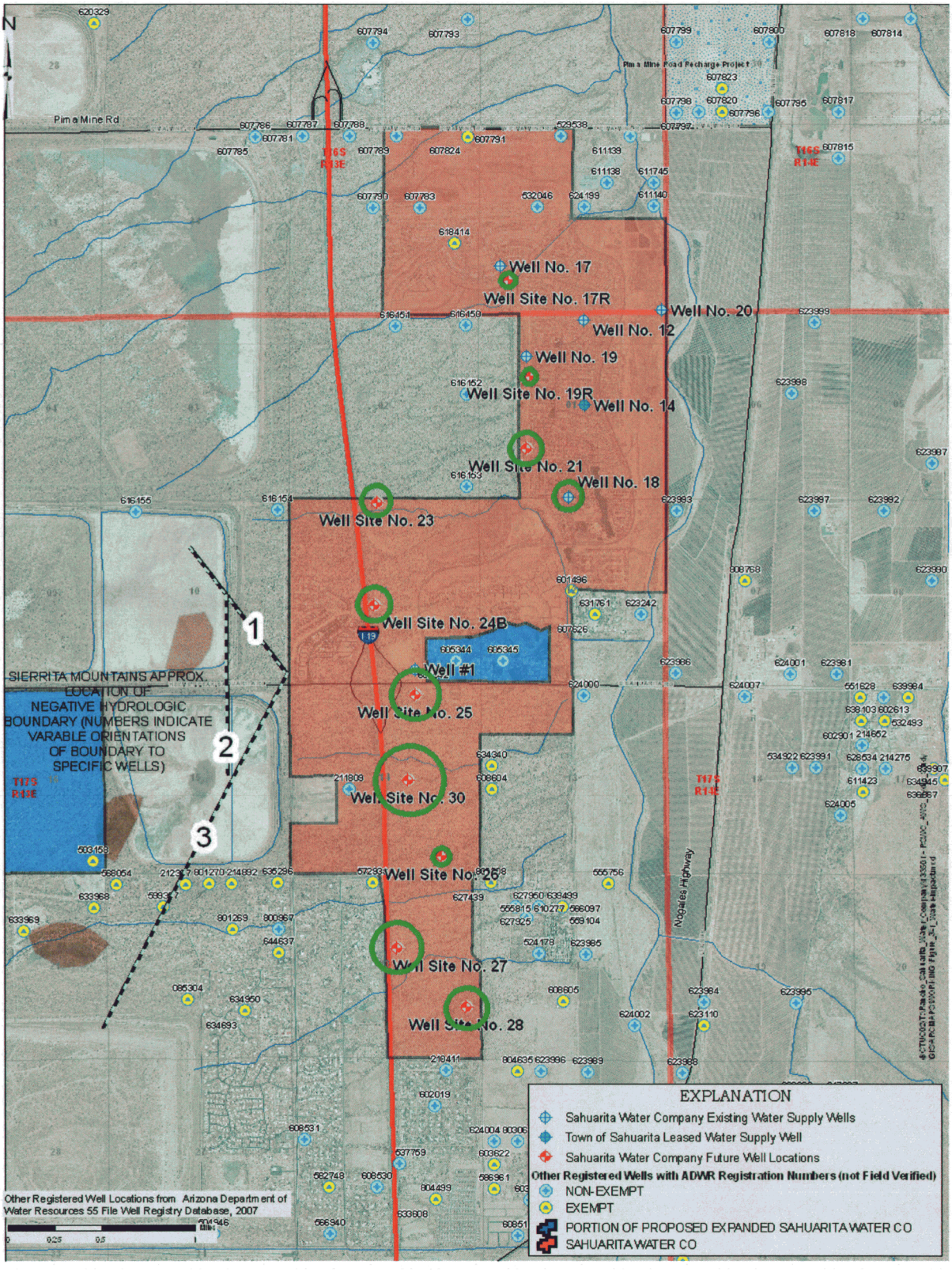

Figure 3-1 – Approximate Five Year, 10—Foot Water-Level Drawdown Impacts of Sahuarita Water Company Wells Pumping Individually at 2034 Build-Out Discharge Rates

4. CONCLUSIONS

Based on the well impact analyses presented, water-level drawdown impacts on neighboring wells from the augmentation of pumping of SWC wells will likely be nominal and will be in compliance with ADWR's well spacing requirements and well spacing regulations. All 10-foot drawdown radii calculated are 850 feet or less from the planned wells as indicated on Table 3-4. No existing exempt and non-exempt wells are affected by greater than 10 feet of additional water-level drawdown after 5 years of continuous pumping as illustrated on Figure 3-1.

5. LIMITATIONS

Report Limitations

This document was prepared solely for Sahuarita Water Company in accordance with professional standards at the time the services were performed and in accordance with the contract between Sahuarita Water Company and Brown and Caldwell, dated February 12, 2007. This document is governed by the specific scope of work authorized for Sahuarita Water Company; it is not intended to be relied upon by any other party, except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Sahuarita Water Company and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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Brown and Caldwell, Well Site No. 24 Pilot Hole Analyses Report, September 6, 2007b.

Brown and Caldwell, Well Site Nos. 21, 22, 23, 25 and 26 Exploratory Boring Analyses Report, September 6, 2007c.

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APPENDIX A

WINFLOW™ Groundwater Model Output

Well Impact Analysis - Well No. 18

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 09:14:59.00

Input File: SWC18.WFL
Map File :

==========
========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.445348
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1649772.000000 y: 11606167.000000
Radius = 0.750000
Pumping Rate = 121121.000000
Head at Well Radius = -23.542681
Well #2
Center of Well -- x: 1635652.000000 y: 11595127.000000
Radius = 0.750000
Pumping Rate = 121121.000000
Head at Well Radius = -23.542843

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -466.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1643873.500000
Minimum Y Coordinate = 11601414.530000

Maximum X Coordinate = 1656837.100000
Maximum Y Coordinate = 11609935.310000

Minimum Head = -13.839690
Maximum Head = -2.282738

Well No. 17R

Well No. 17R Well Impact Analysis

Image Well

==========
========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

==========
========
Date: 10/29/107
Time: 09:38:35.00

Input File: SWC17R.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -2.617927
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1648076.000000 y: 11612302.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.673759
Well #2
Center of Well -- x: 1630107.000000 y: 11598253.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.673853

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

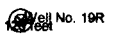
Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1646880.630000
Minimum Y Coordinate = 11610596.830000

Maximum X Coordinate = 1650501.760000
Maximum Y Coordinate = 11613071.270000

Minimum Head = -14.532557
Maximum Head = -4.304557

Well No. 19R Well Impact Analysis



⊠Image Well

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

==========
========
Date: 10/29/107
Time: 09:41:06.00

Input File: SWC19R.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.102571
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1648693.000000 y: 11609592.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.792963
Well #2
Center of Well -- x: 1632588.000000 y: 11597000.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.793083

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

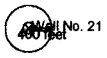
Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1647282.980000
Minimum Y Coordinate = 11608504.620000

Maximum X Coordinate = 1650723.050000
Maximum Y Coordinate = 11610757.770000

Minimum Head = -14.997571
Maximum Head = -4.831864

Well No. 21 Well Impact Analysis



⊗Image Well

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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========
Date: 10/29/107
Time: 09:43:34.00

Input File: SWC21.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.131058
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1648594.000000 y: 11607541.000000
Radius = 0.750000
Pumping Rate = 86511.000000
Head at Well Radius = -26.067978
Well #2
Center of Well -- x: 1634602.000000 y: 11596601.000000
Radius = 0.750000
Pumping Rate = 86511.000000
Head at Well Radius = -26.068115

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
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Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -290.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1647624.970000
Minimum Y Coordinate = 11606271.600000

Maximum X Coordinate = 1650421.290000
Maximum Y Coordinate = 11608544.860000

Minimum Head = -18.631055
Maximum Head = -5.405009

Well No. 23 Well Impact Analysis

Image Well

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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========
Date: 10/29/107
Time: 09:45:41.00

Input File: SWC23.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.145582
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1644385.000000 y: 11606013.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.029911
Well #2
Center of Well -- x: 1637101.000000 y: 11600318.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.030329

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1639398.480000
Minimum Y Coordinate = 11602412.560000

Maximum X Coordinate = 1648477.300000
Maximum Y Coordinate = 11609044.600000

Minimum Head = -14.249449
Maximum Head = -3.864223

Well No. 24B Well Impact Analysis

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 09:57:11.00

Input File: SWC24B.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1640500.375000 y1: 11603535.000000
x2: 1640500.000000 y2: 11598040.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.296631
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1644305.000000 y: 11603102.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.393927
Well #2
Center of Well -- x: 1636695.000000 y: 11603103.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.394300

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1642776.690000
Minimum Y Coordinate = 11601503.780000

Maximum X Coordinate = 1646438.050000
Maximum Y Coordinate = 11604662.210000

Minimum Head = -16.368509
Maximum Head = -5.801896

Well No. 25 Well Impact Analysis

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 09:59:52.00

Input File: SWC25.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1640500.375000 y1: 11603535.000000
x2: 1640500.000000 y2: 11598040.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.808351
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1645484.000000 y: 11600563.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.159061
Well #2
Center of Well -- x: 1635516.000000 y: 11600563.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.159391

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1644225.140000
Minimum Y Coordinate = 11599230.520000

Maximum X Coordinate = 1647464.030000
Maximum Y Coordinate = 11601664.720000

Minimum Head = -19.595329
Maximum Head = -6.646089

Well No. 26 Well Impact Analysis

⊗mage Well

Well No. 26
200 feet

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========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 10:15:11.00

Input File: SWC26.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1642206.125000 y1: 11601294.000000
x2: 1637018.875000 y2: 11591314.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.644881
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1646202.000000 y: 11596015.000000
Radius = 0.750000
Pumping Rate = 64886.000000
Head at Well Radius = -22.912327
Well #2
Center of Well -- x: 1635590.000000 y: 11601531.000000
Radius = 0.750000
Pumping Rate = 64886.000000
Head at Well Radius = -22.912407

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -250.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

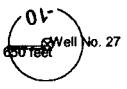
Minimum X Coordinate = 1644667.720000
Minimum Y Coordinate = 11593839.060000

Maximum X Coordinate = 1648610.720000
Maximum Y Coordinate = 11597621.130000

Minimum Head = -15.557647
Maximum Head = -3.799701

Well No. 27 Well Impact Analysis

⊠Image Well



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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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========
Date: 10/29/107
Time: 10:18:13.00

Input File: SWC27.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1642206.125000 y1: 11601294.000000
x2: 1637018.875000 y2: 11591314.000000
Discharge per length = 0.000000
Head in Center of Linesink = -5.834194
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1644956.000000 y: 11593414.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.741333
Well #2
Center of Well -- x: 1634177.000000 y: 11599016.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.741440

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1643510.970000
Minimum Y Coordinate = 11592098.910000

Maximum X Coordinate = 1646850.450000
Maximum Y Coordinate = 11594714.170000

Minimum Head = -21.633819
Maximum Head = -6.381379

Well No. 28 Well Impact Analysis

⊗Image Well

500 feet

Well No. 28

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========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

==========
========
Date: 10/29/107
Time: 10:26:11.00

Input File: SWC28.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1642206.125000 y1: 11601294.000000
x2: 1637018.875000 y2: 11591314.000000
Discharge per length = 0.000000
Head in Center of Linesink = -4.185965
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1646898.000000 y: 11591753.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.119194
Well #2
Center of Well -- x: 1631702.000000 y: 11599651.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.119253

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1645220.940000
Minimum Y Coordinate = 11590046.940000

Maximum X Coordinate = 1649445.590000
Maximum Y Coordinate = 11593627.830000

Minimum Head = -17.903053
Maximum Head = -5.122971

Well No. 30 Well Impact Analysis

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========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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========
Date: 10/29/107
Time: 10:29:30.00

Input File: SWC30.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1640500.375000 y1: 11603535.000000
x2: 1640500.000000 y2: 11598040.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.379215
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1645264.000000 y: 11598164.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.258942
Well #2
Center of Well -- x: 1635736.000000 y: 11598165.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.259293

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1643913.310000
Minimum Y Coordinate = 11596746.030000

Maximum X Coordinate = 1647313.150000
Maximum Y Coordinate = 11599481.990000

Minimum Head = -19.300460
Maximum Head = -6.596577

APPENDIX "X"

(Curtailment Plan Tariff)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-____

WILLIAM A. MUNDELL
CHAIRMAN
JIM IRVIN
COMMISSIONER
MARC SPITZER
COMMISSIONER

BRIAN C. McNEIL
EXECUTIVE SECRETARY

ARIZONA CORPORATION COMMISSION

March 10, 2003

Ms. Diane Marie McKenzie
Rancho Sahuarita Water Company
6339 East Speedway, Suite 102
Tucson, Arizona 85710

RE: RANCHO SAHUARITA WATER COMPANY
DOCKET NO. W-03718A-02-0821
DECISION NO. 65464

Dear Ms. McKenzie:

Enclosed is a stamped copy of the tariffs that were approved pursuant to Decision No. 65464, with an effective date of December 19, 2002.

If you have questions regarding the filing of these tariffs, please contact me at (602) 542-4251.

Sincerely,

Lori H. Miller
Programs & Projects Specialist II
Utilities Division

/lhm

Enclosures

ORIGINAL

TARIFF SCHEDULE

Utility: Rancho Sahuarita Water Co. LLC
Docket No.: _____
Phone No.: _____

Tariff Sheet No.: 1 of 3
Decision No.: _____
Effective: 12-19-02

CURTAILMENT PLAN FOR: Rancho Sahuarita Water Co. LLC

ADEQ Public Water System Number: 12312

Rancho Sahuarita Water Co. LLC ("Company"), is authorized to curtail water service to all customers within its certificated area under the terms and conditions listed in this tariff.

This curtailment plan shall become part of the Arizona Department of Environmental Quality Emergency Operations Plan for the Company.

The Company shall notify its customers of this new tariff as part of its next regularly scheduled billing after the effective date of the tariff or no later than sixty (60) days after the effective date of the tariff.

The Company shall provide a copy of the curtailment tariff to any customer, upon request.

Stage 1 Exists When:

Company is able to maintain water storage in the system at 100 percent of capacity and there are no known problems with its well production or water storage in the system.

Restrictions: Under Stage 1, Company is deemed to be operating normally and no curtailment is necessary.

Notice Requirements: Under Stage 1, no notice is necessary.

Stage 2 Exists When:

a. Company's water storage or well production has been less than 80 percent of capacity for at least 48 consecutive hours, and

b. Company has identified issues such as a steadily declining water table, increased draw down threatening pump operations, or poor water production, creating a reasonable belief the Company will be unable to meet anticipated water demand on a sustained basis.

Restrictions: Under Stage 2, the Company may request the customers to voluntarily employ water conservation measures to reduce water consumption by approximately 50 percent. Outside watering should be limited to essential water, dividing outside watering on some uniform basis (such as even and odd days) and eliminating outside watering on weekends and holidays.

APPROVED FOR FILING
DECISION #: 65464
REVISED: September 18, 2002

ORIGINAL

TARIFF SCHEDULE

Utility: Rancho Sahuarita Water Co, LLC Tariff Sheet No.: 2 of 3
Docket No.: _____ Decision No.: _____
Phone No.: _____ Effective: 12-19-02

Notice Requirements: Under Stage 2, the Company is required to notify customers by delivering written notice door to door at each service address, or by United States first class mail to the billing address or, at the Company's option, both. Such notice shall notify the customers of the general nature of the problem and the need to conserve water.

Stage 3 Exists When:

a. Company's total water storage or well production has been less than 50 percent of capacity for at least 24 consecutive hours, and

b. Company has identified issues such as a steadily declining water table, increased draw down threatening pump operations, or poor water production, creating a reasonable belief the Company will be unable to meet anticipated water demand on a sustained basis.

Restrictions: Under Stage 3, Company shall request the customers to voluntarily employ water conservation measures to reduce daily consumption by approximately 50 percent. All outside watering should be eliminated, except livestock, and indoor water conservation techniques should be employed whenever possible.

Notice Requirements:

1. Company is required to notify customers by delivering written notice to each service address, or by United States first class mail to the billing address or, at the Company's option, both. Such Notice shall notify the customers of the general nature of the problem and the need to conserve water.

2. Beginning with Stage 3, Company shall post at least 8 signs showing the curtailment stage. Signs shall be posted at noticeable locations, like at the well sites and at the entrance to major subdivisions served by the Company.

3. Company shall notify the Consumer Services Section of the Utilities Division of the Corporation Commission at least 12 hours prior to entering stage 3.

Once Stage 3 has been reached, the Company must begin to augment the supply of water by either hauling or through an emergency interconnect with an approved water supply in an attempt to maintain the curtailment at a level no higher than Stage 3 until a permanent solution has been implemented.

Stage 4 Exists When:

a. Company's total water storage or well production has been less than 25 percent of capacity for at least 12 consecutive hours, and

APPROVED FOR FILING
DECISION #: 65464
REVISED: September 18, 2002

ORIGINAL

TARIFF SCHEDULE

Utility: Rancho Sahuarita Water Co., LLC
Docket No.: _____
Phone No.: _____

Tariff Sheet No.: 3 of 3
Decision No.: _____
Effective: 12.19.02

b. Company has identified issues such as a steadily declining water table, increased draw down threatening pump operations, or poor water production, creating a reasonable belief the Company will be unable to meet anticipated water demand on a sustained basis.

Restrictions: Under Stage 4, Company shall inform the customers of a **mandatory** restriction to employ water conservation measures to reduce daily consumption. Failure to comply will result in customer disconnection. The following uses of water shall be prohibited:

- Irrigation of outdoor lawns, trees, shrubs, or any plant life is prohibited
- Washing of any vehicle is prohibited
- The use of water for dust control or any outdoor cleaning uses is prohibited
- The use of drip or misting systems of any kind is prohibited
- The filling of any swimming pool, spas, fountains or ornamental pools is prohibited
- Restaurant patrons shall be served water only upon request
- Any other water intensive activity is prohibited

Notice Requirements:

1. Company is required to notify customers by delivering written notice to each service address, or by United States first class mail to the billing address or, at the Company's option, both. Such notice shall notify the customers of the general nature of the problem and the need to conserve water.

2. Company shall post at least 25 signs showing curtailment stage. Signs shall be posted at noticeable locations, like at the well sites and at the entrance to major subdivisions served by the Company.

3. Company shall notify the Consumer Services Section of the Utilities Division of the Corporation Commission at least 12 hours prior to entering stage 4.

Customers who fail to comply with the above restrictions will be given a written notice to end all outdoor use. Failure to comply within two (2) working days of receipt of the notice will result in temporary loss of service until an agreement can be made to end unauthorized use of outdoor water. To restore service, the customer shall be required to pay all authorized reconnection fees.

If a customer believes he/she has been disconnected in error, the customer may contact the Commission's Consumer Services Section at 1-800-222-7000 to initiate an investigation. Once Stage 4 has been reached, the Company must augment the supply of water by hauling or through an emergency interconnect from an approved supply or must otherwise provide emergency drinking water for its customers until a permanent solution has been implemented.

APPROVED FOR FILING
DECISION #: 65464

EXHIBIT A-2

(April 30, 2008 Amendments to Application)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008

BEFORE THE ARIZONA CORPORATION COMMISSION

RECEIVED

2008 MAY -2 A 11: 37

AZ CORP COMMISSION
DOCKET CONTROL

COMMISSIONERS

MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
KRISTIN K. MAYES
GARY PIERCE

IN THE MATTER OF THE APPLICATION OF SAHUARITA WATER COMPANY, L.L.C. FOR AN EXTENSION OF ITS EXISTING CERTIFICATE OF CONVENIENCE AND NECESSITY IN ORDER TO PROVIDE WATER SERVICE TO AND WITHIN INCORPORATED AND UNINCORPORATED AREAS IN PIMA COUNTY, ARIZONA.	DOCKET NO. W-03718A-07-0687 AMENDMENTS TO APPLICATION

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

Sahuarita Water Company, L.L.C. ("Sahuarita Water"), by and through its undersigned attorney, submits the following Amendments To Application ("Amendments") to the Application which was filed with the Commission in the above-captioned and above-docketed proceeding on December 14, 2007. For convenience in reference, the Amendments will identify the section, page number and line numbers to which the Amendments pertain.

The language appearing at Section III, page 5, line 17 – page 6, line 5 of the Application should be deleted. Subsequent to the filing of it's original Application on December 14, 2007, it was brought to the attention of Sahuarita Water that the Sahuarita Unified School District ("SUSD") facilities which were discussed in the original Application are located within the boundaries of Sahuarita Water's existing CC&N. Accordingly, Sahuarita Water does not require a CC&N extension in order to provide water service to said SUSD facilities, and a reference to the SUSD acreage in the Application is unnecessary. In that regard, Appendices "N," "O," "P" and "Q" to the Application should also be deleted from those documents which are to be considered by the Commission in connection with this matter, inasmuch as they specifically and only relate to SUSD. In addition, and with reference to the introductory paragraph in the

Application, the words "incorporated and" as they appear on page 1, line 17 should be deleted. Finally, and with reference to Section III, page 6, line 9 of the Application, the reference to the acronym "SUSD" should also be deleted and the word "and" which precedes "SUSD" should be relocated to precede the acronym "ASLD."

In Section XII, page 14, lines 6 – 7 of the Application, the following language should be deleted:

> "With the exception of the 112 acre SUSD acreage, which is located within the municipal boundaries of the Town of Sahuarita";

and the remainder of the sentence should begin with the word "All."

All of the language in Section XIII, page 14, lines 14 – 19 should be deleted, and the following language should be substituted in its place:

> "WHEREFORE, and based upon the discussion set forth in the preceding sections of this Application and the information contained in Appendices "A" through "L" and "R" through "X" hereto, Sahuarita Water respectfully requests that the Commission issue an Opinion and Order (i) transferring the CC&N currently held in the name of Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water, and (ii) granting Sahuarita Water an extension to the existing CC&N thereby authorizing Sahuarita Water to provide water service to and within the area(s) legally described and graphically depicted in Appendices "C," "G," "K" and "R" hereto, respectively."

Dated this 30th day of April 2008.

Respectfully submitted,

Lawrence V. Robertson, Jr.
Attorney for Sahuarita Water Company, L.L.C.

The original and thirteen (13) copies of the foregoing Amendments To Application have been mailed this same date with:

Docket Control
Arizona Corporation Commission

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

1200 West Washington
Phoenix, Arizona 85007

A copy of the foregoing Amendments To Application will also be sent to:

Lyn A. Farmer
Chief Administrative Law Judge
Hearing Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Christopher Kempley, Chief Counsel
Legal Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Ernest Johnson, Director
Utilities Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

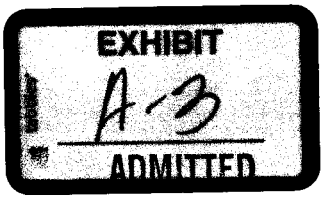
Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW
P.O. Box 1448
Tubac, Arizona 85646
(520) 398-0411

EXHIBIT A-3

(ACC Certificate of Good Standing)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



STATE OF ARIZONA

Office of the

CORPORATION COMMISSION

CERTIFICATE OF GOOD STANDING

To all to whom these presents shall come, greeting:

I, Brian C. McNeil, Executive Director of the Arizona Corporation Commission, do hereby certify that

****SAHUARITA WATER COMPANY, L.L.C.****

a domestic limited liability company organized under the laws of the State of Arizona, did organize on the 30th day of December 1996.

I further certify that according to the records of the Arizona Corporation Commission, as of the date set forth hereunder, the said limited liability company is not administratively dissolved for failure to comply with the provisions of A.R.S. section 29-601 et seq., the Arizona Limited Liability Company Act; and that the said limited liability company has not filed Articles of Termination as of the date of this certificate.

This certificate relates only to the legal existence of the above named entity as of the date issued. This certificate is not to be construed as an endorsement, recommendation, or notice of approval of the entity's condition or business activities and practices.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the Arizona Corporation Commission. Done at Phoenix, the Capital, this 5th Day of August, 2008, A. D.

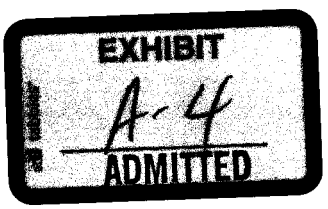
Executive Director

Order Number: 258612

EXHIBIT A-4

(Requests for Water Service from Mission Peaks 4000, L.L.C., Sahuarita Mission Partners and Arizona State Land Department, and SWC Responses)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



Mission Peaks 4000 – Sahuarita Water Company Correspondence

MISSION PEAKS 4000, LLC
901 North Green Valley Parkway, Suite 190
Henderson, NV 89074
(702) 458-8855

November 29, 2007

Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Re: Request for Water Service for Mission Peaks Master Planned Community

Dear Mr. Seamans:

Mission Peaks 4000, L.L.C. ("Mission Peaks 4000") hereby formally requests that Sahuarita Water Company, L.L.C. ("Sahuarita Water") undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to and within approximately 4,217 acres of land which Mission Peaks 4000 owns in an unincorporated area of Pima County, Arizona, northwest of the Town of Sahuarita. Attached to this letter as Appendix "A" are legal descriptions of the acreage in question.

Mission Peaks 4000 intends to cause or facilitate the development of a master-planned community on its aforesaid acreage, which may be known as the Mission Peaks Master Planned Community ("Mission Peaks"). As currently contemplated, Mission Peaks will consist of approximately (i) 11,123 single-family units, (ii) 2,371 active-adult units, (iii) 1,506 multi-family units, and (iv) an additional 1.1 million square feet of non-residential use, which will include commercial development, recreation centers, places of worship, schools and a police and fire station. In that regard, and as a result of previous discussions we have had with you upon this subject, it is our understanding that the projected water system demands associated with the Mission Peaks project have been included in a Water System Master Plan that WestLand Resources, Inc. has recently prepared for Sahuarita Water.

Please advise us in writing if Sahuarita Water is interested in becoming the lawfully authorized provider of water service to Mission Peaks. In that regard, you may use this request for water service in connection with any approvals Sahuarita Water must obtain from regulatory or permitting agencies or entities.

Sincerely,

Mathew Lawson
Vice President of Community Development
Mission Peaks 4000, L.L.C.

Sahuarita Water Company

November 29, 2007

Matt Lawson, Vice President Community Development
Mission Peaks 4000, L.L.C.
901 N. Green Valley Parkway, Suite 190
Henderson, Nevada 89074

Re: Request For Water Service For
Mission Peaks Master Planned Community
("Mission Peaks")

Dear Mr. Lawson:

This letter will acknowledge Sahuarita Water Company, L.L.C.'s ("Sahuarita Water") receipt of your November 29, 2007 letter requesting that Sahuarita Water undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to Mission Peaks which Mission Peaks 4000, L.L.C. ("Mission Peaks 4000") contemplates developing.

Sahuarita Water is interested in becoming the lawfully authorized provider of water service to Mission Peaks, and is willing and able to do so, subject to prior receipt of the necessary approvals and authorizations from governmental entities with jurisdiction over Sahuarita Water's water provider operations. These will include the receipt of the necessary certificate of convenience and necessity from the Arizona Corporation Commission ("ACC"), and ACC approval of such line extension agreements and off-site facilities agreements as Sahuarita Water may find to be necessary.

In that regard, as a condition to Sahuarita Water's willingness to proceed with such actions as may be necessary to obtain the requisite approvals and authorizations, Sahuarita Water will require that Mission Peaks 4000 reimburse Sahuarita Water for any expenses Sahuarita Water may incur in connection with such efforts. Sahuarita Water believes that the cost of such activities should not be borne by the ratepayers of its existing certificated service area.

If the foregoing condition is acceptable to Mission Peaks 4000, please so advise me in writing and Sahuarita Water will promptly undertake to obtain the approvals and authorizations necessary to enable it to be the lawful water provider to the Mission Peaks.

Sincerely,

Sahuarita Water Company, L.L.C.

By: _____
Mark J. Seamans, General Manager

Field Office: c/o Rancho Resort, 15900 S. Rancho Resort Blvd., P.O. Box 1520, Sahuarita, AZ 85629-0530
Ph. (520) 399-1105 Fax (520) 399-1095

MISSION PEAKS 4000, LLC
901 North Green Valley Parkway, Suite 190
Henderson, NV 89074
(702) 458-8855

November 29, 2007

Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

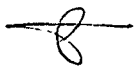
Re: Request for Water Service for Mission Peaks Master Planned Community

Dear Mr. Seamans:

The condition outlined in your letter of November 29, 2007 to me is acceptable to Mission Peaks 4000, L.L.C. ("Mission Peaks 4000"). Accordingly, please proceed with all actions necessary to enable Sahuarita Water Company, L.L.C. ("Sahuarita Water") to become the lawful water provider to Mission Peaks.

In that regard, please provide me with a copy of all documents filed with such governmental entities from whom the necessary approvals or authorizations are requested by Sahuarita Water; and, please provide me with periodic statements of fees and costs incurred by Sahuarita Water in connection with its efforts on our behalf, in order that Mission Peaks 4000 may either directly pay the same or reimburse Sahuarita Water.

Sincerely,



Mathew Lawson
Vice President Community Development
Mission Peaks 4,000, L.L.C.

Sahuarita Mission Partners – Sahuarita Water Company Correspondence

SHARPE & ASSOCIATES, INC.
4549 E. Fort Lowell Road • Tucson, AZ 85712 • (520) 299-8766
FAX (520) 529-3137

November 28, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request for Water Service For
Sahuarita Mission
("Sahuarita Mission")

Dear Mr. Seamans:

Sahuarita Mission Partners, L.L.C. ("Sahuarita Mission") hereby formally requests that Sahuarita Water Company, L.L.C. ("Sahuarita Water") undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to and within approximately 471 acres of land which Sahuarita Mission owns in an unincorporated area of Pima County, Arizona, northwest of the Town of Sahuarita. Attached to this letter as Appendix "A" is a legal description of the acreage in question.

Sahuarita Mission intends to cause or facilitate the development of approximately 3,000 single-family residential units on its aforesaid acreage, which will be known as Sahuarita Mission. In that regard, and as a result of previous discussions we have had with you upon this subject, it is our understanding that the projected water system demands associated with Sahuarita Mission project have been included in a Water System Master Plan that WestLand Resources, Inc. has recently prepared for Sahuarita Water.

Please advise us in writing if Sahuarita Water is interested in becoming the lawfully authorized provider of water service to Sahuarita Mission. In that regard, you may use this request for water service in connection with any approvals Sahuarita Water must obtain from regulatory or permitting agencies or entities.

Sincerely,

Sahuarita Mission Partners, L.L.C.

Sahuarita Water Company

November 28, 2007

Robert M. Sharpe, General Partner
Sahuarita Mission Partners, L.L.C.
4549 E. Fort Lowell Road
Tucson, Arizona 85712

Re: Request For Water Service For
Sahuarita Mission ("Sahuarita Mission")

Dear Mr. Sharpe:

This letter will acknowledge Sahuarita Water Company, L.L.C.'s ("Sahuarita Water") receipt of your November 28, 2007 letter requesting that Sahuarita Water undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to the Sahuarita Mission acreage which Sahuarita Mission Partners L.L.C. ("Sahuarita Mission") contemplates developing or facilitating the development of.

Sahuarita Water is interested in becoming the lawfully authorized provider of water service to the Sahuarita Mission acreage, and is willing and able to do so, subject to prior receipt of the necessary approvals and authorizations from governmental entities with jurisdiction over Sahuarita Water's water provider operations. These will include the receipt of the necessary certificate of convenience and necessity from the Arizona Corporation Commission ("ACC"), and ACC approval of such line extension agreements and off-site facilities agreements as Sahuarita Water may find to be necessary.

In that regard, as a condition to Sahuarita Water's willingness to proceed with such actions as may be necessary to obtain the requisite approvals and authorizations, Sahuarita Water will require that Sahuarita Mission reimburse Sahuarita Water for Sahuarita Mission's proportionate share of any expenses Sahuarita Water may incur in connection with such efforts. Sahuarita Water believes that the cost of such activities should not be borne by the ratepayers of its existing certificated service area.

If the foregoing condition is acceptable to Sahuarita Mission, please so advise me in writing and Sahuarita Water will promptly undertake to obtain the approvals and authorizations necessary to enable it to be the lawful water provider to Sahuarita Mission.

Sincerely,

Sahuarita Water Company, L.L.C.

By: _____
Mark J. Seamans, General Manager

Field Office: c/o Rancho Resort, 15900 S. Rancho Resort Blvd., P.O. Box 1520, Sahuarita, AZ 85629-0530
Ph. (520) 399-1105 Fax (520) 399-1095

SHARPE & ASSOCIATES, INC.
4549 E. Fort Lowell Road • Tucson, AZ 85712 • (520) 299-8766
FAX (520) 529-3137

November 28, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request For Water Service For
Sahuarita Mission ("Sahuarita Mission")

Dear Mr. Seamans:

The condition outlined in your letter of November 28, 2007 to me is acceptable to Sahuarita Mission Partners, L.L.C. ("Sahuarita Mission"). Accordingly, please proceed with all actions necessary to enable Sahuarita Water Company, L.L.C. ("Sahuarita Water") to become the lawful water provider to Sahuarita Mission.

In that regard, please provide me with a copy of all documents filed with such governmental entities from whom the necessary approvals or authorizations are requested by Sahuarita Water; and, please provide me with periodic statements of fees and costs incurred by Sahuarita Water in connection with its efforts on our behalf, in order that Sahuarita Mission may either directly pay the same or reimburse Sahuarita Water.

Sincerely,

Sahuarita Mission Partners, L.L.C.
By: _____
Robert M. Sharpe, General Partner

Arizona State Land Department – Sahuarita Water Company Correspondence

Janet Napolitano

Mark Winkleman

December 12, 2007

Sahuarita Water Company, L.L.C.
P. O. Box 1520
Sahuarita, Arizona 85629

Attention: Mark J. Seamans
General Manager

Re: Request for Water Service For
Arizona State Land Department ("ASLD")

Dear Mr. Seamans:

Arizona State Land Department ("ASLD") hereby formally requests that Sahuarita Water Company, L.L.C. ("Sahuarita Water") undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to and within approximately 634 acres of land which ASLD owns in an unincorporated area of Pima County, Arizona, northwest of the Town of Sahuarita. Attached to this letter as Appendix "A" is a legal description of the acreage in question.

ASLD intends to facilitate the development of approximately 2,300 single-family residential units on its aforesaid acreage. In that regard, it is ASLD's understanding that the projected water system demands associated with such development have been included in a Water System Master Plan that WestLand Resources, Inc. has recently prepared for Sahuarita Water.

Please advise us in writing if Sahuarita Water is interested in becoming the lawfully authorized provider of water service to ASLD's acreage. In that regard, you may use this request for water service in connection with any approvals Sahuarita Water must obtain from regulatory or permitting agencies or entities. This can be accomplished by Sahuarita Water's actions with the Arizona Corporation Commission and by issuing ASLD a letter of intent to serve.

Sincerely,

Jamie Hogue
Deputy Commissioner
Arizona State Land Department

C: Paul Wichmann, Southern Arizona State Land Department

May 24, 2006

EXHIBIT "A"

Rancho Maria: Description of State Parcel in Section 16

Section 16, Township 17 South, Range 13 East of the Gila and Salt River Meridian, Pima County, Arizona.

Excepting therefrom that portion of said Section 16 lying withinthe right-of-way of Helmet Peak Road, Road Proceeding No. 1019 as recorded in Book 8 of Road Maps at Page 97, records of Pima County, Arizona.

See Exhibit 'B' attached hereto and made a part hereof.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
39333
WENDELL T.
HARNESS
ARIZONA U.S.A.

Prepared for and on behalf of

M M L A
P S O M A S

Project No. 95016-10

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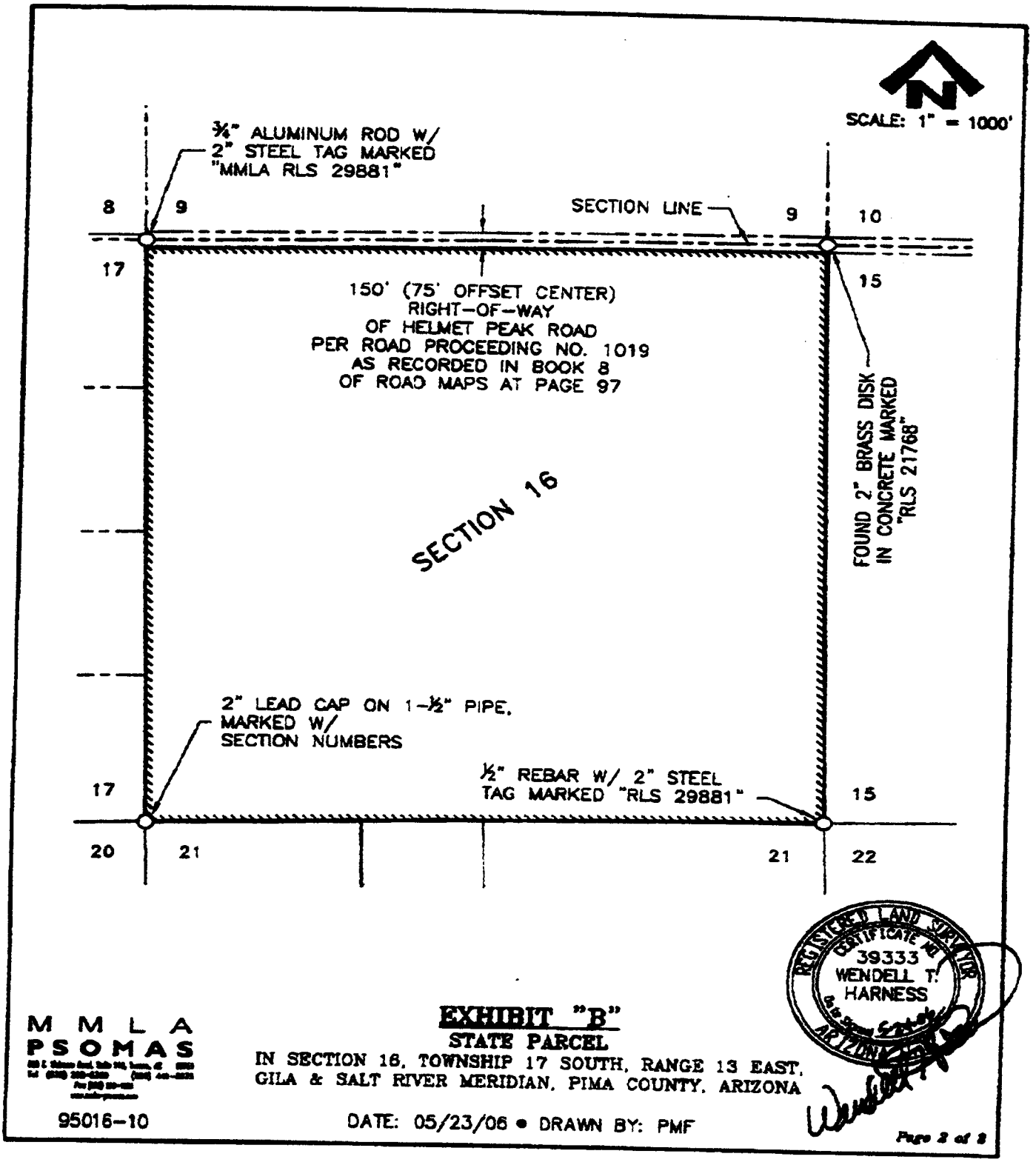


M M L A
P S O M A S

EXHIBIT "B"
STATE PARCEL
IN SECTION 16, TOWNSHIP 17 SOUTH, RANGE 13 EAST,
GILA & SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA

95016-10

DATE: 05/23/06 • DRAWN BY: PMF

Page 2 of 3

Sahuarita Water Company

December 12, 2007

Ms. Jamie Hogue
Deputy State Land Commissioner
Arizona State Land Department
1616 W. Adams
Phoenix, Arizona 85007

Re: Request For Water Service For
Arizona State Land Department

Dear Ms. Hogue:

This letter will acknowledge Sahuarita Water Company, L.L.C.'s ("Sahuarita Water") receipt of your December 12, 2007 letter requesting that Sahuarita Water undertake such actions as may be necessary to enable Sahuarita Water to become the lawful provider of water service to certain acreage which the Arizona State Land Department ("ASLD") currently owns, and anticipates development of, in the vicinity of the Town of Sahuarita, Arizona.

Sahuarita Water is interested in becoming the lawfully authorized provider of water service to the aforesaid acreage owned by ASLD, and is willing and able to do so, subject to prior receipt of the necessary approvals and authorizations from governmental entities with jurisdiction over Sahuarita Water's water provider operations. These will include the receipt of the necessary certificate of convenience and necessity from the Arizona Corporation Commission ("ACC"), and ACC approval of such line extension agreements and off-site facilities agreements with master and/or subdivision developers as Sahuarita Water may find to be necessary in connection with the development of such acreage.

Sincerely,

Sahuarita Water Company, L.L.C.
By: _____
Mark J. Seamans, General Manager

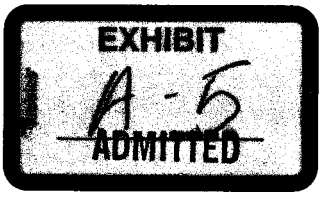
Corporate Office: 4549 E Ft Lowell Rd. Tucson, AZ 85712 Ph. (520) 299-8766 Fax: (520) 529-3137

Field Office: c/o Rancho Resort, 15900 S. Rancho Resort Blvd., P.O. Box 1520, Sahuarita, AZ 85629-0530
Ph. (520) 399-1105 Fax (520) 399-1095

EXHIBIT A-5

(Legal Description for Proposed CC&N Extension Application)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



ORDER NO. 61377 NCW

LEGAL DESCRIPTON

EXHIBIT "A"

AN UNDIVIDED 83.3335% INTEREST IN AND TO THE FOLLOWING DESCRIBED PARCELS:

PARCEL 1:

That portion of Sections 12 and 13, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona, described as follows:

BEGINNING at the Southwest corner of said Section 12;

THENCE North 00 degrees 2h minutes 09 seconds West along the West line of said Section 12 a distance of 1,350.77 feet to the Westerly right-of-way line of Mission Road as shown on Book 2 of Records of Survey at Page 57, Records of Pima County, Arizona, said point being on the arc of a non-tangent curve concave to the Southwest; a radial line of said curve through said point having a bearing of North 42 degrees 32 minutes 51 seconds East;

THENCE Southerly along the arc of said curve, to the right, having a radius of 2814.79 feet and a central angle of 08 degrees 52 minutes 56 seconds for an arc distance of 436.35 feet to a point of tangency;

THENCE South 38 degrees 34 minutes 14 seconds East along said right-of-way line a distance of 630.70 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,195.92 feet and a central angle of 24 degrees 57 minutes 28 seconds for an arc distance of 520.94 feet to a point of tangency;

THENCE South 63 degrees 31 minutes 42 seconds East along said right-of-way line a distance of 162.19 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 666.20 feet and a central angle of 60 degrees 4h minutes 44 seconds for an arc distance of 706.70 feet to a point of tangency;

THENCE South 02 degrees 44 minutes 58 seconds East along said right-of-way line a distance of 87.39 feet;

8696 467

THENCE South 03 degrees 24 minutes 50 seconds East along the re-established right-of-way line of Mission Road a distance of 119.84 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,959.86 feet and a central angle of 29 degrees 57 minutes 08 seconds for an arc distance of 1,024.55 feet to a point of tangency;

THENCE South 33 degrees 21 minutes 58 seconds East along said right-of-way line a distance of 284.19 feet to the South line of the North Half of the Northwest Quarter of said Section 13;

THENCE North 89 degrees 46 minutes 15 seconds West along the South line of said North Half a distance of 2,073.85 feet to the West line of said Northwest Quarter;

THENCE North 00 degrees 14 minutes 11 seconds West along said West line a distance of 1,319.95 feet to the POINT OF BEGINNING.

PARCEL II:

That portion of Section 13, Township 17 South, Range 12 East, Gila and Salt River Base and Meridian, Pima County, Arizona, and that portion of the Waring Lode Mining Claim in Pima Mining District being shown on Mineral Survey No. 4187 on file in the Bureau of Land Management as granted by Patent recorded in Book 34 of Deeds of Mines at Page 220, Pima County Records, described as follows:

COMMENCING at the Southeast corner of said Section 13;

THENCE North 89 degrees 55 minutes 36 seconds West along the South line of said Section 13 a distance of 445.60 feet to the POINT OF BEGINNING, said point being on the Westerly right-of-way line of Mission Road as re-established from the existing paving of said road;

THENCE continue North 89 degrees 55 minutes 36 seconds West along said South line of Section 13 a distance of 2,651.19 feet to a line 440.00 feet West of and parallel with North-South midsection line of said Section 13;

THENCE North 00 degrees 16 minutes 37 seconds West along said parallel line a distance of 3,740.03 feet to said right-of-way line of Mission Road;

THENCE South 33 degrees 21 minutes 58 seconds East along said right-of-way line a distance of 1,978.94 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Southerly along the arc of said curve, to the left, having a radius of 1,462.40 feet and a central angle of 24 degrees 53 minutes 35 seconds for an arc distance of 644.07 feet to a point of tangency;

THENCE South 56 degrees 15 minutes 38 seconds East along said right-of-way line a distance of 434.74 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 1147.53 feet and a central angle of 32 degrees 57 minutes 22 seconds for an arc distance of 660.05 feet to a point of tangency;

THENCE South 25 degrees 18 minutes 14 seconds East along said right-of-way line a distance of 430.76 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Southerly along the arc of said curve, to the right, having a radius of 857.49 feet and a central angle of 13 degrees 52 minutes 12 seconds for an arc distance of 207.58 feet to a point of tangency;

THENCE South 11 degrees 26 minutes 02 seconds East along said right-of-way line a distance of 352.14 feet to the POINT OF BEGINNING.

EXCEPT from the above described properties and any and all rights to oil, gas, minerals and associated hydrocarbons as reserved in Docket 2220 at Page 266 and in Docket 7944 at Page 306.

PARCEL III:

That portion of Section 13, Township 17 South, Range 12 East, Gila and Salt River Base and Meridian, Pima County, Arizona, and that portion of the Waring Lode Mining Claim in Pima Mining District being shown on Mineral Survey No. 4187 on file in the Bureau of Land Management as granted by patent recorded in Book 34 of Deeds of Mines at Page 220, Pima County Records, described as follows:

BEGINNING at the Southeast corner of said Section 13;

THENCE North 89 degrees 55 minutes 36 seconds West along the South line of said Section 13 a distance of 343.54 feet to the Easterly right-of-way line of Mission Road as re-established from the existing paving of said road;

THENCE North 11 degrees 26 minutes 02 seconds West along said right-of-way line a distance of 372.50 feet to a point of curvature of a tangent curve concave to the West;

THENCE Northerly along the arc of said curve, to the left, having a radius of 957.49 feet and a central angle of 13 degrees 52 minutes 12 seconds for an arc distance of 231.79 feet to a point of tangency;

THENCE North 25 degrees 18 minutes 14 seconds West along said right-of-way line a distance of 430.76 feet to a point of curvature of a tangent curve concave to the Southwest;

THENCE Northerly along the arc of said curve, to the left, having a radius of 1,247.53 feet and a central angle of 32 degrees 57 minutes 22 seconds for an arc distance of 717.57 feet to the point of tangency;

THENCE North 58 degrees 15 minutes 38 seconds West along said right-of-way line a distance of 434.74 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Northerly along the arc of said curve, to the right, having a radius of 1,382.40 feet and a central angle of 24 degrees 53 minutes 38 seconds for an arc distance of 600.62 feet to a point of tangency;

THENCE North 33 degrees 21 minutes 58 seconds West along said right-of-way line a distance of 2519.86 feet to a point of curvature of a tangent curve concave to the Northeast;

THENCE Northerly along the arc of said curve, to the right, having a radius of 1,859.56 feet and a central angle of 29 degrees 57 minutes 08 seconds for an arc distance of 972.27 feet to a point of tangency;

THENCE North 03 degrees 24 minutes 50 seconds West along said right-of-way line a distance of 40.50 feet to a point 75.00 feet South of and parallel with the North line of said Section 13, said point being on the South right-of-way line of Helmet Peak Road;

THENCE South 89 degrees 43 minutes 16 seconds East along said parallel line a distance of 3,606.47 feet to the East line of the Northeast Quarter of said Section 13;

THENCE South 00 degrees 18 minutes 59 seconds East along said East line a distance of 2,555.56 feet to the Southeast corner of said Northeast Quarter;

THENCE South 00 degrees 18 minutes 15 seconds East along the East line of Government Lot 1 and 4 of said Section 13 a distance of 2,630.26 feet to the POINT OF BEGINNING;

EXCEPT any and all rights to oil, gas, minerals and associated hydrocarbons as reserved in Docket 2220 at Page 266 and in Docket 7944 at Page 314.

February 15 2008
Psomas # 95016-10

LEGAL DESCRIPTION
RANCHO SAHUARITA WATER COMPANY BOUNDARY

PARCEL 1
Portions of Sections 24 through 27, and 34 through 36, Township 17 South, Range 12 East and portions of Sections 19 and 30, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22 and Book 45 at Page 92, records of Pima County Arizona, described as follows:

BEGINNING at the North one-quarter corner of said Section 27;

THENCE upon the North line of said Section, N 89°21'41" E a distance of 1341.87 feet;

THENCE continue upon said north line, N 89°20'54" E a distance of 1342.07 feet to the northwest corner of Section 26;

THENCE upon the north line of said Section 26, N 89°20'30" E a distance of 1322.48 feet;

THENCE continue upon said north line, N 89°20'16" E a distance of 1325.05 feet to the north one-quarter corner;

THENCE continue upon said north line, N 89°20'57" E a distance of 1336.10 feet;

THENCE N 89°20'28" E a distance of 1311.91 feet to the southwest corner of Section 24;

THENCE upon the west line of said Section 24, N 01°11'04" W a distance of 2639.36 feet to the west one-quarter corner;

THENCE continue upon said west line, N 01°08'44" W a distance of 1319.49 feet to the north line of the south one-half of the north one-half of said Section 24;

THENCE upon said north line, N 89°25'57" E a distance of 2657.64 feet;

THENCE continue upon said north line, N 89°23'50" E a distance of 1329.33 feet;

THENCE continue upon said north line, N 89°24'36" E a distance of 1139.69 feet to the westerly right-of-way of Mission-Twin Buttes Road, recorded in Road Maps Book 1 at Pages 20-23 and Book 12 at Page 31, records of said Pima County;

THENCE upon said westerly right-of-way the following 14 courses and distances:

1) S 12°26'32" E a distance of 6002.25 feet;

2) N 77°33'28" E a distance of 10.00 feet to a point on the arc of a non-tangent curve concave westerly, a radial line of said curve through said point having a bearing of N 77°33'31" E;

3) Southerly upon the arc of said curve, to the right, having a radius of 9269.74 feet and a central angle of 5°15'49" for an arc length of 851.59 feet to a point of tangency;

4) S 07°10'40" E a distance of 633.01 feet to a point of curvature of a tangent curve concave northwesterly;

5) Southwesterly upon the arc of said curve, to the right, having a radius of 955.37 feet and a central angle of 85°29'56" for an arc length of 1425.64 feet to a point of tangency;

6) S 78°19'16" W a distance of 588.25 feet to a point of curvature of a tangent curve concave northerly;

7) Westerly upon the arc of said curve, to the right, having a radius of 2824.93 feet and a central angle of 14°32'34" for an arc length of 717.02 feet to a point of tangency;

8) N 87°08'11" W a distance of 120.17 feet to a point of curvature of a tangent curve concave southeasterly;

9) Southwesterly upon the arc of said curve, to the left, having a radius of 1849.57 feet and a central angle of 52°03'35" for an arc length of 1680.55 feet to a point of tangency;

10) S 40°48'14" W a distance of 1259.01 feet to a point of curvature of a tangent curve concave northwesterly;

11) Southwesterly upon the arc of said curve, to the right, having a radius of 676.78 feet and a central angle of 10°31'45" for an arc length of 124.37 feet to a point of tangency;

12) S 51°19'59" W a distance of 2263.92 feet to a point of curvature of a tangent curve concave southeasterly;

13) Westerly upon the arc of said curve, to the left, having a radius of 756.78 feet and a central angle of 54°16'41" for an arc length of 716.92 feet to a point of tangency;

14) S 02°56'42" E a distance of 1284.38 feet to the northerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon said northerly right-of-way line the following 13 courses and distances;

1) S 89°40'33" W a distance of 103.05 feet to a point of curvature of a tangent curve concave southerly;

2) Westerly upon the arc of said curve, to the left, having a radius of 2894.79 feet and a central angle of 7°29'45" for an arc length of 378.72 feet to a point of tangency;

3) S 82°10'48" W a distance of 187.02 feet to a point of curvature of a tangent curve concave northerly;

4) Westerly upon the arc of said curve, to the right, having a radius of 1879.86 feet and a central angle of 13°26'00" for an arc length of 440.74 feet to a point of tangency;

5) N 84°23'12" W a distance of 927.54 feet to a point of curvature of a tangent curve concave northerly;

6) Westerly upon the arc of said curve, to the right, having a radius of 542.96 feet and a central angle of 14°05'45" for an arc length of 133.58 feet to a point of tangency;

7) N 70°17'27" W a distance of 166.64 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 19°43'06" E;

8) Westerly upon the arc of said curve, to the left, having a radius of 602.96 feet and a central angle of 24°15'25" for an arc length of 255.27 feet;

9) S 85°36'25" W a distance of 63.46 feet to a point of curvature of a tangent curve concave southerly;

10) Westerly upon the arc of said curve, to the left, having a radius of 1939.86 feet and a central angle of 11°33'45" for an arc length of 391.47 feet to a point of tangency;

11) S 74°02'40" W a distance of 691.23 feet to a point of curvature of a tangent curve concave northerly;

12) Westerly upon the arc of said curve, to the right, having a radius of 1270.00 feet and a central angle of 13°15'46" for an arc length of 293.98 feet to a point of tangency;

13) S 87°18'26" W a distance of 48.88 feet;

THENCE N 00°47'09" W a distance of 1331.20 feet;

THENCE N 00°46'29" W a distance of 2038.55 feet;

THENCE N 89°13'05" E a distance of 1531.71 feet to the east line of the northeast one-quarter of Section 35;

THENCE upon said east line, N 01°11'55" W a distance of 1024.90 feet to the south one-quarter corner of Section 26;

THENCE upon the south line of said Section, S 89°18'08" W a distance of 1524.37 feet;

THENCE continue upon said south line, S 89°19'01" W a distance of 1124.01 feet to the northeast corner of Section 34;

THENCE upon the east line of said Section, S 01°23'09" E a distance of 1344.73 feet;

THENCE N 86°28'30" W a distance of 1378.82 feet;

THENCE upon the north line of said Section 21, N 88°57'37" E a distance of 1681.96 feet;

THENCE S 01°49'19" E a distance of 3226.42 feet to the northerly right-of-way of Twin Buttes Road, recorded in Surveys Book 5 at Pages 17 and 19, records of said Pima County, lying on the arc of a non-tangent curve concave northerly, a radial line of said curve through said point having a bearing of S 03°41'28" E;

THENCE upon said northerly right-of-way the following 30 courses and distances:

1) Westerly upon the arc of said curve, to the right, having a radius of 634.16 feet and a central angle of 2°43'13" for an arc length of 30.11 feet to a non-tangent line;

2) S 89°10'36" W a distance of 113.99 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 00°51'39" W;

3) Westerly upon the arc of said curve, to the left, having a radius of 1436.65 feet and a central angle of 17°47'23" for an arc length of 446.06 feet to a non-tangent line;

4) S 71°14'59" W a distance of 433.16 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 18°33'53" W;

5) Northwesterly upon the arc of said curve, to the left, having a radius of 2072.29 feet and a central angle of 7°50'43" for an arc length of 283.75 feet to a point of reverse curvature of a non-tangent curve, concave northerly, a radial line of said curve through said point having a bearing of S 26°29'45" E;

6) Westerly upon the arc of said curve, to the right, having a radius of 1649.24 feet and a central angle of 33°12'23" for an arc length of 955.83 feet to a non-tangent line;

7) N 83°16'46" W a distance of 300.48 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 06°41'16" E;

8) Westerly upon the arc of said curve, to the left, having a radius of 2617.41 feet and a central angle of 19°23'31" for an arc length of 885.87 feet to a point of compound curvature of a non-tangent curve concave southeasterly, a radial line of said curve through said point having a bearing of N 12°39'55" W;

9) Southwesterly upon the arc of said curve, to the left, having a radius of 892.72 feet and a central angle of 26°06'18" for an arc length of 406.74 feet to a non-tangent line;

10) S 51°13'30" W a distance of 231.88 feet to a point of curvature of a tangent curve concave northwesterly;

11) Southwesterly upon the arc of said curve, to the right, having a radius of 856.38 feet and a central angle of 29°24'46" for an arc length of 439.62 feet to the west line of the east one-half of said Section 20;

12) Upon said west line, N 01°46'54" W a distance of 45.36 feet;

13) S 80°53'44" W a distance of 9.64 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 09°16'22" W;

14) Westerly upon the arc of said curve, to the left, having a radius of 2189.63 feet and a central angle of 17°47'42" for an arc length of 680.06 feet to a non-tangent line;

15) S 62°58'37" W a distance of 766.40 feet to a point on the arc of a non-tangent curve concave northwesterly, a radial line of said curve through said point having a bearing of S 27°02'25" E;

16) Southwesterly upon the arc of said curve, to the right, having a radius of 2698.50 feet and a central angle of 7°13'17" for an arc length of 340.11 feet to a non-tangent line;

17) S 70°09'35" W a distance of 314.36 feet to a point on the arc of a non-tangent curve concave southeasterly, a radial line of said curve through said point having a bearing of N 19°46'58" W;

18) Southwesterly upon the arc of said curve, to the left, having a radius of 2001.81 feet and a central angle of 10°22'42" for an arc length of 362.60 feet to a non-tangent line;

19) S 59°47'07" W a distance of 404.63 feet to the west line of Section 20;

20) Upon said west line, S 01°41'07" E a distance of 49.31 feet to the southwest corner;

21) Upon the south line of said Section 20, N 89°02'25" E a distance of 5.45 feet to a point on the arc of a non-tangent curve concave southeasterly, a radial line of said curve through said point having a bearing of N 31°57'43" W;

22) Southwesterly upon the arc of said curve, to the left, having a radius of 1541.19 feet and a central angle of 3°38'01" for an arc length of 97.74 feet to a point of reverse curvature of a non-tangent curve concave northwesterly, a radial line of said curve through said point having a bearing of S 35°40'20" E;

23) Southwesterly upon the arc of said curve, to the right, having a radius of 1481.19 feet and a central angle of 5°34'21" for an arc length of 144.06 feet to a non-tangent line;

24) S 59°48'34" W a distance of 896.58 feet to a point on the arc of a non-tangent curve concave northerly, a radial line of said curve through said point having a bearing of S 30°11'18" E;

THENCE N 00°07'13" W a distance of 1243:26 feet to the south line of Section 27;

THENCE upon the south line of said Section, S 89°18'00" W a distance of 1374.64 feet to the south one-quarter corner;

THENCE upon the west line of the east one-half of said Section 27, the following 4 courses and distances:

1) N 00°50'51" W a distance of 1316.70 feet;

2) N 00°49'57" W a distance of 1317.07 feet;

3) N 00°49'36" W a distance of 1317.21 feet;

4) N 00°49'40" W a distance of 1317.77 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 2

Portions of Sections 19 through 21, 29 and 30, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Book 41 of Surveys, Page 22, Records of Pima County, Arizona described as follows:

BEGINNING at the northwest corner of Section 19;

THENCE upon the north line of said Section, N 89°06'58" E a distance of 2567.47 feet to the north one-quarter corner;

THENCE continue upon said north line, N 89°06'28" E a distance: 2628.85 feet to the northwest corner of Section 20;

THENCE upon the west line of said Section 20, S 01°41'07" E a distance of 30.00 feet;

THENCE N 88°43'21" E a distance of 1979.26 feet;

THENCE S 01°41'07" E a distance of 399.99 feet;

THENCE N 88°43'21" E a distance of 668.88 feet to the west line of the east one-half of said Section 20;

THENCE upon said west line, N 01°46'54" W a distance of 430.00 feet to the north line of said Section 20;

THENCE upon said north line, N 88°43'00" E a distance of 2647.38 feet to the northwest corner of Section 21;

25) Westerly upon the arc of said curve, to the right, having a radius of 1752.46 feet and a central angle of 30°05'12" for an arc length of 920.24 feet to a point of reverse curvature of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 00°05'12" W;

26) Westerly upon the arc of said curve, to the left, having a radius of 869.19 feet and a central angle of 13°15'29" for an arc length of 201.13 feet to a point of reverse curvature of a non-tangent curve concave northerly, a radial line of said curve through said point having a bearing of S 13°21'52" E;

27) Westerly upon the arc of said curve, to the right, having a radius of 2325.40 feet and a central angle of 34°27'47" for an arc length of 1398.71 feet to a non-tangent line;

28) N 68°53'14" W a distance of 151.79 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 21°04'23" E;

29) Westerly upon the arc of said curve, to the left, having a radius of 1010.68 feet and a central angle of 26°56'23" for an arc length of 475.21 feet to a non tangent line;

30) S 84°05'18" W a distance of 381.65 feet to the easterly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 1 at Pages 20-23, records of said Pima County;

THENCE upon said easterly right-of-way, N 12°26'32" W a distance of 4625.24 feet

THENCE N 89°25'11" E a distance of 86.94 feet to the west line of Section 19;

THENCE upon said west line, N 01°14'52" W a distance of 1311.71 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 3

All of Section 16, Township 17 South, Range 13 East, Gila and Salt River Meridian, Pima County, Arizona, Except the north 75 feet.

TOGETHER WITH:
PARCEL 4

A portion of Section 35, Township 17 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22, records of Pima County Arizona, described as follows:

BEGINNING at the east one-quarter corner of said Section 35:

THENCE upon the east line of said Section, S 00°16'41" E a distance of 1684.22 feet to the northerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon said northerly right-of-way, S 89°40'33" W a distance of 103.88 feet to the easterly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 12 at Page 31, records of said Pima County;

THENCE upon said easterly right-of-way, N 02°56'42" W a distance of 1288.04 feet to a point of curvature of a tangent curve concave easterly;

THENCE northerly upon the arc of said curve, to the right, having a radius of 676.78 feet and a central angle of 43°13'34" for an arc length of 510.59 feet to the east line of said Section 35;

THENCE upon east line, S 01°46'39" E a distance of 73.92 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 5

A portion of Section 35, Township 17 South, Range 12 East and a portion of Section 2 , Township 18 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22, records of Pima County Arizona, described as follows:

BEGINNING at the northeast corner of said Section 2;

THENCE upon the east line of said Section, S 00°11'26" E a distance of 1214.24 feet to a point on the easterly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 12 at Page 31, records of said Pima County;

THENCE upon said easterly right-of-way, N 02°56'42" W a distance of 2129.52 feet to the southerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon southerly right-of-way, N 89°40'33" E a distance of 100.94 feet to the east line of said Section 35;

THENCE upon said east line, S 00°16'41" E a distance of 913.05 feet to the **POINT OF BEGINNING.**

TOGETHER WITH:
PARCEL 6

A portion of Section 35, Township 17 South, Range 12 East and a portion of Sections 1 and 2, Township 18 South, Range 12 East, Gila and Salt River Meridian, Pima County, Arizona and shown in Record of Surveys Book 41 at Page 22 and Book 45 at Page 92, records of Pima County Arizona, described as follows:

BEGINNING at the south one-quarter corner of said Section 35;

THENCE upon the south line of said Section 35, S 89°36'56" W a distance of 1800.65 feet;

THENCE N 01°10'34" W a distance of 764.87 feet to the southerly right-of-way of Twin Buttes-McGee Road recorded in Road Maps Book 2 at Pages 184-186, records of said Pima County;

THENCE upon said southerly right-of-way the following 13 courses and distances;

1) N 87°18'26" E a distance of 294.56 feet to a point of curvature of a tangent curve concave northerly;

2) Northerly upon the arc of said curve, to the left, having a radius of 1330.00 feet and a central angle of 13°15'46" for an arc length of 307.87 feet to a point of tangency;

3) N 74°02'40" E a distance of 691.20 feet to a point of curvature of a tangent curve concave southerly;

4) Easterly upon the arc of said curve, to the right, having a radius of 1879.86 feet and a central angle of 11°33'45" for an arc length of 379.36 feet to a point of tangency;

5) N 85°36'25" E a distance of 66.39 feet to a point on the arc of a non-tangent curve concave southerly, a radial line of said curve through said point having a bearing of N 04°14'32" W;

6) Easterly upon the arc of said curve, to the right, having a radius of 542.99 feet and a central angle of 23°56'23" for an arc length of 226.87 feet to a non-tangent line;

7) S 70°17'27" E a distance of 166.87 feet to a point of curvature of a tangent curve, concave northerly;

8) Easterly upon the arc of said curve, to the left, having a radius of 602.96 feet and a central angle of 14°05'45" for an arc length of 148.34 feet to a point of tangency;

9) S 84°23'12" E a distance of 927.54 feet to a point of curvature of a tangent curve, concave northerly;

10) Easterly upon the arc of said curve, to the left, having a radius of 1939.86 feet and a central angle of 13°26'00" for an arc length of 454.81 feet to a point of tangency;

11) N 82°10'48" E a distance of 187.02 feet to a point of curvature of a tangent curve, concave southerly;

12) Easterly upon the arc of said curve, to the right, having a radius of 2834.79 feet and a central angle of 7°29'45" for an arc length of 370.87 feet to a point of tangency;

13) N 89°40'33" E a distance of 105.94 feet to the westerly right-of-way of Mission-Twin Buttes Road recorded in Road Maps Book 12 at Page 31, records of said Pima County;

THENCE upon said westerly right-of-way the following 6 courses and distances;

1) S 02°56'42" E a distance of 2415.93 feet to a point of curvature of a tangent curve concave easterly;

2) Southerly upon the arc of said curve, to the left, having a radius of 756.78 feet and a central angle of 33°37'34" for an arc length of 444.14 to a point of tangency;

3) S 36°34'18" E a distance of 300.36 feet to a point of curvature of a tangent curve concave northeasterly;

4) Southeasterly upon the arc of said curve, to the left, having a radius of 756.78 feet and a central angle of 43°59'24" for an arc length of 581.03 feet to a point of tangency;

5) S 80°33'43" E a distance of 12.61 feet to a point on the arc of a non-tangent curve concave southwesterly, a radial line of said curve through said point having a bearing of N 09°26'20" E;

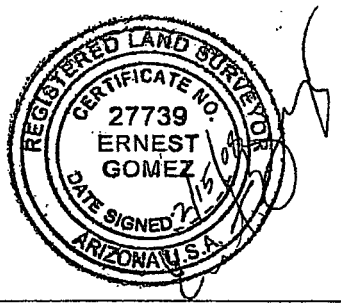
6) Southeasterly upon the arc of said curve, to the right, having a radius of 676.78 feet and a central angle of 34°25'30" for an arc length of 406.63 feet to the south line of the north one-half of said Section 1;

THENCE upon said south line, N 89°58'30" W a distance of 1111.01 feet to the east one-quarter corner of said Section 2;

THENCE upon the south line of the northeast one-quarter of said Section 2, N 89°49'13" W a distance of 2610.14 feet to the center one-quarter corner;

THENCE upon the west line of said northeast one-quarter, N 00°40'50" W a distance of 2605.25 feet to the **POINT OF BEGINNING.**

Prepared by:
PSOMAS

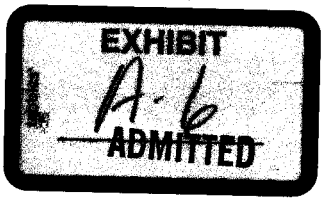


Ernest Gomez, AZ. R.L.S. 27739

EXHIBIT A-6

(Map of Proposed CC&N Extension Area)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



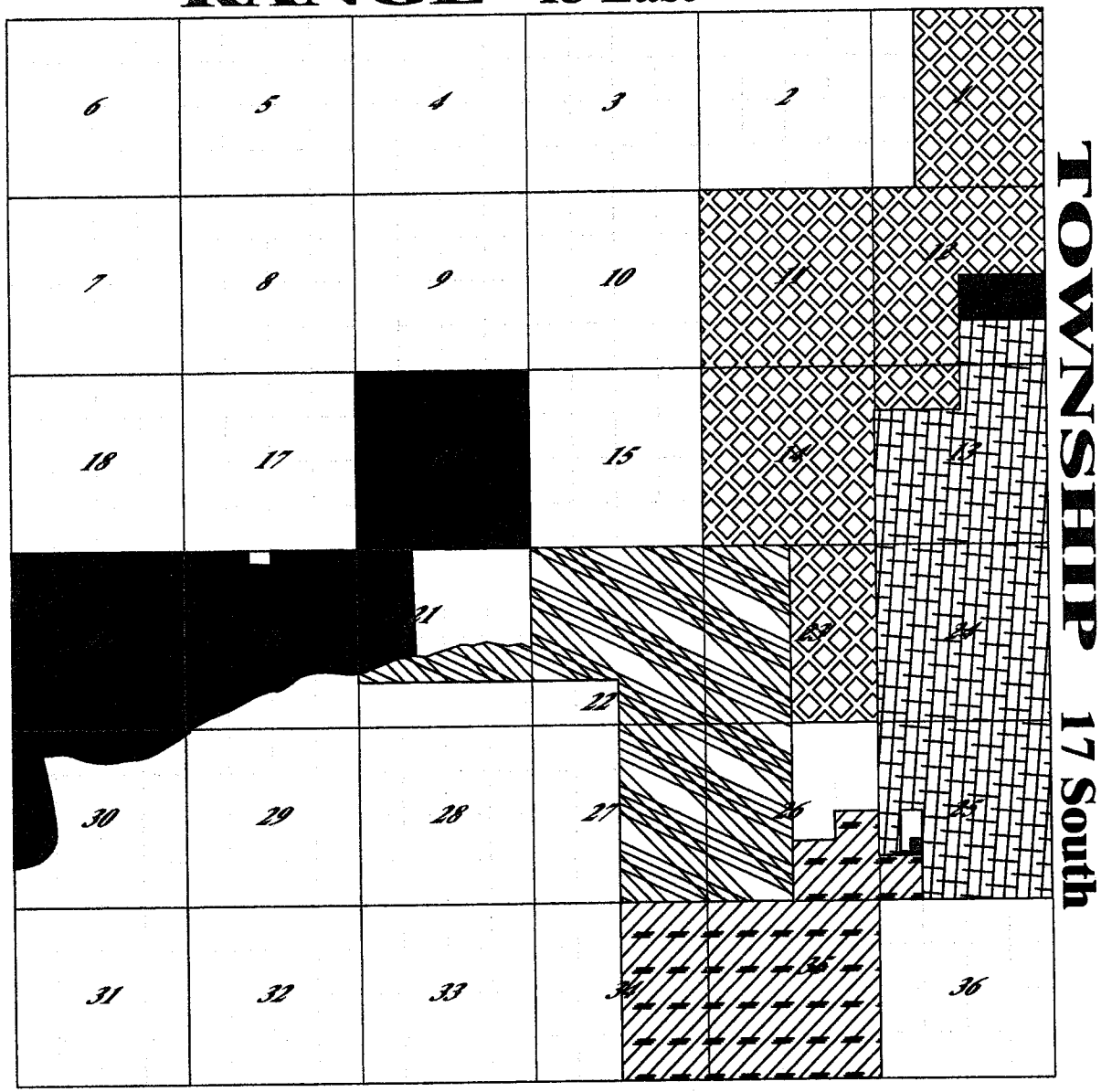
Pursuant to ARS § 39-121.03 this map is 'Not for Commercial Use'

Map No. 34

COUNTY: *Pima*

RANGE 13 East

TOWNSHIP 17 South



W-2304 (2)
Community Water Company of Green Valley

W-1654 (6)
Farmers Water Company

W-1583 (1)
Las Quintas Serenas Water Company

W-3718 (4)
Sahuarita Water Company, LLC

(1)
Sahuarita Village Water Company
(Nonjurisdictional)

Community Water Company of Green Valley
Docket No. W-02304A-07-0393
Application for Extension

(3)
Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

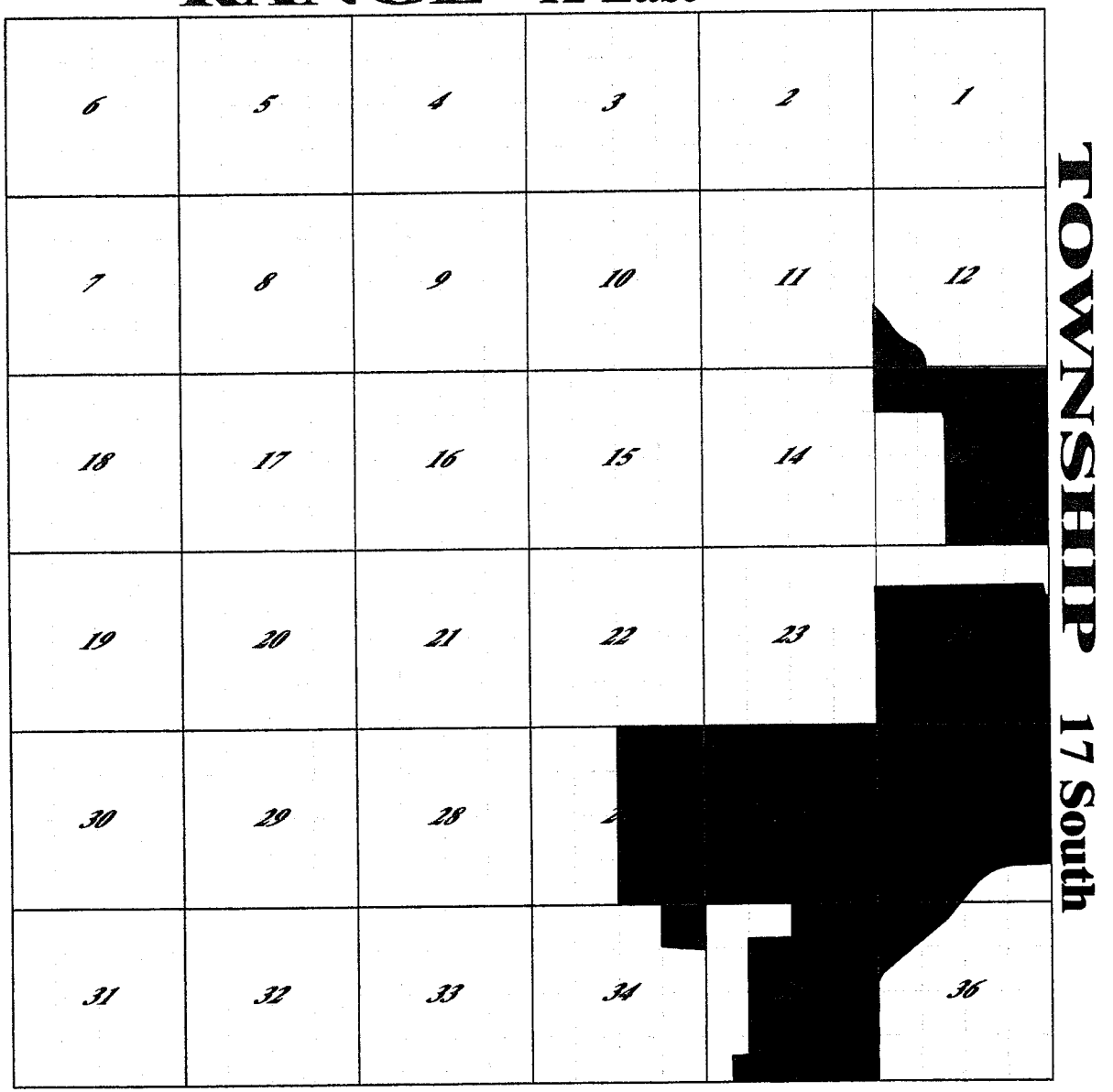
TR17S13E 11 JAN 2001

Pursuant to ARS § 39-121.03 this map is 'Not for Commercial Use'

Map No. 52

COUNTY: *Pima*

RANGE 12 East



W-3718 (3)
Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

TR17S12E 11 JAN 2008

Pursuant to ARS § 39-121.03 this map is 'Not for Commercial Use'

Map No. 53

COUNTY: *Pima*

RANGE 12 East

6	5	4	3	[redacted]	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

TOWNSHIP 18 South

[redacted] **W-3718 (3)**

Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

TR18S12E 11 JAN 2008

COUNTY: *Pima*

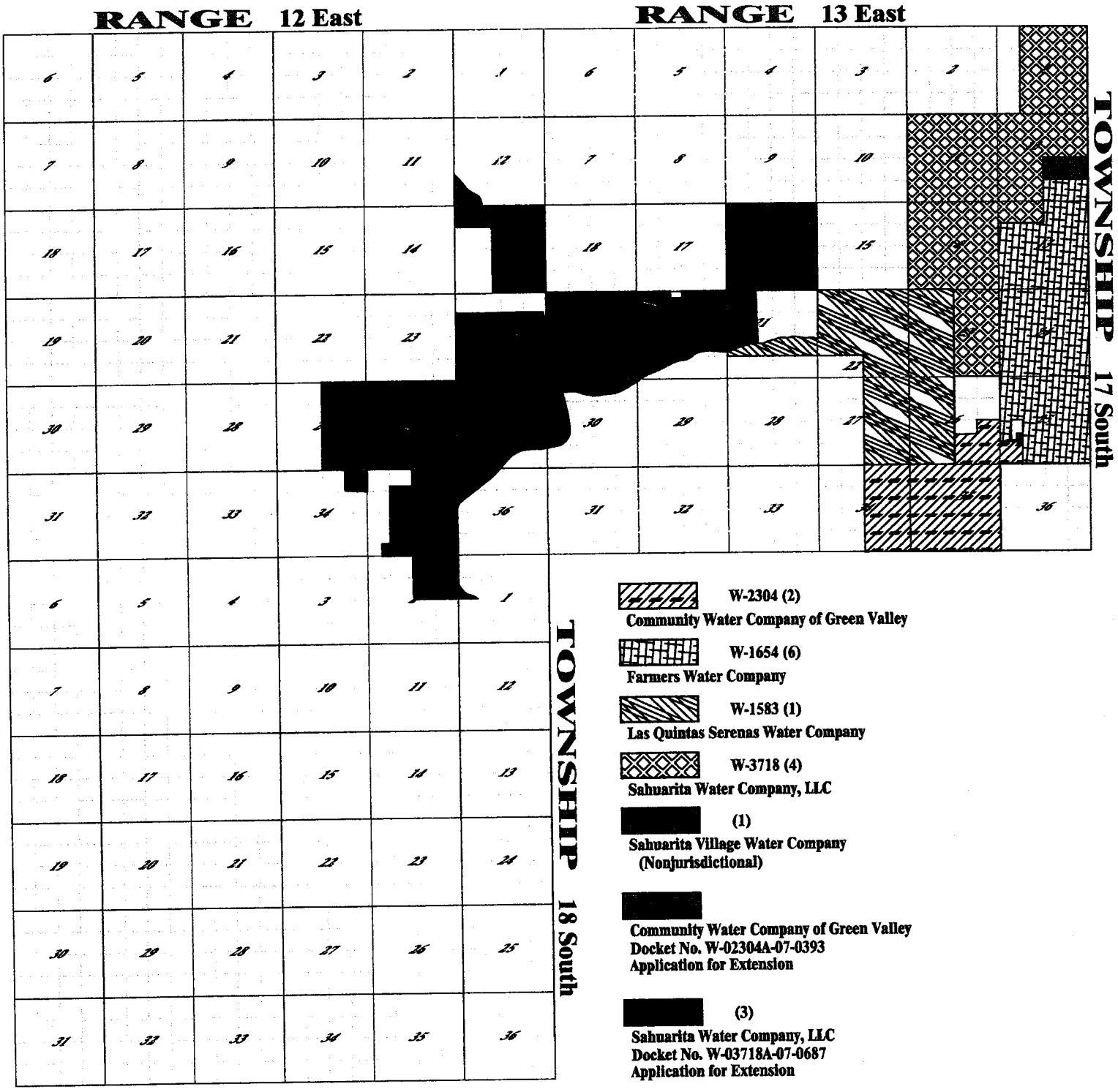

RANGE 12 East
RANGE 13 East
TOWNSHIP 17 South
TOWNSHIP 18 South
W-2304 (2)
Community Water Company of Green Valley
W-1654 (6)
Farmers Water Company
W-1583 (1)
Las Quintas Serenas Water Company
W-3718 (4)
Sahuarita Water Company, LLC
(1)
Sahuarita Village Water Company
(Nonjurisdictional)
Community Water Company of Green Valley
Docket No. W-02304A-07-0393
Application for Extension
(3)
Sahuarita Water Company, LLC
Docket No. W-03718A-07-0687
Application for Extension

EXHIBIT A-7

(November 2007 Water System Master Plan)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008

SAHUARITA WATER COMPANY, LLC

WATER SYSTEM MASTER PLAN

Prepared for:

SAHUARITA WATER COMPANY
15900 Rancho Resort Blvd, Bldg No. 3
Sahuarita, Arizona 85629
(520) 399-1105

Prepared by:

WESTLAND RESOURCES, INC.
4001 E. Paradise Falls Drive
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NOVEMBER 2007
Project No. 217.132 A 8000

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Appendix A. Demand Calculations

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Exhibit 1. Existing Water System Master Plan
Exhibit 2. Future Water System Master Plan

LIST OF ACRONYMS

ACC	Arizona Corporate Commission
ADD	Average Daily Demand
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
CC&N	Certificate of Convenience and Necessity
gpad	gallons per acre per day
gpcd	gallons per capital per day
gpm	gallons per minute
lf	lineal feet
MCL	maximum contaminant level
MG	million gallons
MGD	million gallons per day
PDD	Peak-day Demand
PDEQ	Pima County Department of Environmental Quality
PHD	Peak-hour Demand
ppb	parts per billion
PRV	pressure reducing valve
psi	pounds per square inch
USEPA	US Environmental Protection Agency

CHAPTER 1. INTRODUCTION

The Sahuarita Water Company (SWC) is a private water utility currently located within the Town of Sahuarita, Arizona. The water company's current Certificate of Convenience and Necessity (CC&N) encompasses 3,314 acres that is generally located 10 miles south of Tucson City limits and straddles Interstate 19 (Exhibit 1). The current CC&N for the SWC approximately coincides with the Rancho Sahuarita Master Planned Community. SWC is requesting that the existing CC&N boundary be expanded to include an additional 5,445 Acres (Exhibit 2). Projects within the requested expansion include Mission Peaks, State Land, Sahuarita Mission, and an existing Sahuarita Unified School District school site. This water system master plan report will cover the buildout of the existing system and the expansion areas.

1.1. EXISTING CC&N SITE AND FACILITIES

The current Rancho Sahuarita property, contained within the existing CC&N boundary, is relatively flat with no major geologic formations within the site. The parcel of land gradually slopes eastward to the Santa Cruz River at approximately two percent. The highest portion of the property, located at La Cañada Drive and El Toro Road, is at an elevation of 2,920. The lowest point within the property is near the northeast corner at an elevation of 2,670.

The property surrounding SWC is primarily undeveloped land to the north, pecan orchards located along the east property boundary, and Asarco Mining Facilities and tailing areas to the west. Las Quintas Serenas Water Company is located southwest of the existing SWC CC&N. A Sahuarita Unified School District (SUSD) high, middle, and elementary school is surrounded by the existing CC&N boundary along Sahuarita Road. The CC&N is proposed to be extended to include the school site, which is currently served by its own well and distribution system.

The Rancho Sahuarita property, contained within the existing CC&N boundary, was at one time owned by Asarco, Inc. Portions of the original Asarco well fields are located within the property boundaries. Within the site boundaries are six large production wells which served the Asarco Mining Complex. The large production wells were originally served by three-phase overhead power and large transmission mains transporting the water northerly and then pumping westerly to the Mining Complex. Four of the six original production wells within the property are no longer operating. All pumps, motors, and associated equipment have been removed and the well casings capped. Two of the wells have been rehabilitated and are now serving the Rancho Sahuarita system; well numbers 14 and 18 are discussed further in this report.

1.2. OBJECTIVES

The current CC&N boundary is proposed to be extended to serve three new offsite projects west of the current CC&N boundary and the school site that is currently surrounded by the existing CC&N boundary. This master plan will address existing facilities and present future infrastructure requirements to serve both the existing CC&N service area and the proposed extension of the CC&N service area.

1.3. SYSTEM DEVELOPMENT AREA AND LAND USES

This report will be broken into the existing development area and future development areas. The existing service area is confined by the existing SWC CC&N boundary.

The existing Rancho Sahuarita Specific Plan consists of low- to high-density residential, a town center, regional commercial center, park industrial, public facilities, and open space. At buildout the current Rancho Sahuarita development will contain approximately 10,100 single-family (SF) units, 1,460 active-adult units, and approximately 3.1 million square feet of commercial use. Rancho Sahuarita's buildout is planned to occur in 2017.

Future developments, shown in Exhibit 2, consist of State Land, Sahuarita Mission, Mission Peaks, and an existing SUSD school site and are summarized below.

The State Land parcel consists of 634 acres, located in Section 16, Township 17 South, Range 13 East, and has a planned buildout density of 2,300 SF units. Planned non-residential use consists of commercial development and several proposed schools (one high school, one middle school, and one elementary school).

Sahuarita Mission consists of 471 acres, located in Sections 12 and 13, Township 17 South, Range 12 East, and has a planned buildout density of 3,000 SF units.

Mission Peaks consists of 4,216 acres, located in portions of Sections 19, 22, and 30 of Township 17 South, Range 13 East, portions of Sections 24 thru 27, 34, 35, and 36 of Township 17 South, Range 12 East, and portions of Sections 1 and 2 of Township 18 South, Range 12 East. Mission Peaks is anticipated to include 15,000 units. Within the 15,000 units, there are 11,123 single-family units, 2,371 active-adult units, 1,506 multi-family units. In addition to this number, 500 existing offsite units will be included to the water demands for this property as they may be served by the SWC potable water infrastructure at buildout of Mission Peaks. These units are in the Magee Ranch area. They are currently served by Las Quintas in an existing stand-pipe system. They may be served by a similar stand-pipe system located at the westerly border of Mission Peaks closer to their property by the proposed SWC. Mission Peaks will also include the development of an additional 1.1 million square feet of non-residential use. Non-residential use consists of commercial development, recreation centers, worship, and a police and fire station. Several proposed schools will also be located within Mission Peaks with one high school, one middle school, and two elementary schools planned.

The existing SUSD school site consists of 112 acres, located in portions of Sections 11 and 12, Township 17 South, Range 13 East and is surrounding by the existing SWC CC&N boundary. The existing school consists of a high school, middle school, and elementary school.

1.4. POPULATION PROJECTIONS

Population projections are determined based on land use type and number of units. Single-family (SF) units are estimated to have a persons per housing unit population of 2.7. Multi-family (MF) housing units are estimated to have a persons per housing unit population of 1.9. Active-adult (AA) housing units are estimated to have a persons per housing unit population of 1.8. The existing Sahuarita Water Company CC&N area has a projection population of 29,860 persons based on the criteria above. Future population is estimated based on the projected number of housing units and summarized in the Table 1. Buildout of the existing and future expansion area is projected at approximately 82,700 persons.

Table 1. Future Developments Population Projections

Development	SF Units	MF Units	AA Units	Total Units	Projected Population
Rancho Sahuarita	10,086	-	1,460	11,546	29,860
State Land	2,300	-	-	2,300	6,210
Sahuarita Mission	3,000	-	-	3,000	8,100
Mission Peaks	11,623*	1,506	2,371	15,500	38,511
Total	27,009	1,506	3,831	32,346	82,681

*Includes 500 units for a stand-pipe system that would benefit nearby residents that truck water.

CHAPTER 2. SCOPE AND APPROACH

2.1. WATER SOURCE CAPACITY AND QUALITY REQUIREMENTS

The Arizona Department of Environmental Quality (ADEQ) requires that the well system be capable of providing peak day demand (PDD) for the entire system with the largest well out of service. The Master Plan will develop the capacity requirements and locations for wells to meet this requirement. All new sources will be tested for water quality to determine if treatment is required to meet the current ADEQ water quality requirements.

2.2. STORAGE REQUIREMENTS

Reservoir storage capacity is a highly critical element in the design and operation of water systems. The storage will provide operational flexibility and system reliability. Reservoir storage is used primarily to accommodate hourly fluctuations and demand, PDD fluctuations, fire flow requirements, and emergency reserve storage. Each of these requirements added together form the required storage capacity for each zone. Current ADEQ criteria typically require 1.0 times the average daily demand (ADD) peak month plus fire flow requirements to be the minimum storage capacity per zone. Under certain circumstances, specifically in service areas with multiple wells, the storage capacity may be lowered. Pima County Department of Environmental Quality (PDEQ) has generally allowed the total storage to be reduced to ADD plus fire flow for a multiple well system. Storage capacity may be based on existing consumption and phased as the water system expands. Storage should be provided in the zone where the usage is required or be available to be readily transferred to the zone of use.

The goal of the Master Plan is to develop future reservoir capacity using floating storage wherever possible. The highest zones may be an exception, as an appropriate floating reservoir location may not be available. The water surface of a floating reservoir is set at the high water elevation for the zone, which is generally about 100-feet above the highest home in the zone. This allows the homes within the zone boundary to be served directly from the reservoir by gravity and the system pressure to be regulated by the reservoir elevation. This method provides a highly reliable system with very low pressure fluctuations. The system will also continue to operate during power outages using the stored water in the reservoir system.

2.3. PRESSURE REQUIREMENTS

Pressure extremes in water systems result in a potential for contamination to enter the system. Low pressures may allow polluted fluids to be forced into the system. High pressures may cause ruptures or breaks. Normal working pressure in the distribution system should not be less than 40 pounds per square inch (psi). System pressures under peak hour conditions should not drop below 35 psi anywhere within the system. The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all

points in the distribution system under all conditions of flow. Typically, a hydraulic analysis is run at a minimum of 25 psi in order to ensure that there is a minimum of 20 psi at any given household. This is generally understood to mean that the minimum residual pressure must be 20 psi for each customer in a fire flow event from any hydrant, during a flow condition of peak day plus fire flow. Maximum pressures as high as 100 psi can be allowed in small, low-lying areas not subject to high flow rates and surge pressure. The Uniform Plumbing Code limits the highest water pressure within the individual property owners' plumbing to 80 psi. Regulating the pressure from the meter to the customer is the responsibility of the customer.

2.4. Fire Flow Requirements

There are generally two considerations to providing adequate fire flow. The first consideration includes offsite requirements such as the volume of fire flow storage available in reservoirs, adequately designed pressure zones, and the size of transmission mains. The second factor is the internal distribution system within the neighborhood, including main sizes, adequate looping, and fire hydrant placement. The goal of the Master Plan is to develop adequately sized reservoirs, properly designed pressure zones, and water transmission mains sized to provide fire flow to existing areas, if possible, and to provide adequate fire flow for new development.

Fire flow requirements for homes typically vary from 1,000 to 1,750 gallons per minute (gpm), depending on the size of the home. The typical residential subdivision will have a fire flow requirement of 1,000 gpm for houses under 3,600 square feet and 1,750 gpm for houses 3,600 square feet and above. The standard duration requirement for residential fire flow is two hours. Commercial facility fire flow requirements also vary depending on the square footage of the commercial building, occupancy type, building material type, exposure distance to other buildings, and whether the structure is sprinklered. Typical commercial facilities will have fire low requirements from 1,500 to 2,500 gpm for a two to four hour duration. Fire flows can be adjusted by the local fire district, if the nature of the system or the rural nature of the area precludes the full fire flow per the International Fire Code. For purposes of the Master Plan, the fire flow will be assumed to be the different for each zone (see Tables 8 and 14) based on different types of non-residential use in each zone.

2.5. Water Main Requirements

The goal for the Master Plan is to describe a spine water transmission system that will transport the appropriate volume of source water to the zone of which it is utilized. Spine mains will also be sized to transport the appropriate volume of fire flow throughout each zone. The transmission and distribution systems should be sized and arranged to minimize friction-generated line losses and provide redundancy. It is recommended that the policy of SWC shall be to require or provide looped water transmission and distribution systems for the water main grid system wherever possible. In addition, appropriate valve

locations and intervals should be required to isolate small sections of main during breakages and reduce the number of residences out of service.

2.6. LAND AND EASEMENT REQUIREMENTS

The Master Plan will help to provide locations and sizes for future wells, reservoirs, booster stations, future treatment facilities, and major transmission mains to serve the water system. These facilities will be generally located on water system maps. Many factors and constraints will be required to determine the final location for each site. These factors include the proximity to existing water transmission mains, the proximity to three-phase power, access to local public streets, specific elevation requirements for floating reservoirs, hydrologic requirements for well sites, noise and buffer requirements for booster stations and wells, aesthetic screening requirements for aboveground facilities, and the cost of land and/or the availability of other preferable sites.

2.7. SYSTEM UPGRADES

The Master Plan will develop the system design criteria to guide the utility in designing proposed water facilities. The system design criteria will include methods for demand calculations, peaking factors, water supply requirements, the number and capacity of wells required, reservoir storage and booster station capacity requirements, emergency backup systems, distribution system sizing, and treatment and water system grid requirements.

The Master Plan will identify requirements for the existing CC&N boundary and future CC&N expansion at buildout, and specify the required new facilities and existing facility upgrades. These facilities will include additional and/or upgraded wells, booster station additions and upgrades, reservoir capacity additions, and transmission and distribution main extensions.

CHAPTER 3. ENGINEERING CRITERIA

Based on the information presented in Chapter 2, the system design criteria for the Master Plan are described below in terms of demand, supply, storage, and distribution system assumptions. The criteria presented in this chapter follow ADEQ, Arizona Department of Water Resources (ADWR), and Arizona Administrative Code (AAC) standards.

3.1. DEMAND CRITERIA

- Average daily per capita water usage for Single-Family and Active Adult residential ..... 110 gpcd
- Average daily per capita water usage for Multi-Family residential ..... 90 gpcd
- Average daily per square foot commercial, industrial, Institutional water use (gallons per day per square foot)..... 0.12*
- Average daily water usage for elementary/middle school use 25 gallons per student per day (gpsd)
- Average daily water usage for high school use ..... 43 gpsd
- Average number of persons per Single-Family dwelling unit..... 2.7
- Average number of persons per Active Adult dwelling unit..... 1.8
- Average number of persons per Multi-Family dwelling unit..... 1.9
- Ratio of peak-day to average-day use 2.0
- Ratio of peak-hour to average-day use 3.2

*Based on Arizona Administrative Code Title 18, Chapter 9, Shopping Center no food or laundry, sewage assumed to be 85 percent of water usage.

gpcd – gallons per capita per day
gpad – gallons per acre per day

3.2. SUPPLY CRITERIA

- Well capacity to meet PDD with the largest well out of service.
- Minimum supply from well and boosters pumping to elevated storage to meet PDD.
- Minimum booster capacity to zones without elevated storage to meet peak hour demand (PHD) or PDD plus fire flow, whichever is larger.

3.3. STORAGE CRITERIA

- Provide storage volume equal to a minimum of 1.0 times the ADD.
- Provide additional storage volume required to provide fire flow for a specific duration to each zone (see Tables 8 and 14)
- Provide valving at reservoirs to allow a change in the direction of supply to lower zones if required for fire flow.
- Provide two equally sized reservoirs at critical sites for phasing and maintenance considerations.

3.4. DISTRIBUTION SYSTEM CRITERIA

- System design and construction to meet Sahuarita Water Company, City of Tucson Water Department, and Arizona Department of Health Services requirements.

- Maximum friction head loss for lines up to and including 8 inches in size to be 8 feet per 1,000 feet or less. Head loss for lines over 8 inches in size to be 5 feet per 1,000 feet or less, according to pipe size. Maximum head losses will be determined by hydraulic modeling studies to maintain the required flow and system pressures.

- Distribution lines to be sized and arranged to provide required fire flows and to move source water to the zones with which it is utilized.

- The SWC pressure zones and zone boundaries are at 100 and 150-foot elevation differences for most of the system.

- Provide a line-size valve, normally closed, or a PRV station at pipelines crossing zone boundaries.

- Water will be supplied at the customer's meter within a static pressure range of 43 to 87 psi in 100-ft zones and 43 to 108 psi in 150-ft zones. Due to localized conditions, certain locations may receive water pressure slightly less or greater.

CHAPTER 4. EXISTING SYSTEM ANALYSIS

4.1. EXISTING SYSTEM OVERVIEW

The existing Sahuarita Water CC&N area is separated into pressure zones with zone boundaries located at 100-foot intervals. The high water elevations of the zone boundaries are also spaced at approximately 100-foot intervals. Typical static pressure fluctuations within the system will vary from approximately 40 psi at the top of the zone to 87 psi at the bottom of the zone, although static pressures will vary with daily demand fluctuations and fire flow conditions. The zone boundaries and high water elevations of the existing SWC CC&N area are shown in Table 2. The zone delineation is shown on Exhibit 1. The existing water system is divided into the following zones: 2850, 2950, and 3050. The 2950 Zone is further divided into two areas, a north area and a south area. For this report, the south 2950 Zone will be considered the 2950 Zone, while the north area will be noted as 2950 North (2950 N). The 2950 North Zone is presented individually in some subsequent tables, since this zone operates on a separate system of infrastructure than the other zones.

The 2850 Zone is currently served by gravity from two floating 2850 Zone Reservoirs and direct connection of Well Nos. 14 and 18 into the zone. The 2950 and 3050 Zones are currently served by booster stations pumping from storage at the 2850 Zone Reservoir. The 2950N Zone is served by a booster station pumping from storage at the Well No. 17 reservoir. In the future the 2950 Zone reservoir will be served by gravity from a proposed 2950 Zone floating reservoir.

Table 2. SWC Pressure Zone Boundaries

High Water (elev)	Elevation Boundaries	Static Pressure (psi)
2850	2650 – 2750	87 – 43
2950 and 2950 N	2750 – 2850	87 – 43
3050	2850 – 2950	87 – 43

The existing Sahuarita Water system currently delivers groundwater from two production wells to the 2850 Zone reservoir. The water supply must be distributed to the rest of the system through a booster station and reservoir system. The wells must provide sufficient capacity to meet PDD with the largest well out of service.

There are two reservoirs that serve to pressurize or float on the 2850 Zone. The floating storage serves as forebay storage for a booster station that provides pressure for the 2950 and 3050 Zones.

Exhibit 1 shows the existing infrastructure including wells, reservoirs, booster stations, and transmission mains.

4.2. EXISTING UNITS AND NON-RESIDENTIAL AREA

4.2.1. Existing Units

Table 3 demonstrates the number of existing units per zone within Sahuarita Water Company CC&N boundary. These numbers represents the number of connections as of April 2007.

Table 3. SWC Existing Units

Zone	Units
2850 Zone	2,973
2950 Zone	225
2950 N Zone	144
3050 Zone	357
TOTAL	**3,699**

4.2.2. Existing Non-Residential Area

Table 4 shows the existing non-residential acreage totals. This information was provided by Sahuarita Water Company.

Table 4. SWC Existing Non-Residential Areas

Zone	Use	Square Feet
2850 Zone	Main Lake Clubhouse, Lake, Lake Park, and Wastewater Treatment Plant	35,000 for Clubhouse and the Wastewater Treatment Plant, with an additional 17.5 acres for the Lake and Lake Park
2950 Zone	Post Office, Temporary Municipal Complex, Fire Department	24,000
2950 N Zone	Sonora Clubhouse	15,000
3050 Zone	Rancho Resort Clubhouse	15,000
TOTAL		**89,000**

4.3. EXISTING WELLS

The well capacity within the existing Sahuarita Water system consists of two active wells (Well Nos. 14 and 18) with a total capacity of 1,900 gpm for Well No. 14 plus 1,400 gpm for Well No. 18 for a total of 3,300 gpm or 4.75 million gallons per day (MGD). There are also four existing capped wells. The existing active wells and their capacities are shown in Table 5.

Table 5. Active Wells

Facility Name	Capacity (gpm)	Capacity (MGD)
Well No. 14	1,900	2.73
Well No. 18	1,400	2.02
TOTAL/AVERAGE	**3,300**	**4.75**

4.4. Existing Reservoirs and Booster Stations

The capacities and elevations of reservoirs and booster stations within Sahuarita Water are summarized in Table 6. The total booster station capacity within the Sahuarita Water system is approximately 6,650 gpm and the total reservoir capacity is 2.55-million gallons (MG).

Table 6. Existing Reservoir/Booster Summary

Pressure Zone	Well Capacity (gpm)	Booster Capacity	Storage (gallons)
2850	3,300	0	2,200,000
2950	0	2,550	0
3050	0	2,250	0
TOTAL	**3,300**	**4,800**	**2,200,000**
2950 N	0	1,850	350,000

4.5. Existing System Demands

The SWC verified the total number of existing connections for residential and commercial use (see Section 4.2). These values were used to calculate estimated existing demands. The number of units within each zone was used to calculate ADD, PDD, and PHD for each zone based on the engineering criteria presented in Chapter 2. This information is presented in Table 7. The 2950 North Zone is presented individually since this zone operates on a separate infrastructure system than the other zones. The 2950 North Zone is supplied source water to an on-site forebay reservoir by the 2850 Zone. The 2950 North Zone booster pumps water from the forebay reservoir to the 2950 North Zone distribution system and the booster is controlled by the pressure on the discharge side of the hydropneumatic tank.

As of the end of October 2007, actual water company source pumping records indicated a total volume of 1,212 acre-feet of water since the beginning of 2007. This equates to approximately 914 gpm over a 300 day period.

Table 7. Existing Demand

Pressure Zone	Existing Units	Existing Commercial (square feet)	Average Daily Demand (gpm)	Peak Daily Demand (gpm)	Peak Hour Demand (gpm)
2850	2,973 (SF)	35,000[a]	616	1,232[b]	1,972
2950	225 (SF)	24,000	48	97	155
3050	357 (AA)	15,000	50	101	161
TOTAL	**3,189 (SF) 357 (AA)**	**74,000**	**714**	**1,430**	**2,288**

[a]The 2850 Zone also includes demands for Lake and Lake Park. These demands were based on numbers received from Diane McKenzie at the Sahuarita Water Company and are not represented as a square footage.

[b]The 2850 Zone demand was calculated as follows: residential and non-residential demands were multiplied by a factor of 2 for conversion to PDD (as described in Chapter 3). The WWTP, Lake, and Lake Park demands were added as ADD since these properties should not experience significant peaking factors.

2950 N	76 (SF) 68 (AA)	15,000	26	53	84
TOTAL	**76 (SF) 68 (AA)**	**15,000**	**26**	**53**	**84**

The usage demands were calculated based on the previous design criteria and are as follows:

ADD = SF Units x 2.7 x 110 GPCD/1,440 = 0.21 gpm/SF unit
ADD = AA Units x 1.8 x 110 GPCD/1,440 = 0.14 gpm/AA unit
PDD = ADD x 2.0 = 0.42 gpm/SF unit
PDD = ADD x 2.0 = 0.28 gpm/AA unit
PHD = ADD x 3.2 = 0.67 gpm/SF unit
PHD = ADD x 3.2 = 0.45 gpm/AA unit

4.6. Existing System Fire Flow Requirements

Table 8 presents the existing fire flow requirements for each of the zones.

Table 8. Existing Fire Flow Requirements

Pressure Zone	Fire Flow Demand (gpm)	Fire Flow Duration (hours)	Total Fire Flow Storage (gallons)
2850	1,500	2	180,000
2950	2,000	4	480,000
3050	1,500	2	180,000
2950 N	1,500	2	180,000

4.7. Existing System Requirements

A summary of the existing requirements and the existing infrastructure is shown in Table 9. Exhibit 1 also presents the existing infrastructure and pipelines.

The table below demonstrates that the well production of both wells (Well Nos. 14 and 18) is above existing PDD demands. However, by ADEQ standards, the well production system must be able to

provide PDD when the largest well is out of service. The largest well is Well No. 14 at 1,900 gpm of flow. Therefore, with only Well No. 18 at 1,400 gpm to serve the system, the projected well requirement is just under the recommended criteria. Considering the actual demand recorded by the water company is approximately 914 gpm, the current well capacity is sufficient to provide existing demands with the largest well out of service. Plans are currently being designed to add a new well (Well No. 23) to the system.

The existing storage capacity is currently above the recommended standards presented in Chapter 3.

Table 9. Existing System Capacity Requirements

Zone	Well Requirement (PDD) (gpm)	Total Well Capacity (gpm)	Fire Flow Requirement	Booster Requirement (PDD + FF)	Existing Booster Capacity (gpm)	Storage Requirement[b] (ADD + FF)	Existing Storage Capacity (gallons)
2850	1,232	1,400[a]	1,500	N/A	N/A	1,067,181	2,200,000
2950	97	0	2,000	2,097	2,550	369,705	
3050	101	0	1,500	1,601	2,250	72,486	
TOTAL	**1,430**	**1,400**		**3,198**	**4,800**	**1,509,372**	**2,200,000**

[a]The total well capacity is 1,400 gpm for Well No. 14 and 1,900 gpm for Well No. 18. However, to demonstrate the largest well out of service, 1,400 gpm is shown as the well capacity.
[b]The existing Fire Flow requirement of 1,500 gpm for 2 hours was added to the 2850 Zone Storage Requirement.

2950 N	53	0	1,500	1,553	1,850	259,836[c]	350,000
TOTAL	**53**	**0**	**1,500**	**1,553**	**1,850**	**259,836**	**350,000**

[c]A Fire Flow requirement of 1,500 gpm for 2 hours was also added to the 2950 North Zone Storage Requirement.

4.8. EXISTING SYSTEM BUILDOUT REQUIREMENTS

A summary of the existing system buildout requirements for the current CC&N boundary and the proposed infrastructure is shown in Table 10. Exhibit 1 also presents the proposed infrastructure and pipelines.

At buildout, the production capacity of Well No. 14 will be replaced by Well Nos. 23. Well No. 14 production capacity is planned to be replaced by source capacity from a newly drilled well in the future to insure greater system reliability since this well is reaching the projected life expectancy for a production well. It has been determined that Well No. 14 will be downsized to provide water to the current Town of Sahuarita Lake, Lake Park, and right-of-ways under a existing Type I water right. This well is planned to be taken off-line by the fourth quarter of 2010. Additional well production capacity needed will be provided by Well Nos. 21, 24B, and 25. Future storage capacity will consist of two 1.25 MG floating 2950 Zone reservoirs. Once the 2950 Zone reservoir is operational, the 2950 Zone booster will no longer be required to provide fire flow and will be sized to move PDD for the 2950 Zone. The 3050 Zone is planned to be served by two pressure controlled booster stations, one is currently existing and the second will be constructed at the new 2950 Zone reservoir site.

Table 10. Existing System Buildout Capacity Requirements

Zone	Well Requirement (PDD) (gpm)	Total Well Capacity[a] (gpm)	Fire Flow Requirement	Booster Requirement (PDD + FF)	Proposed Booster Capacity (gpm)	Storage Requirement[b] (ADD + FF)	Proposed Storage Capacity (gallons)
2850	1,658	3,900	1,500	N/A	N/A	1,373,664	2,200,000
2950	2,793	1,500	2,000	2,610	3,050	2,490,749	2,500,000
3050	483	0	2,250	2,733	4,650	408,058	
TOTAL	**4,934**	**5,400**		**5,343**	**7,700**	**4,272,471**	**4,700,000**

[a]The total well capacity is 6,900 gpm for Well No. 18, 21, 23, 24B and 25. However, to demonstrate the largest well out of service, 5,400 gpm is shown as the well capacity.

[b]The proposed Fire Flow requirement of 1,500 gpm for 2 hours was added to the 2850 Zone Storage Requirement. The proposed fire flow requirement of 2,000 gpm for 4 hours was added to the 2950 Zone Storage Requirement. Because the 3050 Zone is served by the 2950 Zone reservoir at buildout the proposed fire flow requirement of 2,250 gpm for 4 hours was reduced to 250 gpm for four hours for the 3050 Zone Storage Requirement.

2950 N	323	0	1,500	1,823	1,850	412,371[c]	350,000
TOTAL	**323**	**0**	**1,500**	**1,823**	**1,850**	**412,371**	**350,000**

[c]A Fire Flow requirement of 1,500 gpm for 2 hours was also added to the 2950 North Zone Storage Requirement.

CHAPTER 5. FUTURE SYSTEM ANALYSIS

5.1. FUTURE SYSTEM OVERVIEW

The expansion area of the Sahuarita Water CC&N boundary is separated into pressure zones with zone boundaries located at 150-foot intervals. The high water elevations of the zone boundaries are also spaced at approximately 150-foot intervals. The standard pressure for a typical 150-foot zone is 43 to 108 pounds per square inch (psi). For the 180-foot zone, the pressure will be approximately 43 to 122 psi, although static pressures will vary with daily demand fluctuations and fire flow conditions. Individual pressure-reducing valves (PRVs) will be required for all homes with main pressures greater than 80 psi. The zone boundaries and high water elevations of the proposed extension area of the SWC CC&N area are shown in Table 11. The existing SUSD School will be served by the existing 2950 Zone. The zone delineation is shown on Exhibit 2. The proposed water system expansion is divided into the following zones: 3270, 3420, 3570, 3720, and 3900.

Each zone is served by one or a combination of the following methods: floating reservoir, booster stations pumping from storage, or booster stations pumping to a reservoir that floats the zone.

Table 11. Proposed Sahuarita Water Company Pressure Zone Boundaries

Zone	High Water (ft)	Boundaries (ft)	Static Pressure (psi)	Ultimate Control Method
3270	3270	3020 to 3170	108 - 43	Level
3420	3420	3170 to 3320	108 - 43	Level
3570	3570	3320 to 3470	108 - 43	Level
3720	3720	3470 to 3620	108 - 43	Level
3900	3900	3620 to 3800	122 - 43	Pressure

5.2. PROPOSED CC&N BUILDOUT SYSTEM DEMANDS

The future buildout populations and demands are based on the zones as discussed in previous sections. The buildout demands were based on the latest land planning information for each project. The projected number of units served at buildout is approximately 32,300 units, as shown in Table 1. Within the 32,300 units, there are approximately 27,000 single-family units, 3,800 active-adult units, 1,500 multi-family units. The non-residential square footage is projected to be approximately 4.2 million square feet. The breakdown of these units and the associated water demands in terms of ADD, PDD, and PHD are presented in Table 12. Further analyses of all calculations are presented in Appendix A.

Table 12. Buildout Water Usage Summary

Pressure Zone	Future Units	Non-residential (Sq. Ft)	Number of Students	Average Daily Demand (gpm)	Peak Daily Demand (gpm)	Peak Hour Demand (gpm)
2850	3,992 (SF)	67,000	-	829	1,658	2,653
2950	5,603 (SF)	1,793,252	1,226 (HS) 3,150 (ES)	1,396	2,793	4,468
2950-N	491 (SF) 428 (AA)	15,000	-	161	323	516
3050	1,032 (AA)	1,197,683	-	242	483	773
3270	1,999 (SF) 174 (MF)	344,355	478 (HS) 2,028 (ES)	511	1,022	1,636
3420	375 (SF) 226 (MF) 1,161 (AA)	70,855	-	270	539	863
3570	3,478 (SF) 1,106 (MF) 1,210 (AA)	619,271	1,287 (ES)	1,089	2,178	3,485
3720	5,079 (SF)	-	478 (HS) 2,028 (ES)	1,097	2,194	3,510
3900	5,992 (SF)	70,855	-	1,242	2,484	3,974
TOTAL	**27,009 (SF) 1,506 (MF) 3,831 (AA)**	**4,178,271**	**2,182 (HS) 8,493 (ES)**	**6,837**	**13,674**	**21,878**

(HS) High School (ES) Elementary School

5.3. FUTURE SYSTEM SIZING

The previously provided water system design criteria were used to develop the future water system buildout capacity requirements for Sahuarita Water Company. Future system requirements include the capacity of wells, storage, boosters, and mains to serve future demands. The proposed future system upgrades are shown on Exhibit 2.

Exhibit 2 shows the interconnection of zones including production requirements, booster station facility capacities, and reservoir sizes. The proposed infrastructure is noted and proposed transmission mains are shown as solid lines. This exhibit identifies the zones without reservoirs where the boosters are required to provide PDD plus fire flow.

5.3.1. Wells

Well production requirements are based on meeting PDD. Sufficient reserve capacity is required to meet PDD with the largest well out of service.

A new arsenic standard that defines the maximum contaminant level of arsenic at 10 parts per billion (ppb) has been approved by the US Environmental Protection Agency (USEPA). Recent ADEQ MAPS tests results indicated that arsenic levels in both existing Well Nos. 14 and 18 are currently under the 10 ppb requirement. Well No. 14 production capacity is planned to be replaced by a newly drilled well in

the future to insure greater system reliability since this well is reaching the projected life expectancy for a production well. It has been determined that Well No. 14 will be downsized to provide water to the current Town of Sahuarita Lake, Lake Park, and right-of-ways under a existing Type I water right. This well is planned to be taken off-line by the fourth quarter of 2010.

In order to serve future demands, it is planned that approximately 10 new wells will be drilled to serve Sahuarita Water Company. The locations for these wells can be found on Exhibit 2. Exploratory borings have been conducted at five (Wells Nos. 21, 22, 23, 25, and 26) of the ten proposed well locations to verify lithology and groundwater quality. Water Quality results show that arsenic levels do not currently exceed the arsenic maximum contaminant level (MCL) or can be kept below the new requirement through well design. Additional exploratory drilling is expected to be done within the next few months on Well No. 24B for further investigation. It is anticipated that the production capacity of these wells will be approximately 1,500 gpm each; with the exception of Well No. 21 that has a projected capacity of 1,000 gpm and Well No. 26 with a projected capacity of 750 gpm. The first production well to be drilled will be Well No. 23, due to it's proximity to existing facilities. Well Site Nos. 17R, 18, 19R, and 21 are planned to pump via dedicated well collection main to the existing reservoirs located near Well No. 23. Well No. 25 is expected to pump directly into the 2950 pressure zone. The remaining wells, Well Nos. 26, 27, 28, and 30 are anticipated to pump through dedicated well collection mains to a forebay reservoir then pumped into the future 2950 Zone reservoir via booster station for distribution through the proposed water system. Depending on the capacities of each of these wells, there is the potential for more or less wells.

Each well will be equipped with a manual transfer switch to allow a portable backup generator to power the wells during a power outage.

A summary of the required well capacities and the future additional well capacity required is presented in Table 13.

Table 13. Future Well Capacity Requirements

	Buildout PDD capacity (gpm)
System Requirement:	**13,674**
	Future Well Capacity (gpm)
Future Wells:	
17R	1,500
18	1,400
19R	1,500
21	1,000
23	1,500
24B	1,500
25	1,500
26	750
27	1,500
28	1,500
30	1,500
14	This well will be downsized to serve non-potable demands of the Lake and Lake Park under the existing Town Type I Water right.
TOTAL	**15,150***

*13,750 gpm with largest well out of service.

5.3.2. Future Fire Flow Requirements

The fire flow requirement for the 2950 North Zone is considered separate as it was in the existing system. The largest fire flow, in the 3050 Zone, will dictate the size of the planned 2950 Zone reservoirs.

Table 14. Future Fire Flow Requirements

Pressure Zone	Fire Flow Demand (gpm)	Fire Flow Duration (hours)	Total Fire Flow Storage (gallons)
2850	1,500	2	180,000
2950	2,000	4	480,000
2950 N	1,500	2	180,000
3050	2,250	4	540,000
3270	2,250	2	270,000
3420	1,750	2	210,000
3570	2,250	2	270,000
3720	2,250	2	270,000
3900	1,750	2	210,000

5.3.3. Storage

Storage sizing requirements are based on meeting 1.0 times the ADD plus fire flow. Fire flow demands will either be served by a floating reservoir for the 2850, 2950, 3270, 3420, 3570, and 3720 Zones, or via a pressurized booster station feeding off a reservoir for the 2950N, 3050, and 3900 Zones.

The storage requirements per zone are presented in Table 15. The Sahuarita Water system buildout requires an additional 10.7 MG of storage distributed throughout the system to meet the storage criteria. The proposed reservoir sizing to meet this requirement is summarized by zone in Table 16. These reservoirs are anticipated to be constructed at the locations shown on Exhibit 2. These reservoirs will float the 2950, 3270, 3420, 3570, and 3720 Zones and will have booster stations onsite to serve the 3050 and 3900 Zones. The booster station at the 2950 Zone will act as a redundant booster station to the existing 3050 Zone booster station at the existing 2850 Zone reservoir site. Normal practice for upgrading storage or supply is when the system demand is at 90 percent of the system supply or storage capacity.

There will also be a 0.6 MG Well Collection reservoir designed at the Well No. 26 site. This reservoir will serve as a forebay reservoir for the four new wells on the south side of the Rancho Sahuarita property; Well Nos. 26, 27, 28, and 30.

Table 15. Future Reservoir Capacity Requirements

Zone	Potable Storage Requirement (1.0 ADD/ gal)	Fire flow Storage Requirement (gal)	Total Storage Requirement (gal)	Total Existing Storage Capacity (gal)	Total Future Storage Capacity (gal)	Excess Storage Capacity[a] (gal)
2850	1,193,664	180,000	1,373,664	2,200,000	-	826,336
2950	2,010,749	480,000	2,490,749	0	2,500,000	9,251
2950 N	232,371	180,000	412,171	350,000	-	(62,171)
3050	348,058	540,000[b]	348,058	0	0	(348,058)
3150	-	-	-	0	1,200,000	1,200,000
3270	736,034	270,000	1,006,034	0	1,000,000	(6,034)
3420	388,402	210,000	598,402	0	1,200,000	601,598
3570	1,568,160	270,000	1,838,160	0	1,800,000	(38,160)
3720	1,579,717	270,000	1,849,717	0	1,200,000	(649,717)
3900	1,788,127	210,000[c]	1,788,127	0	1,200,000	(588,127)
Well Collection Forebay	-	-	-	0	600,000	600,000
TOTAL	**9,845,281**		**11,705,082**	**2,550,000**	**10,700,000**	**1,544,918**

[a]Parentheses indicate negative numbers
[b]Fire flow volume already provided in 2850 and 2950 Zone reservoirs
[c]Fire Flow volume already provided in 3720 Zone reservoir

Table 16. Proposed Reservoirs

Zone	Potable Storage Requirement (gallons)	Proposed Storage Reservoirs (gallons)
2850*	2,200,000	1,000,000 / 1,200,000
2950*	2,500,000	1,250,000 / 1,250,000
2950 N	350,000	350,000
3050	0	-
3150	1,200,000	600,000 / 600,000
3270*	1,000,000	1,000,000
3420*	1,200,000	600,000 / 600,000
3570*	1,800,000	900,000 / 900,000
3720*	2,400,000	1,200,000 / 1,200,000
Forebay	600,000	600,000
TOTAL	**13,250,000**	**13,250,000**

*Zones with floating storage

5.3.4. Booster Station and Transmission Facilities

5.3.4.1 Booster Stations

Booster station facility sizing is based upon conveying the PDD from zones with excess supply capacity to the zones within the water system without supply capacity. As can be seen on Exhibit 2, all of the SWC wells are located in the 2850 and 2950 Zones. This situation occurs because the greatest hydrologic water availability is located within these zones. The water that is extracted within these zones must, therefore, be transported through booster stations to the remaining zones in the system. In zones that are not served by floating reservoirs, the PDD and fire flow requirements must be supplied by the booster station.

The 2850 Zone is currently a floating zone and will remain a floating zone, so there are no booster station requirements for this zone. The 2950 Zone will be a floating zone upon construction of the new reservoir at the intersection of El Toro and La Cañada Drive. Until this time, the 2950 Zone will be served by the booster station at the existing 2.2 MG 2850 Zone reservoir site. The existing capacity of this booster station is 2,550 gpm. Per WestLand's 2950 Zone booster station plans designed in January 2004, the first pump of this booster station (250 gpm) is designed to be replaced by a 750 gpm pump to provide an ultimate flow at this booster station of 3,050 gpm.

There will be a second 3050 Zone booster station at the site of the new 2950 Zone reservoir at the intersection of El Toro and La Cañada Drive. This booster station is expected to have a capacity of approximately 2,400 gpm. This size is based on a portion of the buildout flow for the 3050 Zone PDD plus 2,250 gpm fire flow.

There will also be two 3150 Zone booster stations designed for the transport of flow from the 2850 and 2950 Zone Reservoirs to the forebay reservoirs located within Mission Peaks 3270 Zone. The 3150 Zone booster stations will be sized to move PDD to the 3270, 3420, 3570, 3720, and 3900 Zones to serve State Land, Mission Peaks, and Sahuarita Mission. The PDD demands of these zones is approximately 8,400 gpm, therefore each booster will provide 4,300 gpm. There will be an additional 2950 Zone booster located at the well collection forebay storage reservoir that will transported treated or blended water to the proposed 2950 Zone reservoir. This booster will move well capacity for Well Nos. 26, 27, 28, and 30 with an estimated combined capacity of 5,250 gpm.

The large capacity transfer booster stations (3150, 3420, 3570, 3720, and 3900 Zones) will be designed with equal sized transfer booster pumps. The transfer booster stations will have dual suction manifolds from each reservoir and dual discharge lines for redundancy and ease of maintenance. Each booster station will be equipped with backup generators to ensure continued operation during a power outage. All proposed booster stations will have an extra equal sized pump and separate electrical panels to operate each pump to allow for pumps to be taken off-line for maintenance or replacement without having to shut-down the entire booster station.

Table 17. Booster Station Capacity Analysis

Zone	PDD (gpm)	Fire Flow Requirements (gpm)	Total Required Booster Station Capacity (gpm)	Proposed Booster Station Capacity (gpm)
2850	1,658	1,500 However, this is a floating zone, and therefore fire flow is provided by the 2850 Reservoir.	N/A, Floating	N/A, Floating
2950	2,793	2,000 However, this is a floating zone, and therefore fire flow is provided by the future 2950 Reservoirs.	2,793	3,050
2950 N	323	1,500	1,823	1,850
3050	483	2,250	2,733	1-2,400* 1-2,250
3150	8,417	N/A	8,417	2- 4,300
3270	1,022	2,250 However, this is a floating zone, and therefore fire flow is provided by the future 3270 Reservoirs.	1,022	1,100
3420	539	1,750 However, this is a floating zone, and therefore fire flow is provided by the future 3420 Reservoirs.	7,395	7,500
3570	2,178	2,250 However, this is a floating zone, and therefore fire flow is provided by the future 3570 Reservoirs.	6,856	6,900
3720	2,194	2,250 However, this is a floating zone, and therefore fire flow is provided by the future 3720 Reservoirs.	4,678	4,700
3900	2,484	1,750	4,234	4,300

*Includes existing booster station at the 2850 Reservoir and proposed 2950 Zone reservoir (corner of El Toro and La Cañada Drive).

5.3.4.2 Transmission Mains

Exhibit 1 also shows the total capacity of transmission systems required for transporting water throughout the system. Main size requirements can then be estimated based upon maximum velocity requirements and maximum pipe friction losses in order to maintain adequate pressure within the system during PDD plus fire flow conditions. The 3150 Zone mains will transport PDD for the 3270, 3420, 3570, 3720, and 3900 Zones. Large diameter mains are proposed to reduce head losses, operating and pumping costs. Dual water mains transfer source water through the system and provide redundancy for future maintenance or replacement. The water main between the proposed forebay reservoir at Well No. 26 and the 2950 Zone reservoir will be required to transport well capacity from Well Nos. 26, 27, 28, and 30 with an estimated combined capacity of 5,250 gpm. Well collection mains are sized based on the well capacity being transported by them.

5.4. PROPOSED FACILITIES

The facilities proposed to meet the future system buildout requirements are described below. These facilities are also shown on Exhibit 2.

5.4.1. Well System Requirements

In accordance with Table 12, the future buildout capacity of the Sahuarita Water system is approximately 13,556 gpm, which is equivalent to approximately 19.5 million gallons per day (MGD) capacity requirements. As was discussed in Section 5.3.1, in order to meet these peak day demands, an additional seven wells at 1,500 gpm, one well at 750 gpm, and one well at 1,000 gpm will be required. These nine wells will be supplemented by an extra well in case of a well outage.

The future and existing well site locations are shown on Exhibit 2. This report is not considering existing Well Nos. 17, 18, 19, or 20 as part of the future system. Existing Well Nos. 17, 19, and 20 are planned to be abandoned. Wells Nos. 17 and 19 will be replaced by proposed Well Nos. 17R and 19R.

5.4.2. Reservoir System Requirements

Based upon Table 15, it is anticipated that approximately 10.7 MG of additional reservoir capacity will be required to provide 1.0 times the ADD plus fire flow. The proposed floating zone storage systems within the SWC system will provide service to the 2850, 2950, 3270, 3420, 3570, and 3720 Zones. The 2950 N, 3050, and 3900 Zones will be served via pumped storage. Reservoir capacity will be split between equally sized reservoirs, when possible, to allow for system flexibility and maintenance. The following new reservoirs are proposed:

- Two adjacent 1.25 MG 2950 Zone reservoirs located at the intersection of El Toro and La Cañada Drive at southwest corner of the 3050 Zone (Exhibit 1). These reservoirs will have a combined capacity of 2.5 MG.

- A 0.6 MG Well Collection reservoir located at Well Site No. 26. This will serve as a forebay reservoir to Well Nos. 26, 27, 28, and 30.

- Two adjacent 0.6 MG forebay reservoirs located along the eastern edge of the Mission Peaks project. These reservoirs will be phased and provide storage capacity for zones located within the Mission Peaks and Sahuarita Mission projects. These reservoirs will have a combined capacity of 1.2 MG.

- A 1.0 MG floating 3270 Zone reservoir located within the Mission Peaks project.

- Two adjacent 0.6 MG floating 3420 Zone reservoirs located within the Mission Peaks project. These reservoirs will be phased and provide storage capacity for zones located within the Mission Peaks and Sahuarita Mission projects. These reservoirs will have a combined capacity of 1.2 MG.

- Two adjacent 0.9 MG floating 3570 Zone reservoirs located within the Mission Peaks project. These reservoirs will have a combined capacity of 1.8 MG.

- Two adjacent 1.2 MG 3720 Zone floating reservoirs located within the Mission Peaks project. These reservoirs will have a combined capacity of 2.4 MG. Additional storage capacity for the 3720 and 3900 Zones is stored in the 3150 Zone forebay reservoirs.

5.4.3. Booster Station Requirements

The booster station locations, zone boundaries, and capacities are as follows:

- Upgrade to the existing 2950 Zone booster station will be required. The upgrade will upsize pump 1 of this booster station from 250 gpm to 750 gpm to a total flow of 3,050 gpm.

- A new 3050 Zone booster station will be required. This booster station will be designed at the intersection of El Toro and La Cañada Drive next to the proposed 2950 Zone reservoirs. This booster station is expected to have a capacity of approximately 2,400 gpm. This size is based on a portion of the buildout flow for the 3050 Zone PDD plus 2,250 gpm fire flow.

- An upgrade to the 2950 North Zone booster station will be required. A spare 550 gpm pump will be added as future Pump 4 to this manifold. The addition of a pump to the booster station will mean that the booster station capacity will meet the buildout requirements of PDD (2,793 gpm).

- There will be a 5,250 gpm Well Collection booster station located at Well Site No. 26. This will serve to transport water from the Well Collection Reservoir fed by Well Nos. 26, 27, 28 and 30.

- Two new 3150 Zone booster stations will be required. The booster stations will be located at the intersection of El Toro and La Cañada Drive next to the proposed 2950 Zone reservoirs and adjacent to the existing 2850 Zone reservoir site and Well No. 23. These booster stations will transfer PDD for the 3270, 3420, 3570, 3720, and 3900 Zones to the forebay reservoirs located on the eastern boundary of Mission Peaks. Each booster will have a 4,300 gpm capacity.

- A 3270 Zone booster station will be required to fill the 3270 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3270 Zone. The proposed capacity of this booster station will be 1,100 gpm.

- A 3420 Zone booster station will be required to fill the 3420 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3420, 3570, 3720, and 3900 Zones. The proposed capacity of this booster station will be 7,500 gpm and will be phased in according to capacity requirements.

- A 3570 Zone booster station will be required to fill the 3570 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3570, 3720, and 3900 Zones. The proposed capacity of this booster station will be 6,900 gpm and will be phased in according to capacity requirements.

- A 3720 Zone booster station will be required to fill the 3720 Zone floating reservoir. This booster station will be controlled by the level in the reservoir. The booster will be sized to transfer PDD to the 3720 and 3900 Zones. The proposed capacity of this booster station will be 4,700 gpm and will be phased in according to capacity requirements.

- A 3900 Zone booster station will be required to provide PDD plus fire flow to the 3900 Zone. This booster station will be controlled by pressure in the 3900 Zone. The proposed capacity of this booster station will be 4,300 gpm and will be phased in according to capacity requirements. This site will be equipped with a back-up generator.

5.4.4. Transmission System Requirements

A number of mains are required in order to provide transport capacity between wells and reservoirs, provide additional capacity for fire flow to interior service areas, and improve the looping and layout of the distribution system. In addition to the transmission mains between reservoirs, a concept distribution system loop for fire flow and redundancy is proposed. The sizing of these mains should be confirmed through further detailed analysis.

Dual large diameter water mains are proposed to move large volumes of source water up through the system to the reservoirs in the highest zones. Dual mains allow continued water transport during a main break or shut-down needed for maintenance purposes. Large diameter mains reduce system head loss which in turn reduces the amount of pumping head needed to transport water from one zone to the next. A reduction in pumping head will equate to a reduction in pumping electrical costs.

APPENDIX A

DEMAND CALCULATIONS

Rancho Sahuarita Water Mater Plan Demands - Summary

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential			Demand		
Zone	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)
2850	3,992	-	-	67,000	-	-	1,193,664	1,658	2,653
2950	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468
2950N	491	-	428	15,000	-	-	232,371	323	516
3050	-	-	1,032	1,197,683	-	-	348,058	483	773
3270	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636
3420	375	226	1,161	70,855	-	-	388,402	539	863
3570	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485
3720	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510
3900	5,992	-	-	70,855	-	-	1,788,127	2,484	3,974
Total	27,009	1,506	3,831	4,178,271	2,182	8,493	9,845,281	13,674	21,878

Revisions made per Matt on 8/24 (15000 units Mission Peaks + 2300 units State Land + 500 units McGee Ranch)
Revisions made per Marian on 9/12 (revise active adult units (100% of units in 3050, 428 units in 2950N)(revise commerical SF per e-mailed spreadshe
Revision made per Marian on 9/13 (revise hospital in 2950 zone to add 245,000 SF in 2017)

Rancho Sahuarita Water Mater Plan Demands - 2850 Zone

Demand Criteria

Residential		Non-residential		Peak Factors	
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2	peak day
1.9 pphu	multi-family			3.2	peak hour
1.8 pphu	active-adult				
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School		
90 gpcd	multi-family	43 gpsd	High School		

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	2,973	-	-	35,000	-	-	887,181	1,232	1972	1500
2007	3,356	-	-	35,000	-	-	1,000,932	1,390	2224	1500
2008	3,711	-	-	35,000	-	-	1,106,219	1,536	2458	1500
2009	3,781	-	-	35,000	-	-	1,127,157	1,565	2505	1500
2010	3,876	-	-	51,000	-	-	1,157,292	1,607	2572	1500
2011	3,992	-	-	59,000	-	-	1,192,704	1,657	2650	1500
2012	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2013	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2014	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2015	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2016	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2017	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2018	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2019	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2020	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2021	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2022	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2023	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2024	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2025	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2026	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2027	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2028	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2029	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2030	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2031	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2032	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2033	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500
2034	3,992	-	-	67,000	-	-	1,193,664	1,658	2653	1500

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 2950 Zone

Demand Criteria

Residential

2.7 pphu	single-family
1.9 pphu	multi-family
1.8 pphu	active-adult
110 gpcd	single-family & Active-adult
90 gpcd	multi-family

Non-residential

0.12 gpdpsf	Commercial
25 gpsd	Elementary School
43 gpsd	High School

Peak Factors

2	peak day
3.2	peak hour

Year	Residential			Non-Residential						
	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	225	-	-	24,000	-	-	69,705	97	155	2,000
2007	225	-	-	288,196	-	-	101,409	141	225	2,000
2008	1,064	-	-	376,305	1,159	-	483,502	672	1,074	2,000
2009	1,214	-	-	473,252	1,226	2,900	546,166	759	1,214	2,000
2010	1,590	-	-	698,252	1,226	3,044	687,488	955	1,528	2,000
2011	1,778	-	-	993,252	1,226	3,150	778,724	1,082	1,730	2,000
2012	2,307	-	-	1,043,252	1,226	3,150	941,837	1,308	2,093	2,000
2013	2,907	-	-	1,199,252	1,226	3,150	1,138,757	1,582	2,531	2,000
2014	3,507	-	-	1,296,252	1,226	3,150	1,328,597	1,845	2,952	2,000
2015	4,107	-	-	1,510,252	1,226	3,150	1,532,477	2,128	3,406	2,000
2016	4,707	-	-	1,548,252	1,226	3,150	1,715,237	2,382	3,812	2,000
2017	5,307	-	-	1,793,252	1,226	3,150	1,922,837	2,671	4,273	2,000
2018	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2019	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2020	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2021	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2022	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2023	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2024	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2025	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2026	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2027	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2028	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2029	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2030	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2031	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2032	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2033	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000
2034	5,603	-	-	1,793,252	1,226	3,150	2,010,749	2,793	4,468	2,000

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 2950N Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	76	-	68	15,000	-	-	37,836	53	84	1,500
2007	161	-	143	15,000	-	-	77,931	108	173	1,500
2008	341	-	297	15,000	-	-	161,883	225	360	1,500
2009	378	-	330	15,000	-	-	179,406	249	399	1,500
2010	429	-	374	15,000	-	-	203,265	282	452	1,500
2011	491	-	428	15,000	-	-	232,371	323	516	1,500
2012	491	-	428	15,000	-	-	232,371	323	516	1,500
2013	491	-	428	15,000	-	-	232,371	323	516	1,500
2014	491	-	428	15,000	-	-	232,371	323	516	1,500
2015	491	-	428	15,000	-	-	232,371	323	516	1,500
2016	491	-	428	15,000	-	-	232,371	323	516	1,500
2017	491	-	428	15,000	-	-	232,371	323	516	1,500
2018	491	-	428	15,000	-	-	232,371	323	516	1,500
2019	491	-	428	15,000	-	-	232,371	323	516	1,500
2020	491	-	428	15,000	-	-	232,371	323	516	1,500
2021	491	-	428	15,000	-	-	232,371	323	516	1,500
2022	491	-	428	15,000	-	-	232,371	323	516	1,500
2023	491	-	428	15,000	-	-	232,371	323	516	1,500
2024	491	-	428	15,000	-	-	232,371	323	516	1,500
2025	491	-	428	15,000	-	-	232,371	323	516	1,500
2026	491	-	428	15,000	-	-	232,371	323	516	1,500
2027	491	-	428	15,000	-	-	232,371	323	516	1,500
2028	491	-	428	15,000	-	-	232,371	323	516	1,500
2029	491	-	428	15,000	-	-	232,371	323	516	1,500
2030	491	-	428	15,000	-	-	232,371	323	516	1,500
2031	491	-	428	15,000	-	-	232,371	323	516	1,500
2032	491	-	428	15,000	-	-	232,371	323	516	1,500
2033	491	-	428	15,000	-	-	232,371	323	516	1,500
2034	491	-	428	15,000	-	-	232,371	323	516	1,500

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 3050 Zone

Demand Criteria

Residential

2.7 pphu	single-family
1.9 pphu	multi-family
1.8 pphu	active-adult
110 gpcd	single-family & Active-adult
90 gpcd	multi-family

Non-residential

0.12 gpdpsf	Commercial
25 gpsd	Elementary School
43 gpsd	High School

Peak Factors

2 peak day
3.2 peak hour

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	357	15,000	-	-	72,486	101	161	2,250
2007	-	-	357	15,000	-	-	72,486	101	161	2,250
2008	-	-	357	15,000	-	-	72,486	101	161	2,250
2009	-	-	357	424,000	-	-	121,566	169	270	2,250
2010	-	-	357	739,000	-	-	159,366	221	354	2,250
2011	-	-	357	782,486	-	-	164,584	229	366	2,250
2012	-	-	357	854,378	-	-	173,211	241	385	2,250
2013	-	-	357	878,378	-	-	176,091	245	391	2,250
2014	-	-	357	985,734	-	-	188,974	262	420	2,250
2015	-	-	357	1,047,683	-	-	196,408	273	436	2,250
2016	-	-	357	1,197,683	-	-	214,408	298	476	2,250
2017	-	-	357	1,197,683	-	-	214,408	298	476	2,250
2018	-	-	661	1,197,683	-	-	274,600	381	610	2,250
2019	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2020	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2021	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2022	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2023	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2024	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2025	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2026	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2027	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2028	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2029	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2030	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2031	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2032	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2033	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250
2034	-	-	1,032	1,197,683	-	-	348,058	483	773	2,250

All development in this zone located in Rancho Sahuarita

Rancho Sahuarita Water Mater Plan Demands - 3270 Zone

Demand Criteria

Residential		Non-residential		Peak Factors	
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2	peak day
1.9 pphu	multi-family			3.2	peak hour
1.8 pphu	active-adult				
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School		
90 gpcd	multi-family	43 gpsd	High School		

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	100	174	-	30,000	-	-	63,054	88	140	2,250
2011	200	174	-	60,000	-	-	96,354	134	214	2,250
2012	400	174	-	90,000	-	-	159,354	221	354	2,250
2013	800	174	-	120,000	-	-	281,754	391	626	2,250
2014	1,200	174	-	150,000	-	-	404,154	561	898	2,250
2015	1,600	174	-	180,000	478	2,028	597,808	830	1,328	2,250
2016	1,999	174	-	210,000	478	2,028	719,911	1,000	1,600	2,250
2017	1,999	174	-	240,000	478	2,028	723,511	1,005	1,608	2,250
2018	1,999	174	-	270,000	478	2,028	727,111	1,010	1,616	2,250
2019	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2020	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2021	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2022	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2023	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2024	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2025	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2026	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2027	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2028	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2029	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2030	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2031	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2032	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2033	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250
2034	1,999	174	-	344,355	478	2,028	736,034	1,022	1,636	2,250

Development in this zone is located in Mission Peaks and State Land

Rancho Sahuarita Water Mater Plan Demands - 3420 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	-	-	100	-	-	-	19,800	28	44	1,750
2011	-	-	300	-	-	-	59,400	83	132	1,750
2012	150	-	600	-	-	-	163,350	227	363	1,750
2013	375	226	900	-	-	-	328,221	456	729	1,750
2014	375	226	1,161	-	-	-	379,899	528	844	1,750
2015	375	226	1,161	-	-	-	379,899	528	844	1,750
2016	375	226	1,161	30,000	-	-	383,499	533	852	1,750
2017	375	226	1,161	60,000	-	-	387,099	538	860	1,750
2018	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2019	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2020	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2021	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2022	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2023	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2024	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2025	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2026	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2027	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2028	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2029	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2030	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2031	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2032	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2033	375	226	1,161	70,855	-	-	388,402	539	863	1,750
2034	375	226	1,161	70,855	-	-	388,402	539	863	1,750

Development in this zone is located in Mission Peaks

Rancho Sahuarita Water Mater Plan Demands - 3570 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential							
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)	Sahuarita Mission Unit
2006	-	-	-	-	-	-	-	-	-	-	
2007	-	-	-	-	-	-	-	-	-	-	
2008	-	-	-	-	-	-	-	-	-	-	
2009	-	-	-	-	-	-	-	-	-	-	
2010	-	-	-	-	-	-	-	-	-	-	
2011	440	-	-	-	-	-	130,680	182	290	2,250	240
2012	880	-	-	-	-	-	261,360	363	581	2,250	480
2013	1,320	200	-	-	-	-	426,240	592	947	2,250	720
2014	1,760	600	200	-	-	1,287	697,095	968	1,549	2,250	960
2015	2,200	1,000	400	-	-	1,287	935,775	1,300	2,080	2,250	1200
2016	2,640	1,106	600	100,000	-	1,287	1,136,181	1,578	2,525	2,250	1440
2017	2,998	1,106	800	200,000	-	1,287	1,294,107	1,797	2,876	2,250	1680
2018	3,238	1,106	1,000	300,000	-	1,287	1,416,987	1,968	3,149	2,250	1920
2019	3,478	1,106	1,210	400,000	-	1,287	1,541,847	2,141	3,426	2,250	2160
2020	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2021	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2022	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2023	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2024	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2025	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2026	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2027	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2028	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2029	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2030	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2031	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2032	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2033	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160
2034	3,478	1,106	1,210	619,271	-	1,287	1,568,160	2,178	3,485	2,250	2160

Development in this zone is located in Mission Peaks and Sahuarita Mission

Rancho Sahuarita Water Mater Plan Demands - 3720 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-	-
2019	700	-	-	-	478	2,028	279,154	388	620	2,250
2020	1,400	-	-	-	478	2,028	487,054	676	1,082	2,250
2021	2,100	-	-	-	478	2,028	694,954	965	1,544	2,250
2022	2,840	-	-	-	478	2,028	914,734	1,270	2,033	2,250
2023	3,340	-	-	-	478	2,028	1,063,234	1,477	2,363	2,250
2024	3,840	-	-	-	478	2,028	1,211,734	1,683	2,693	2,250
2025	4,340	-	-	-	478	2,028	1,360,234	1,889	3,023	2,250
2026	4,840	-	-	-	478	2,028	1,508,734	2,095	3,353	2,250
2027	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250
2028	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250
2029	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250
2030	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250
2031	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250
2032	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250
2033	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250
2034	5,079	-	-	-	478	2,028	1,579,717	2,194	3,510	2,250

Sahuarita Mission Units
0
0
0
0
0
0
0
0
0
200
400
600
840
840
840
840
840
840
840
840
840
840
840

Development in this zone is located in Mission Peaks and Sahuarita Mission

Rancho Sahuarita Water Mater Plan Demands - 3900 Zone

Demand Criteria

Residential		Non-residential		Peak Factors
2.7 pphu	single-family	0.12 gpdpsf	Commercial	2 peak day
1.9 pphu	multi-family			3.2 peak hour
1.8 pphu	active-adult			
110 gpcd	single-family & Active-adult	25 gpsd	Elementary School	
90 gpcd	multi-family	43 gpsd	High School	

	Residential			Non-Residential						
Year	Single Family units	Multi Family Units	Active Adult Units	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	PDD (gpm)	PHD (gpm)	Fire Flow Requirement (gpm)
2006	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-	-	-	-
2021	-	-	-	-	-	-	-	-	-	-
2022	-	-	-	-	-	-	-	-	-	-
2023	-	-	-	-	-	-	-	-	-	-
2024	-	-	-	-	-	-	-	-	-	-
2025	-	-	-	-	-	-	-	-	-	-
2026	-	-	-	-	-	-	-	-	-	-
2027	750	-	-	70,855	-	-	231,253	321	514	1,750
2028	1,500	-	-	70,855	-	-	454,003	631	1,009	1,750
2029	2,250	-	-	70,855	-	-	676,753	940	1,504	1,750
2030	3,500	-	-	70,855	-	-	1,048,003	1,456	2,329	1,750
2031	4,250	-	-	70,855	-	-	1,270,753	1,765	2,824	1,750
2032	5,000	-	-	70,855	-	-	1,493,503	2,074	3,319	1,750
2033	5,750	-	-	70,855	-	-	1,716,253	2,384	3,814	1,750
2034	5,992	-	-	70,855	-	-	1,788,127	2,484	3,974	1,750

Development in this zone is located in Mission Peaks (500 homes served in McGee Ranch)

EXHIBIT 1

EXISTING WATER SYSTEM MASTER PLAN

OVERSIZED MAP

-Sahuarita Water Co. Existing Water System Master Plan Exhibit 1

TO REVIEW SEE DOCKET SUPERVISOR

DOCKET W-03718A-07-0687

EXHIBIT 2

FUTURE WATER SYSTEM MASTER PLAN

OVERSIZED MAP

-Sahuarita Water Co. Future Water System Master Plan Exhibit 2

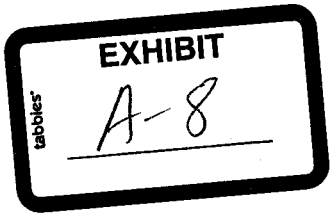
TO REVIEW SEE DOCKET SUPERVISOR

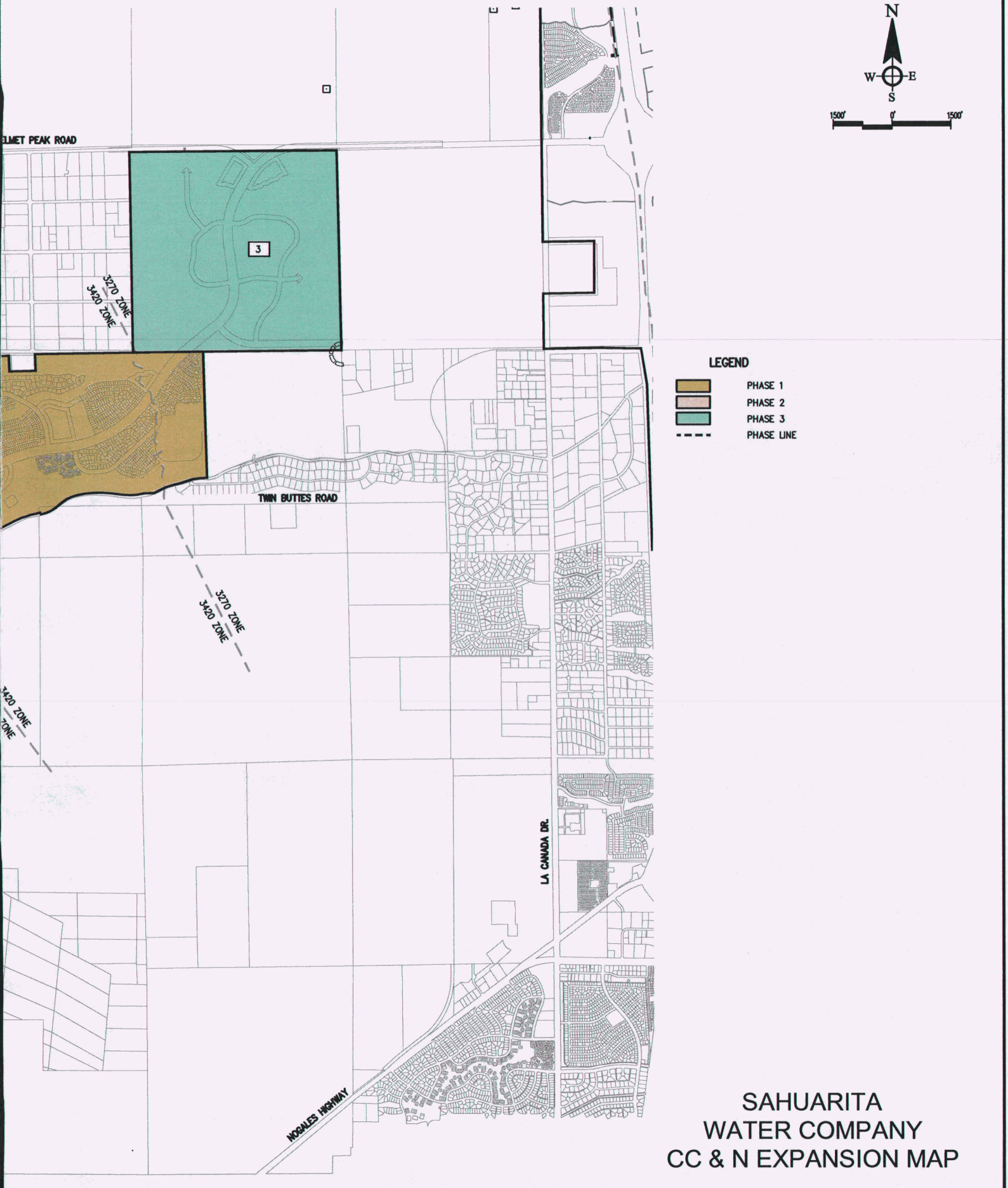
DOCKET W-03718A-07-0687

EXHIBIT A-8

(Map of Anticipated Development (Phases 1-3)
Within Proposed CC&N Extension Area)

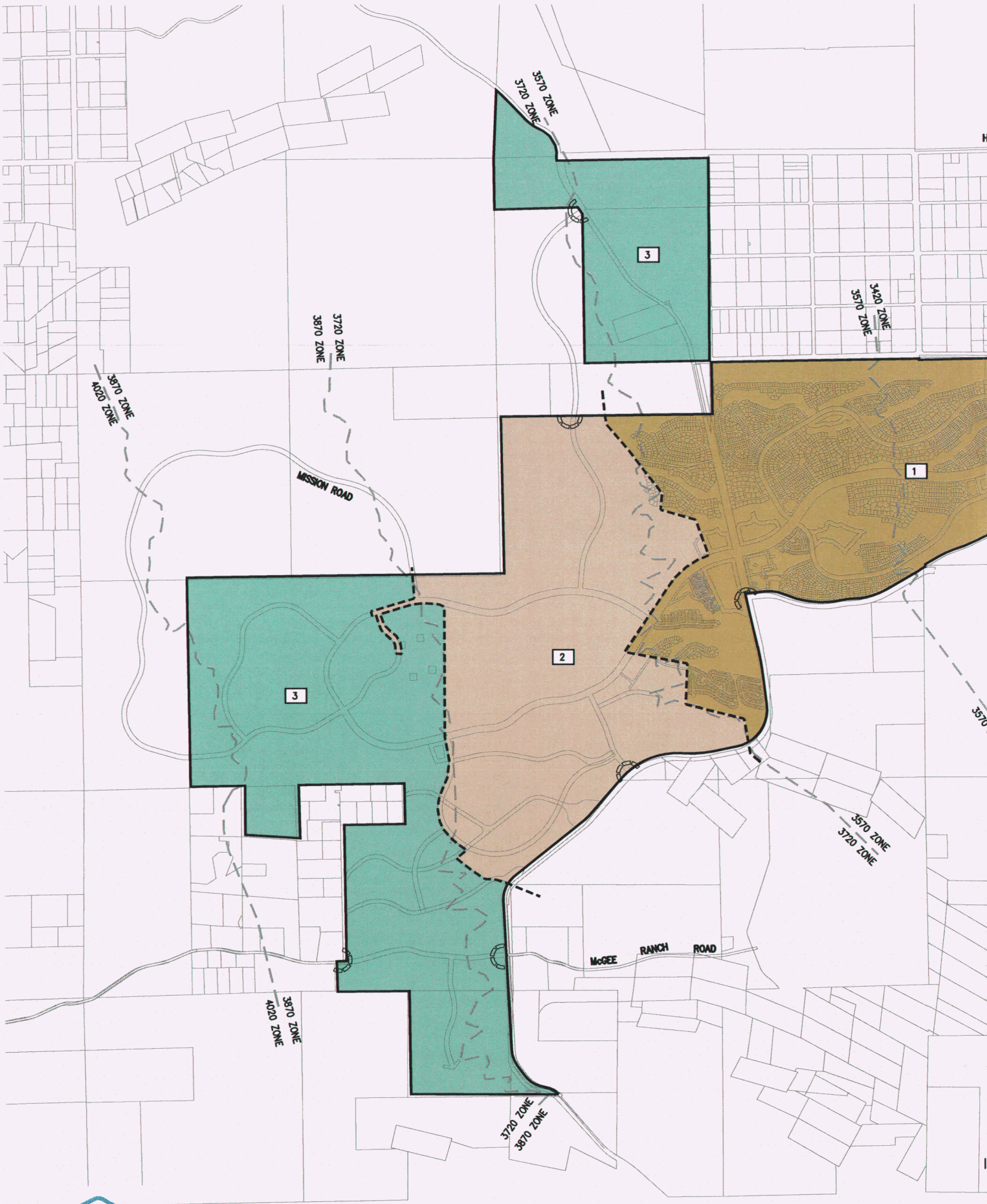
Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008





SAHUARITA WATER COMPANY CC & N EXPANSION MAP

MARCH 13, 2008



WestLand Resources Inc.
Engineering and Environmental Consultants
4001 E. Paradise Falls Drive
Tucson, Az 85712 (520) 206-9585

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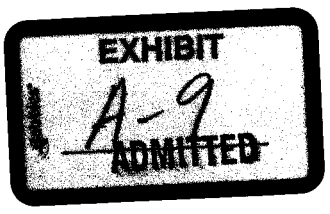
EXHIBIT A-9

(Projected Customers and Consumption (Years 1-5)
Within Proposed CC&N Extension Area)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



Sahuarita Water Company CC&N Extension 5-yr Summary

2/15/2008

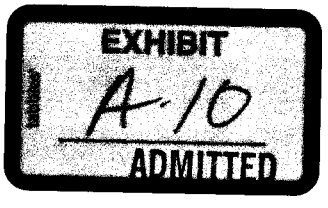
	Residential				Non-Residential				
Year	Single Family units	Multi Family Units	Active Adult Units	Population	Commerical (sq. ft.)	High School students	Elementary School students	ADD (gallons)	Notes
2008	0	0	0	0	0	-	-	-	
2009	0	0	0	0	0	-	-	-	No Expansion
2010	100	174	100	781	30,000	-	-	82,854	
2011	640	174	300	2,599	60,000	-	-	286,434	Phase 1 of
2012	1,430	174	600	5,272	90,000	-	-	584,064	Expansion
2013	2,495	600	900	9,497	120,000	-	-	1,036,215	Area
2014	3,335	1,000	1,361	13,354	150,000	-	1,287	1,481,148	2010-2014

Numbers are cumulative

EXHIBIT A-10

(November 2007 Infrastructure Projection (Years 1-5) and February 15, 2008 Opinion of Probable Construction Cost (Years 1-5))

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	2008 – No growth				$0	
	2009 – No growth				$0	
	Year 1 (2010)					
1	24-inch 3150 Zone water main (DIP)	LF	7,200	$175	$900,000	Includes valving, air releases, fittings, and corrosion protection. From 3150 Zone Booster to Helmet Peak Rd.
2	16-inch 3150 Zone water main	LF	14,400	$120	$1,728,000	Includes valving, air releases, fittings, and corrosion protection. From Helmet Peak Rd. to forebay reservoir.
3	0.6 MG forebay reservoir	LS	1	$600,000	$600,000	Located in Mission Peaks, Assumes 2,250 gpm fire flow requirement for 3270 Zone Phase I. Cost includes site work, block wall and piping.
4	2,500 gpm 3150 Zone Booster Station (Phase 1)	LS	1	$525,000	$525,000	Located at existing 2850 Zone reservoir site. Cost includes electrical and telemetry.
5	New 1,500-gpm well	LS	1	$1,100,000	$1,100,000	Well 24B drilling and equipping, site work, block wall, and piping. Assumes rotary drilling. Assumes no water treatment necessary.
6	12–inch well transmission main	LF	3,000	$80	$240,000	Well collection main from Well 24B to 2850 Zone Reservoir site.

OPINION OF PROBABLE CONSTRUCTION COST

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
7	1,700 gpm 3270 Zone Booster Station	LS	1	$425,000	$425,000	Located at forebay reservoir site. Assumes 1,000 gpm fire flow requirement for 3270 Zone. Cost includes electrical, telemetry, and portable back-up generator.

OPINION OF PROBABLE CONSTRUCTION COST

8	2,300 gpm 3420 Zone Booster Station	LS	1	$525,000	$525,000	Located at forebay reservoir site. Assumes 1,750 gpm fire flow requirement for 3420 Zone. Cost includes electrical and telemetry.
9	16-inch 3270 Zone water main	LF	2,160	$120	$259,200	Includes valving, air releases, and fittings. Spine Main only.
10	12-inch 3420 Zone water main	LF	8,400	$80	$672,000	Includes valving, air releases, and fittings. Spine Main only.
11	24-inch 3420 Zone water main (DIP)	LF	4,700	$175	$822,500	Includes valving, air releases, fittings, and corrosion protection. From 3420 Zone Booster to proposed 3420 Zone reservoir site.
	Subtotal				$7,796,700	
	25% Engineering, Contingencies, Inspection & Permits				$1,949,175	
	Total Year 1				**$9,745,875**	Assumes no additional water treatment is necessary

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 2 (2011)					
1	0.6 MG 3420 Zone Reservoir	LS	1	$600,000	$600,000	Located in Mission Peaks, Assumes 1,750 gpm fire flow requirement for 3420 Zone. Cost includes site work, block wall and piping.
2	3,300 gpm 3570 Zone Booster Station	LS	1	$600,000	$600,000	Located at 3420 Zone reservoir site. Assumes 2,250 gpm fire flow requirement for 3570 Zone. Cost includes electrical and telemetry.
2	12–inch 3570 Zone water main	LF	19,800	$80	$1,584,000	Includes valving, air releases, and fittings. Spine Main only.
3	24-inch 3420 Zone water main (DIP)	LF	8,400	$175	$1,470,000	Includes valving, air releases, fittings, and corrosion protection. From 3420 Zone Booster to proposed 3420 Zone reservoir site.
4	12-inch 3420 Zone water main	LF	7,200	$80	$576,000	Includes valving, air releases, and fittings. Spine Main only.
	Subtotal				$4,830,000	
	25% Engineering, Contingencies, Inspection & Permits				$1,207,500	
	Total Year 2				**$6,037,500**	

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 3 (2012)					
1	0.6 MG Forebay reservoir	LS	1	$600,000	$600,000	Located in Mission Peaks, Assumes 2,250 gpm fire flow requirement for 3270 Zone. Cost includes site work, block wall and piping.
	25% Engineering, Contingencies, Inspection & Permits				$150,000	
	Total Year 3				**$750,000**	

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 4 (2013)					
1	New 1500-gpm well	LS	1	$1,100,000	$1,100,000	Includes site work, block wall, and onsite piping, Well No. 19R, assumes rotary drilling. Assumes no water treatment necessary.
2	16-inch well transmission main	LF	2,900	$120	$348,000	Well collection main from Well 19R to Well 21.
3	24-inch 3570 Zone water main	LF	3,600	$175	$630,000	Includes valving, air releases, and fittings. Spine Main only.
4	16–inch 3570 Zone water main	LF	6,000	$120	$720,000	Includes valving, air releases, and fittings. Spine Main only.
5	0.9 MG 3570 Zone Reservoir	LS	1	$800,000	$800,000	
	Subtotal				$3,598,000	
	25% Engineering, Contingencies, Inspection & Permits				$899,500	
	Total Year 4				**$4,497,500**	Assumes no additional water treatment is necessary

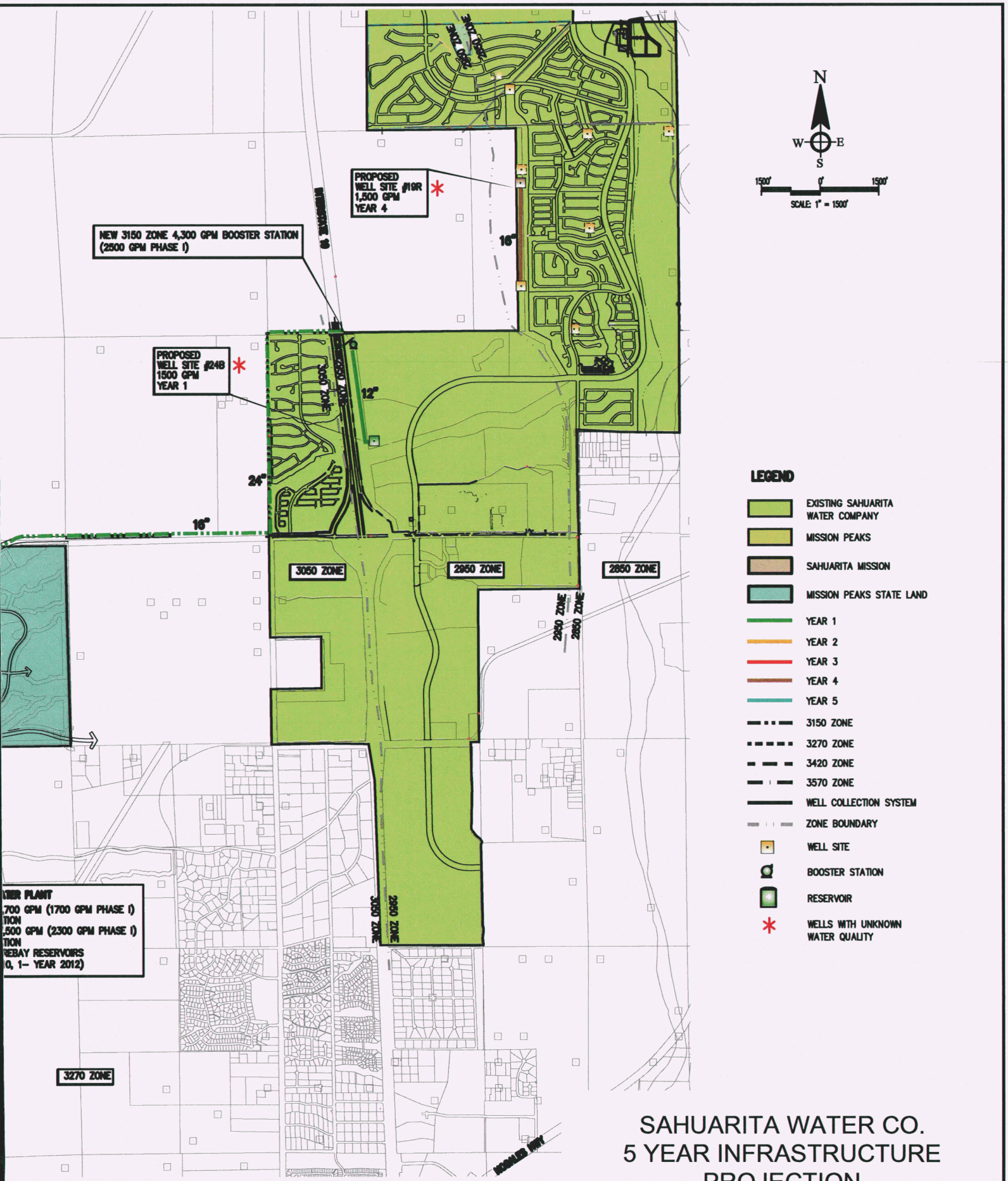
Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

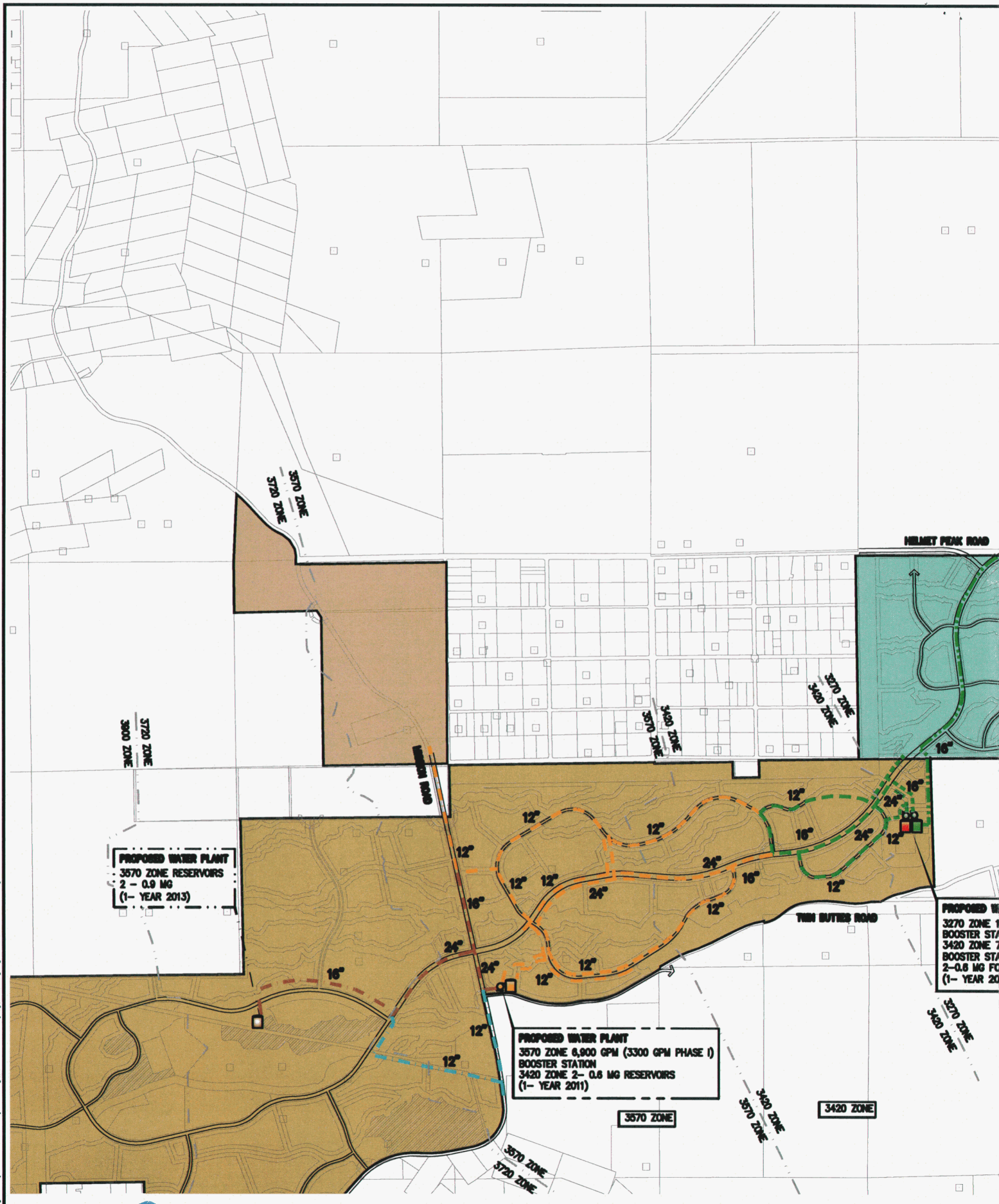
Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 5 (2014)					
1	12–inch 3570 Zone water main	LF	7,200	$80	$576,000	Includes valving, air releases, and fittings. Spine Main only.
	25% Engineering, Contingencies, Inspection & Permits				$144,000	
	Total Year 5				**$720,000**	
	Total Cost 1st 5 years				**$21,750,875**	

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.



SAHUARITA WATER CO.
5 YEAR INFRASTRUCTURE PROJECTION

November 6, 2007



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Tucson, Az 85712 (520) 206-9585

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EXHIBIT A-11

(Projected Utility Plant Account Balances)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008

Sahuarita Water Co., L.L.C
Plant
Projected Years

APPENDIX T
Page 1.1

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Estimate	Engineering Permits, Etc.	Year 1 Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%	$ 120,000		$ 120,000	$ 120,000	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%	25,000		25,000	25,000	-	25,000	-
4	304	Structures and Improvements		2.90%	100,000	25,387	125,387	125,387	1,818	125,387	1,818
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%	1,237,350	314,130	1,551,481	1,551,481	31,030	1,551,481	31,030
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%	1,659,174	421,220	2,080,395	2,080,395	52,010	2,080,395	52,010
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%	674,918	171,344	846,262	846,262	13,963	846,262	13,963
14	331	Transmission and Distribution	0%	2.00%	5,198,784	1,319,833	6,518,617	6,518,617	65,186	6,518,617	65,186
15	331	Transmission and Distribution (AIAC)	100%	2.00%	364,287	92,483	456,770	456,770	4,568	456,770	4,568
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	124,013	31,483	155,496	155,496	2,021	155,496	2,021
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 9,503,527	$ 2,375,882	$ 11,879,409	$ 11,879,409	$ 170,596	$ 11,879,409	$ 170,596
35											
36		Composite Rate with 1/2 yr convention							1.44%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			2,375,882					
40		Total				$ 2,375,882					
41											

Sahuarita Water Co., L.L.C
Plant
Projected Years

APPENDIX T
Page 1.2

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 2 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%			-	-	-	25,000	-
4	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	5,454
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%		-	-	-	62,059	1,551,481	93,089
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%	701,915	175,479	877,394	877,394	125,955	2,957,789	177,964
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%	701,915	175,479	877,394	877,394	42,404	1,723,656	56,367
14	331	Transmission and Distribution	0%	2.00%	4,246,587	1,061,647	5,308,233	5,308,233	183,455	11,826,851	248,641
15	331	Transmission and Distribution (AIAC)	100%	2.00%	740,813	185,203	926,016	926,016	18,396	1,382,786	22,963
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	240,218	60,054	300,272	300,272	7,946	455,768	9,968
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 6,631,447	$ 1,657,862	$ 8,289,309	$ 8,289,309	$ 443,850	$ 20,168,718	$ 614,447
35											
36		Composite Rate with 1/2 yr convention							2.20%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			1,657,862					
40		Total				$ 1,657,862					
41											

Sahuarita Water Co., L.L.C
Plant
Projected Years

APPENDIX T
Page 1.3

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year $ Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1											
2											
3											
4	Account	Description	AIAC Spread	Depreciation Rate	Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
5	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
6	302	Franchises		0.00%			-	-	-	-	-
7	303	Land and Land Rights		0.00%			-	-	-	25,000	-
8	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	9,091
9	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
10	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
11	307	Wells and Springs		4.00%		-	-	-	62,059	1,551,481	155,148
12	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
13	309	Supply Mains		2.00%		-	-	-	-	-	-
14	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
15	311	Pumping Equipment		5.00%		-	-	-	147,889	2,957,789	325,854
16	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
17	330	Distribution Reservoirs and St		3.30%	729,992	182,498	912,490	912,490	71,937	2,636,146	128,304
18	331	Transmission and Distribution	0%	2.00%		-	-	-	236,537	11,826,851	485,178
19	331	Transmission and Distribution (AIAC)	100%	2.00%	1,134,468	283,617	1,418,085	1,418,085	41,837	2,800,871	64,800
20	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
21	334	Meters and Meter Installations (AIAC)		2.60%	351,343	87,836	439,178	439,178	17,559	894,946	27,527
22	335	Hydrants	0%	2.40%		-	-	-	-	-	-
23	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
24	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
25	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
26	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
27	341	Transportation Equipment		12.90%		-	-	-	-	-	-
28	342	Stores Equipment		5.00%		-	-	-	-	-	-
29	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
30	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
31	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
32	346	Communication Equipment		9.00%		-	-	-	-	-	-
33	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
34	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
35											
36							-	-	-	-	-
37											
38											
39		Totals			$ 2,215,802	$ 553,951	$ 2,769,753	$ 2,769,753	$ 581,454	$ 22,938,470	$ 1,195,901
40											
41		Composite Rate with 1/2 yr convention									
42									2.53%		
43											
44		Licenses, Taxes, Permits	0%			$ -					
45		Engineering and Contingency	25%			553,951					
46		Total				$ 553,951					
47											

Sahuarita Water Co., L.L.C
Plant
Projected Years

APPENDIX T
Page 1.4

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 4 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%			-	-	-	25,000	-
4	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	12,727
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%	1,391,851	347,963	1,739,814	1,739,814	96,856	3,291,294	252,004
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%		-	-	-	147,889	2,957,789	473,743
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%	1,012,255	253,064	1,265,319	1,265,319	107,871	3,901,465	236,174
14	331	Transmission and Distribution	0%	2.00%	2,148,512	537,128	2,685,640	2,685,640	263,393	14,512,490	748,571
15	331	Transmission and Distribution (AIAC)	100%	2.00%	1,931,636	482,909	2,414,545	2,414,545	80,163	5,215,416	144,963
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	573,910	143,478	717,388	717,388	32,595	1,612,333	60,122
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31											
32											
33											
34		Totals			$ 7,058,164	$ 1,764,541	$ 8,822,705	$ 8,822,705	$ 732,403	$ 31,761,175	$ 1,928,304
35											
36		Composite Rate with 1/2 yr convention							2.31%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			1,764,541					
40		Total				$ 1,764,541					
41											

Sahuarita Water Co., L.L.C
Plant
Projected Years

APPENDIX T
Page 1.5

Line No.	Account	Description	AIAC Spread	Depreciation Rate	Year 5 Estimate	Engineering Permits, Etc.	Gross Amt	Additions	Depreciation	Balance	A/D Balance
1	301	Organization		0.00%			$ -	$ -	$ -	$ 120,000	$ -
2	302	Franchises		0.00%			-	-	-	-	-
3	303	Land and Land Rights		0.00%			-	-	-	25,000	-
4	304	Structures and Improvements		2.90%		-	-	-	3,636	125,387	16,363
5	305	Collecting and Impounding Rese		2.00%		-	-	-	-	-	-
6	306	Lake, River and Other Intakes		2.90%		-	-	-	-	-	-
7	307	Wells and Springs		4.00%		-	-	-	131,652	3,291,294	383,655
8	308	Infiltration Galleries and Tun		4.00%		-	-	-	-	-	-
9	309	Supply Mains		2.00%		-	-	-	-	-	-
10	310	Power Generation Equipment		5.00%		-	-	-	-	-	-
11	311	Pumping Equipment		5.00%		-	-	-	147,889	2,957,789	621,633
12	320	Water Treatment Equipment		5.00%		-	-	-	-	-	-
13	330	Distribution Reservoirs and St		3.30%		-	-	-	128,748	3,901,465	364,923
14	331	Transmission and Distribution	0%	2.00%	757,977	189,494	947,471	947,471	299,725	15,459,961	1,048,296
15	331	Transmission and Distribution (AIAC)	100%	2.00%	1,910,470	477,617	2,388,087	2,388,087	128,189	7,603,503	273,152
16	333	Services (AIAC)		3.30%	-	-	-	-	-	-	-
17	334	Meters and Meter Installations (AIAC)		2.60%	545,335	136,334	681,669	681,669	50,782	2,294,002	110,904
18	335	Hydrants	0%	2.40%		-	-	-	-	-	-
19	335	Hydrants (AIAC)	100%	2.40%	-	-	-	-	-	-	-
20	336	Backflow Prevention Devices		6.67%		-	-	-	-	-	-
21	339	Other Plant and Miscellaneous		6.67%		-	-	-	-	-	-
22	340	Office Furniture and Equipment		4.60%		-	-	-	-	-	-
23	341	Transportation Equipment		12.90%		-	-	-	-	-	-
24	342	Stores Equipment		5.00%		-	-	-	-	-	-
25	343	Tools, Shop and Garage Equipme		6.30%		-	-	-	-	-	-
26	344	Laboratory Equipment		6.70%		-	-	-	-	-	-
27	345	Power Operated Equipment		9.00%		-	-	-	-	-	-
28	346	Communication Equipment		9.00%		-	-	-	-	-	-
29	347	Miscellaneous Equipment		9.00%		-	-	-	-	-	-
30	348	Other Tangible Plant		9.00%		-	-	-	-	-	-
31							-	-	-	-	-
32											
33											
34		Totals			$ 3,213,781	$ 803,445	$ 4,017,227	$ 4,017,227	$ 890,622	$ 35,778,402	$ 2,818,926
35											
36		Composite Rate with 1/2 yr convention							2.49%		
37											
38		Licenses, Taxes, Permits	0%			$ -					
39		Engineering and Contingency	25%			803,445					
40		Total				$ 803,445					
41											

EXHIBIT A-12

(Balance Sheet, Income Statement, and Annual Operating Revenues, Expenses and Customers for Projected Years 1-5)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008

Sahuarita Water Co., L.L.C
Projected Balance Sheets
For the Years Ended

Line No.		Beginning of Year	Label	1st year Changes	Year 1	Year 2	Year 3	Year 4	Year 5
1									
2									
3	**Assets**								
4									
5	Utility Plant	-	(a)	11,879,409	11,879,409	20,168,718	22,938,470	31,761,175	35,778,402
6	Accumulated Depreciation	-	(b)	(170,596)	(170,596)	(614,447)	(1,195,901)	(1,928,304)	(2,818,926)
7									
8	Cash	25,000	(c)	206,770	231,770	616,526	560,521	179,239	346,959
9									
10									
11	**Total Assets**	$ 25,000		$ 11,915,582	$ 11,940,582	$ 20,170,797	$ 22,303,090	$ 30,012,110	$ 33,306,435
12									
13	Equity and Liabilities			-					
14									
15	**Equity**								
16									
17	Common Stock, Net of	25,000	(d)	11,158,486	11,183,486	18,039,441	18,049,027	22,048,307	22,048,307
18									
19	Retained Earnings		(e)	38,186	38,186	29,082	116,872	430,355	576,507
20	**Total Equity**	$ 25,000		$ 11,196,672	$ 11,221,672	$ 18,068,524	$ 18,165,899	$ 22,478,661	$ 22,624,814
21									
22	**Liabilities & Deferred Credits**			-					
23	Advances in Aid of Construction		(f)	580,783	580,783	1,705,988	3,370,394	6,164,726	8,759,029
24	Contributions in Aid of			-					
25	Construction		(g)	140,140	140,140	407,260	798,000	1,432,970	2,037,560
26	Less: Amortization		(g)	(2,013)	(2,013)	(10,975)	(31,203)	(64,247)	(114,967)
27	Customer Deposits			-					
28	Long-Term Debt								
29									
30									
31	**Total Liabilities and**								
32	**Deferred Credits**	-		718,910	718,910	2,102,273	4,137,191	7,533,449	10,681,622
33									
34									
35	**Total Equity & Liab.**	$ 25,000		$ 11,915,582	$ 11,940,582	$ 20,170,797	$ 22,303,090	$ 30,012,110	$ 33,306,435
36									
37									
38									
39	(a) Plant Additions ((See Appendix T, pages 1.1 through 1.5)								
40	(b) Depreciation Computations (See Appendix T, pages 1.1 through 1.5)								
41	(c) Cash flows (See Appendix U, page 1.5)								
42	(d) Financing (See Appendix U, page 1.1)								
43	(e) Profit or loss from operations (See Appendix U, page 2)								
44	(f) Advances-in-Aid of Construction (See Appendix U, pages 1.2 and 1.4)								
45	(g) Contibutions-in-Aid of Construction (See Appendix U, page 1.3)								
46									
47									
48									
49									

Sahuarita Water Co., L.L.C
Schedule of Developer Advances and Refunds
Projected Years

Appendix U
Page 1.2

Line No.		Year 1	2	3	4	5
1						
2						
3						
4						
5	**Developer Advances Collected**					
6	Developer Advances - Trans & Dist.	$ 456,770	$ 926,016	$ 1,418,085	$ 2,414,545	$ 2,388,087
7						
8						
9						
10	Total Collected	$ 456,770	$ 926,016	$ 1,418,085	$ 2,414,545	$ 2,388,087
11						
12	Cummulative Collected	$ 456,770	$ 1,382,786	$ 2,800,871	$ 5,215,416	$ 7,603,503
13						
14						
15	**Developer Advances Refunded (a)**					
16	Based on Revenues		28,627	68,599	122,566	213,028
17						
18						
19						
20						
21	Total Refunds	$ -	$ 28,627	$ 68,599	$ 122,566	$ 213,028
22						
23	Cummulative Refunds	$ -	$ 28,627	$ 97,226	$ 219,791	$ 432,820
24						
25	Cummulative Balance	$ 456,770	$ 1,354,159	$ 2,703,645	$ 4,995,625	$ 7,170,684
26						
27						
28	(a) Refund Rate per Year	10% based on revenues.				
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

Sahuarita Water Co., L.L.C
Schedule of Contributions-in-Aid of Construction
Projected Years

APPENDIX U
Schedule 1.3

Line No.		Year 1	2	3	4	5
1						
2						
3						
4						
5	**Contributions (Hook-up Fees)**					
6	Residential	130,900	259,000	381,500	626,850	595,350
7	Commercial	8,120	8,120	8,120	8,120	8,120
8	Irrigation	1,120	-	1,120	-	1,120
9	**Developer Contributions**					
10	Developer Contributions	$ -	$ -	$ -	$ -	$ -
11						
12						
13	Total Collected	$ 140,140	$ 267,120	$ 390,740	$ 634,970	$ 604,590
14						
15	Cummulative Collected	$ 140,140	$ 407,260	$ 798,000	$ 1,432,970	$ 2,037,560
16						
17	**Amortization**					
18	Composite Rate (1/2 Yr Conv.)	1.44%	2.20%	2.53%	2.31%	2.49%
19						
20	Amortization	$ 2,013	$ 8,963	$ 20,228	$ 33,044	$ 50,720
21						
22	Cummulative Amortization	$ 2,013	$ 10,975	$ 31,203	$ 64,247	$ 114,967
23						
24	Cummulative Balance	$ 138,127	$ 396,285	$ 766,797	$ 1,368,723	$ 1,922,593
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

Sahuarita Water Co., L.L.C
Schedule of Service Line and Meter Installation Refunds
Projected Years

APPENDIX U
Schedule 1.4

Line No.			Year 1	2	3	4	5
1							
2							
3							
4							
5	**Service Line and Meter Installations**						
6	Residential		$ 118,745	$ 234,950	$ 346,075	$ 568,643	$ 540,068
7	Commercial		5,268	5,268	5,268	5,268	5,268
8	School		-	-	-	-	-
9							
10	Total Collected		$ 124,013	$ 240,218	$ 351,343	$ 573,910	$ 545,335
11							
12	Cummulative Collected		$ 124,013	$ 364,230	$ 715,573	$ 1,289,483	$ 1,834,818
13							
14	**Service Line and Meter Installations Refunded (a)**						
15	Service Line & Meter Install. from	1		12,401	12,401	12,401	12,401
16	Service Line & Meter Install. from	2			24,022	24,022	24,022
17	Service Line & Meter Install. from	3				35,134	35,134
18	Service Line & Meter Install. from	4					54,534
19	Service Line & Meter Install. from	5					
20	Total Refunds		$ -	$ 12,401	$ 36,423	$ 71,557	$ 126,091
21							
22	Cummulative Refunds		$ -	$ 12,401	$ 48,824	$ 120,382	$ 246,472
23							
24	Cummulative Balance		$ 124,013	$ 351,829	$ 666,748	$ 1,169,101	$ 1,588,345
25							
26							
27							
28							
29	(a) Refund Rate per Year	10%					
30							
31							
32							
33							
34							
35							
36							
37							
38							

Sahuarita Water Co., L.L.C
Projected Cash Flows
For the Years Ended

Line No.		Year 0	1	2	3	4	5
1							
2							
3	**Cash from Operations**						
4	Beginning Cash Balance	$ -	$ 25,000	$ 231,770	$ 616,526	$ 560,521	$ 179,239
5							
6	Income from Operations		38,186	(9,104)	87,790	313,482	146,152
7	Add Depreciation expense		168,584	434,888	561,226	699,359	839,901
8							
9	**Total Cash From Operations**	$ -	$ 206,770	$ 425,784	$ 649,016	$ 1,012,841	$ 986,054
10							
11	**Cash from Financing**						
12							
13	Deposits (security) collected	$ -	$ -	$ -	$ -	$ -	$ -
14	Long-Term Debt	-	-	-	-	-	-
15	Common Equity	25,000	11,158,486	6,855,955	9,585	3,999,280	-
16	Advances in Aid of Const.	-	456,770	926,016	1,418,085	2,414,545	2,388,087
17	Contribution in Aid of Const.	-	140,140	267,120	390,740	634,970	604,590
18	Meter Deposits Collected	-	124,013	240,218	351,343	573,910	545,335
19							
20							
21	**Total Cash from Financing**	$ 25,000	$ 11,879,409	$ 8,289,309	$ 2,169,753	$ 7,622,705	$ 3,538,012
22							
23							
24							
25	**Uses of Cash:**						
26							
27							
28	Long-term debt Repayment						
29	Advances Refunded	$ -	$ -	$ 41,028	$ 105,022	$ 194,123	$ 339,119
30	Meter Deposit Refunded						
31	Deposit (Security) refunded						
32	Capital Improvements - Plant	-	11,879,409	8,289,309	2,769,753	8,822,705	4,017,227
33							
34	**Total Cash Uses**	$ -	$ 11,879,409	$ 8,330,337	$ 2,874,774	$ 9,016,828	$ 4,356,346
35							
36	**Ending Cash Balance**	$ 25,000	$ 231,770	$ 616,526	$ 560,521	$ 179,239	$ 346,959
37							
38							
39	Interest Income: Assuming Earning Equal to Inflation Factor on Average Cash Balance						
40	Average Cash Balance	$ 12,500	$ 128,385	$ 424,148	$ 588,523	$ 369,880	$ 263,099
41	Interest Earned	$ 375	$ 3,852	$ 12,724	$ 17,656	$ 11,096	$ 7,893
42							
43							
44							
45							

Sahuarita Water Co., L.L.C
Projected Statements of Income
For the 12 Months Ended

Line No.		Cost Per	Description	Minimum	Year 1	2	3	4	5
1									
2									
3	Metered Water Revenues(g)				$ 286,271	$ 685,987	$ 1,225,657	$ 2,130,282	$ 2,814,506
4	Unmetered Water Revenues								
5	Other Water Revenues								
6	**Total estimated Revenues**				$ 286,271	$ 685,987	$ 1,225,657	$ 2,130,282	$ 2,814,506
7	**Variable Expenses**								
8	Pumping Power (per 1,000 gallons)(b)	0.30	per 1,000 gals		6,178	24,045	53,916	102,096	163,021
9	CAGRD Costs	See Gallons Sold Summary			7,634	33,812	85,460	180,165	317,474
10	Repairs & Maint.(a)(b)	0.25	/month/customer		589	2,328	5,329	10,231	16,454
11	Gen. Insurance (a)(b)	0.80	/month/customer	$ 1,500	1,829	7,451	17,054	32,740	52,652
12	Water Treatment & Testing (d)(b)	0.10	/1,000 gallon	$ 1,000	2,059	8,015	17,972	34,032	54,340
13	Billing, Postage, Operations (a)(b)	17.00	/month/customer	$ 5,000	38,862	158,325	362,401	695,722	1,118,859
14					$ 57,150	$ 233,976	$ 542,133	$ 1,054,986	$ 1,722,802
15	**Other Expenses**								
16	Depreciation net of Amortization of CIAC (h)				168,584	434,888	561,226	699,359	839,901
17	Office (b)	$ 2,500			2,500	2,575	2,732	2,985	3,360
18	Legal & Accounting (b)	$ 2,500			2,500	2,575	2,732	2,985	3,360
19	Miscellenous Expenses (b) (e)	$ 1,200			1,200	1,236	1,311	1,433	1,613
20	Income Taxes				-	-	-	-	-
21	Property Taxes (f)	See Property Tax			16,526	23,692	40,456	72,708	108,415
22									
23	**Total Other Expense**				$ 191,310	$ 464,966	$ 608,458	$ 779,469	$ 956,648
24									
25	**Total Operating Expenses**				$ 248,460	$ 698,942	$ 1,150,591	$ 1,834,455	$ 2,679,450
26									
27	**Operating income (loss)**				$ 37,811	$ (12,955)	$ 75,066	$ 295,827	$ 135,056
28	Less:								
29	Interest (Expense)Income on Work. Cap. (c)				375	3,852	12,724	17,656	11,096
30	Interest Expense Long-term Debt (c)				-	-	-	-	-
31	**Net Income**				$ 38,186	$ (9,104)	$ 87,790	$ 313,482	$ 146,152
32									
33	(a) Per customer per month								
34	(b) Annual Inflation of:	3.00%							
35	(c) If Applicable								
36	(d) ADEQ based on per 1,000 gallons sold								
37	(e) Miscellaneous Expenses of $100 per month								
38	(f) Property Tax Calculation (Appendix U, page 2.4)								
39	(g) Revenues (see Appendix U, page 2.1)								
40	(h) Depreciation and amortization (see Appendix T, pages 1.1 to 1.5 and Appendix U, page 1.3)								
41									

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

APPENDIX U
Page 2.1

Line No.		Year 1	2	3	4	5
3	Residential					
4	5/8 Inch	$ 85,197	$ 320,266	$ 700,140	$ 1,301,932	$ 2,007,860
5	3/4 Inch					
6	1 Inch					
7	2 Inch					
8	3 inch					
9						
10	Commercial					
11	5/8 Inch					
12	1 Inch	1,229	3,587	5,945	8,303	10,661
13	2 Inch	3,896	11,537	19,178	26,819	34,460
14	3 Inch					
15						
16						
17	Irrigation					
18	3/4 Inch	1,387	2,725	4,112	5,449	6,837
19	1 Inch	3,210	6,370	9,579	12,739	15,949
20	2 Inch					
21	3 Inch					
22	School	32,750	32,750	32,750	32,750	32,750
23	Construction Water	158,603	308,753	453,953	742,290	705,990
24						
25	Total	$ 286,271	$ 685,987	$ 1,225,657	$ 2,130,282	$ 2,814,506
26						
27						
28						
29						
30	See supporting schedules (Appendix U, pages 2.2, 2.3, 2.5 to 2.12)					
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						

Sahuarita Water Co., L.L.C
Customer Counts
For Projected Years Ended

APPENDIX U
Page 2.2

Line No.		Year				
1						
2	**Year Ended**	**1**	**2**	**3**	**4**	**5**
3	Residential					
4	5/8 Inch	374	1,114	2,204	3,995	5,696
5	3/4 Inch					
6	1 Inch					
7	2 Inch					
8	3 inch					
9	Commercial					
10	5/8 Inch					
11	3/4 Inch					
12	1 Inch	2	4	6	8	10
13	2 Inch	3	6	9	12	15
14	3 inch					
15	Irrigation					
16	5/8 Inch					
17	3/4 Inch	1	1	2	2	3
18	1 Inch	1	1	2	2	3
19	2 Inch					
20						
21	Total	381	1,126	2,223	4,019	5,727
22						
23	1/2 Year Convention					
24	**Year Ended**	**1**	**2**	**3**	**4**	**5**
25	Residential					
26	5/8 Inch	187.00	744.00	1,659.00	3,099.50	4,845.50
27	3/4 Inch					
28	1 Inch					
29	2 Inch					
30	3 inch					
31	Commercial					
32	5/8 Inch					
33	3/4 Inch					
34	1 Inch	1.00	3.00	5.00	7.00	9.00
35	2 Inch	1.50	4.50	7.50	10.50	13.50
36	3 inch					
37	Irrigation					
38	5/8 Inch					
39	3/4 Inch	0.50	1.00	1.50	2.00	2.50
40	1 Inch	0.50	1.00	1.50	2.00	2.50
41	2 Inch					
42	3 inch					
43						
44	Total	190.50	753.50	1,674.50	3,121.00	4,873.00

Sahuarita Water Co., L.L.C
Gallons Sold (1,000's)
For Projected Years Ended

Line No.		Year				
2	**Year Ended**	**1**	**2**	**3**	**4**	**5**
3	Residential					
4	5/8 Inch	17,952	71,424	159,264	297,552	465,168
5	3/4 Inch					
6	1 Inch					
7	2 Inch					
8	3 inch					
9	Commercial					
10	5/8 Inch					
11	3/4 Inch					
12	1 Inch	300	900	1,500	2,100	2,700
13	2 Inch	810	2,430	4,050	5,670	7,290
14	3 inch					
15	Irrigation					
16	5/8 Inch					
17	3/4 Inch	450	900	1,350	1,800	2,250
18	1 Inch	1,080	2,160	3,240	4,320	5,400
19	2 Inch					
20						
21						
22						
23						
24						
25	Total	20,592	77,814	169,404	311,442	482,808
26						
27	Acre Feet	63.19	238.80	519.88	955.78	1481.68
28						

29	CAGRD Costs	Year	Replenishment Oblication	CAGRD Fee (per acre foot)	Note
30		2010	40.0%	$ 302.00	a
31		2011	43.3%	$ 327.00	a
32		2012	46.7%	$ 352.00	a
33		2013	50.0%	$ 377.00	b
34		2014	53.3%	$ 402.00	b

35 a - Published advisory costs
36 b - Additional $25/year
37
38
39
40
41
42
43
44

Sahuarita Water Co., L.L.C
Schedule for the Computation of Projected
Property Taxes for the Years Ended

Line No.		Year 1	2	3	4	5
1						
2						
3	Revenue Component 1	$ 286,271	$ 286,271	$ 286,271	$ 685,987	$ 1,225,657
4	Revenue Component 2	286,271	286,271	685,987	1,225,657	2,130,282
5	Revenue Component 3	286,271	685,987	1,225,657	2,130,282	2,814,506
6						
7	Average 3 years of revenue	286,271	419,510	732,638	1,347,308	2,056,815
8						
9	Average 3 years of revenue times 2	$ 572,543	$ 839,019	$ 1,465,276	$ 2,694,617	$ 4,113,630
10	Add:					
11	Construction Work in Progress at 10%	0	0	0	0	0
12	Deduct:					
13	Book Value of Transportation Equipment	0	0	0	0	0
14						
15	Full Cash Value	$ 572,543	$ 839,019	$ 1,465,276	$ 2,694,617	$ 4,113,630
16						
17						
18	Times Assessment Ratio	23.00%	22.50%	22.00%	21.50%	21.00%
19						
20	Assessed Value	$ 131,685	$ 188,779	$ 322,361	$ 579,343	$ 863,862
21						
22	Property Tax Rate	12.55%	12.55%	12.55%	12.55%	12.55%
23						
24	**Computed Property Tax**	$ 16,526	$ 23,692	$ 40,456	$ 72,708	$ 108,415
25						
26						
27						
28						
29						
30						

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.							Year 1	2	3	4	5
1											
2	**Projected Customers / Residential 5/8 Inch Meter**										
3											
4											
5											
6	Estimated connections installed by year end						374	1,114	2,204	3,995	5,696
7	(Cumulative)										
8	Estimated connection installed during the year						374	740	1,090	1,791	1,701
9											
10	1/2 Year Convention for Revenue						187.00	744.00	1,659.00	3,099.50	4,845.50
11											
12	**Projected Revenue**										
13											
14	Annual gallonage delivered (in 1,000's)						17,952	71,424	159,264	297,552	465,168
15	Assuming average usage per month of:					8,000					
16	Daily Gallons						49,867	198,400	442,400	826,533	1,292,133
17	Residential:										
18	Monthly Mins.	$	16.00		Minimum Charge		$ 35,904	$ 142,848	$ 318,528	$ 595,104	$ 930,336
19	Commodity Rev.		-		Gals. in minimum						
20		$	2.05		Charge per/1,000		39,943	158,918	354,362	662,053	1,034,999
21	from		- gals		up to	6,000 gals					
22		$	2.75		Charge per/1,000						
23	from		6,000 gals		up to	10,000 gals					
24		$	2.75		Charge per/1,000						
25					Over	10,000 gals					
26											
27	Establishment Fees at				$	25.00	$ 9,350	$ 18,500	$ 27,250	$ 44,775	$ 42,525
28	Total Revenue						$ 85,197	$ 320,266	$ 700,140	$ 1,301,932	$ 2,007,860
29											
30											
31	AWWA factor used		1.00								
32											
33											
34											
35											
36											
37											
38											

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Projected Customers / Irrigation 3/4 Inch Meter

Line No.							Year 1	2	3	4	5
6	Estimated connections installed by year end (Cumulative)						1	1	2	2	3
8	Estimated connection installed during the year						1	-	1	-	1
10	1/2 Year Convention for Revenue						0.50	1.00	1.50	2.00	2.50
12	**Projected Revenue**										
14	Annual gallonage delivered (in 1,000's)										
15	Assuming average usage per month of:					75,000	450	900	1,350	1,800	2,250
16	Daily Gallons										
17	Commecial						1,250	2,500	3,750	5,000	6,250
18	Monthly Mins. 1 Inch Meter	$	25.00		Minimum Charge		$ 150	$ 300	$ 450	$ 600	$ 750
19	Commodity Rev.		-		Gals. in minimum						
20		$	2.05		Charge per/1,000						
21	from		-	gals	up to	6,000 gals	1,212	2,425	3,637	4,849	6,062
22		$	2.75		Charge per/1,000						
23					Over	6,000 gals					
24											
25	Establishment Fees at				$	25.00	$ 25	$ -	$ 25	$ -	$ 25
26	Total Revenue						$ 1,387	$ 2,725	$ 4,112	$ 5,449	$ 6,837
27											
29	AWWA Factor Used		1.50								

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.						Year 1	2	3	4	5
1										
2	**Projected Customers / Irrigation 1 Inch Meter**									
3										
4										
5										
6	Estimated connections installed by year end (Cumulative)					1	1	2	2	3
7	Estimated connection installed during the year					1	-	1	-	1
8										
9	1/2 Year Convention for Revenue					0.50	1.00	1.50	2.00	2.50
10										
11	**Projected Revenue**									
12										
13	Annual gallonage delivered (in 1,000's)					1,080	2,160	3,240	4,320	5,400
14	Assuming average usage per month of:				180,000					
15	Daily Gallons					3,000	6,000	9,000	12,000	15,000
16	Commecial									
17	Monthly Mins. 1 Inch Meter	$	40.00	Minimum Charge		$ 240	$ 480	$ 720	$ 960	$ 1,200
18	Commodity Rev.		-	Gals. in minimum						
19		$	2.05	Charge per/1,000						
20	from		- gals	up to	6,000 gals	2,945	5,890	8,834	11,779	14,724
21		$	2.75	Charge per/1,000						
22				Over	6,000 gals					
23										
24	Establishment Fees at			$	25.00	$ 25	$ -	$ 25	$ -	$ 25
25	Total Revenue					$ 3,210	$ 6,370	$ 9,579	$ 12,739	$ 15,949
26										
27										
28	AWWA Factor Used		2.50							
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.								Year 1	2	3	4	5
1												
2	**Projected Customers / Commercial 1 Inch Meter**											
3												
4												
5												
6	Estimated connections installed by year end							2	4	6	8	10
7	(Cumulative)											
8	Estimated connection installed during the year							2	2	2	2	2
9												
10	1/2 Year Convention for Revenue							1.00	3.00	5.00	7.00	9.00
11												
12	**Projected Revenue**											
13												
14	Annual gallonage delivered (in 1,000's)							300	900	1,500	2,100	2,700
15	Assuming average usage per month of:						25,000					
16	Daily Gallons							833	2,500	4,167	5,833	7,500
17	Commecial											
18	Monthly Mins. 1 Inch Meter	$	40.00			Minimum Charge		$ 480	$ 1,440	$ 2,400	$ 3,360	$ 4,320
19	Commodity Rev.		-			Gals. in minimum						
20		$	2.05			Charge per/1,000						
21		from	-	gals		up to	15,000 gals	699	2,097	3,495	4,893	6,291
22		$	2.75			Charge per/1,000						
23		from	15,000	gals		up to	25,000 gals					
24		$	2.75			Charge per/1,000						
25		from	25,000	gals		up to	######### gals					
26		$	2.75			Charge per/1,000						
27						Over	######### gals					
28												
29	Establishment Fees at					$	25.00	$ 50	$ 50	$ 50	$ 50	$ 50
30	Total Revenue							$ 1,229	$ 3,587	$ 5,945	$ 8,303	$ 10,661
31												
32												
33	AWWA Factor Used		2.50									
34												
35												
36												

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.								Year 1	2	3	4	5
1												
2	**Projected Customers / Commercial 2 Inch Meter**											
3												
4												
5												
6	Estimated connections installed by year end							3	6	9	12	15
7	(Cumulative)											
8	Estimated connection installed during the year							3	3	3	3	3
9												
10	1/2 Year Convention for Revenue							1.50	4.50	7.50	10.50	13.50
11												
12	**Projected Revenue**											
13												
14	Annual gallonage delivered (in 1,000's)											
15	Assuming average usage per month of:						45,000	810	2,430	4,050	5,670	7,290
16	Daily Gallons											
17	Commecial							2,250	6,750	11,250	15,750	20,250
18	Monthly Mins. 2 Inch Meter	$	120.00			Minimum Charge		$ 2,160	$ 6,480	$ 10,800	$ 15,120	$ 19,440
19	Commodity Rev.		-			Gals. in minimum						
20		$	2.05			Charge per/1,000						
21	from		-	gals		up to	48,000 gals	1,661	4,982	8,303	11,624	14,945
22		$	2.75			Charge per/1,000						
23	from		48,000	gals		up to	80,000 gals					
24		$	2.75			Charge per/1,000						
25	from		80,000	gals		up to	######## gals					
26		$	2.75			Charge per/1,000						
27						Over	######## gals					
28												
29	Establishment Fees at						$ 25.00	$ 75	$ 75	$ 75	$ 75	$ 75
30	Total Revenue							$ 3,896	$ 11,537	$ 19,178	$ 26,819	$ 34,460
31												
32												
33	AWWA Factor Used		8.00									
34												
35												
36												

Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.								Year 1	2	3	4	5
1												
2	**Projected Customers / Irrigation 1 Inch Meter**											
3												
4												
5												
6	Estimated connections installed by year end							5	15	25	35	45
7	(Cumulative)											
8	Estimated connection installed during the year							5	10	10	10	10
9												
10	1/2 Year Convention for Revenue							2.50	10.00	20.00	30.00	40.00
11												
12	**Projected Revenue**											
13												
14	Annual gallonage delivered (in 1,000's)											
15	Assuming average usage per month of:						384,000	11,520	46,080	92,160	138,240	184,320
16	Daily Gallons											
17	Commecial							32,000	128,000	256,000	384,000	512,000
18	Monthly Mins. 1 Inch Meter	$	120.00				Minimum Charge	$ 3,600	$ 14,400	$ 28,800	$ 43,200	$ 57,600
19	Commodity Rev.		-				Gals. in minimum					
20		$	2.05				Charge per/1,000					
21	from		-	gals			up to 48,000 gals	30,672	122,688	245,376	368,064	490,752
22		$	2.75				Charge per/1,000					
23	from		48,000	gals			up to 80,000 gals					
24		$	2.75				Charge per/1,000					
25	from		80,000	gals			up to ######## gals					
26		$	2.75				Charge per/1,000					
27							Over ######## gals					
28												
29	Establishment Fees at						$ 25.00	$ 125	$ 250	$ 250	$ 250	$ 250
30	Total Revenue							$ 34,397	$ 137,338	$ 274,426	$ 411,514	$ 548,602
31												
32												
33	AWWA Factor Used		8.00									
34												
35												
36												

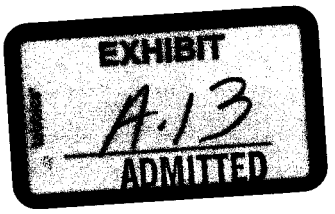
Sahuarita Water Co., L.L.C
Schedule of Projected Revenues
For the Years Ended

Line No.					Year 1	2	3	4	5
1									
2	**Projected Customers / Construction Water**								
3									
4									
5									
6	Estimated connections installed by year end (Cumulative)				1	1	1	1	1
7									
8	Estimated connection installed during the year				-	-	-	-	-
9									
10	1/2 Year Convention for Revenue				1.00	1.00	1.00	1.00	1.00
11									
12	**Projected Revenue**								
13									
14	Annual gallonage delivered (in 1,000's)				57,150	111,750	164,550	269,400	256,200
15	Assuming average usage per unit added per month of:			150,000	4,762,500	9,312,500	13,712,500	22,450,000	21,350,000
16	Daily Gallons				158,750	310,417	457,083	748,333	711,667
17	Commecial								
18	Monthly Mins. 1 Inch Meter	$ 120.00	Minimum Charge		$ 1,440	$ 1,440	$ 1,440	$ 1,440	$ 1,440
19	Commodity Rev.	-	Gals. in minimum						
20		$ 2.75	Charge per/1,000		157,163	307,313	452,513	740,850	704,550
21	from	- gals	up to	######## gals					
22									
23									
24									
25									
26									
27									
28									
29	Establishment Fees at			$ 25.00	$ -	$ -	$ -	$ -	$ -
30	Total Revenue				$ 158,603	$ 308,753	$ 453,953	$ 742,290	$ 705,990
31									
32									
33	AWWA Factor Used	8.00							
34									
35									
36									

EXHIBIT A-13

(November 23, 2007 Application for Modification of Designation of Assured Water Supply)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



ARIZONA DEPARTMENT OF WATER RESOURCES OFFICE OF ASSURED AND ADEQUATE WATER SUPPLY 3550 NORTH CENTRAL AVENUE, 2nd FLOOR PHOENIX, ARIZONA 85012 (602) 771-8585 Fax: (602) 771-8689	DATE RECEIVED:
APPLICATION NO:	

DESIGNATION OR MODIFICATION OF DESIGNATION OF ASSURED WATER SUPPLY APPLICATION

PART A - GENERAL INFORMATION

1. This is an application for: ☐ New Designation ☒ Modification of an existing designation

2. Name of municipal provider: Sahuarita Water Company, LLC AMA: Tucson

   ADWR No. 56-000373.0000

3. Name and address of person representing the municipal provider:
   Name: Mark Seamans
   Title: General Manager E-Mail: mseamans@ranchosahuarita.com
   Address: PO Box 1520, Sahuarita, AZ 85629 Phone: 520-399-1105 Fax: 520-399-1095

4. Contact person for questions regarding this application:
   Name: Kristen Whatley
   Company: WestLand Resources, Inc. E-Mail: kwhatley@westlandresources.com
   Address: 4100 E. Paradise Falls Drive, Tucson, AZ 85712 Phone: 520-206-9585 Fax: 520-206-9518

5. If not already on file with the Department, provide a map of the service area that includes the current and proposed distribution system and any treatment or storage facilities and reference as an attachment.

Up to date service area map on file with the Department	☐	
Hard copy of service area map attached	☒	Attachment: Attachment A
Electronic copy of service area map attached	☐	Attachment:

I DO HEREBY certify that the information contained in **this application and all information accompanying it is true and correct to the best of my knowledge and belief. NOTE:** If the applicant is a city or town, include a resolution of the governing body of the city or town authorizing the person to sign the application.

J.V.C. Chalfant — Printed Name

Senior Vice-President, Sahuarita Water Company — Title

J V C Chalfant — Signature

11-8-07 — Date

PART B - DEMAND ESTIMATE

Please use and attach the Designation Demand Spreadsheet provided by the Department (*See* http://www.azwater.gov/vWaterManagement_2005/Content/OAAWS/Designation_Demand_Spreadsheet.xls) **OR** provide and reference an attachment detailing the assumptions used in estimating water demand. Include projections of population and demand for each calendar year for at least ten years from the date of this application. **Attachment B**

CURRENT ANNUAL DEMAND: 1,348 acre-feet per year **YEAR:** 2007

COMMITTED DEMAND: 1,241 acre-feet per year

PROJECTED DEMAND: 10,983 acre-feet per year **YEAR:** 2034

Note: Projected demand should be for the 10th calendar year from the date of the application.

PART C- PHYSICAL AVAILABILITY OF SOURCE WATER

A comprehensive hydrologic study must be submitted with this application, unless the Department has previously reviewed the hydrologic conditions for this area and has issued a valid Letter of Water Availability or Physical Availability Determination. Please indicate the evidence of physical availability and reference as an attachment: Attachment C

- ☐ Water Availability Letter
- ☐ Physical Availability Determination
- ☒ New Hydrologic Study
- ☐ Other, please specify: _____

PART D- CONTINUOUS AVAILABILITY AND LEGAL AVAILABILITY OF SOURCE WATER

1. If the municipal provider has not yet established a service area right, please attach a copy of the Initial Petition to Establish New Water Service Area as submitted to the AMA.

2. If applicant is a private water company, attach a copy of the existing Certificate of Convenience and Necessity or a copy of the Decision and Order from the Arizona Corporation Commission establishing the CC&N or extension of CC&N. Reference as attachment: Pending review and approval

3. To complete the table below, multiply the Total Annual Demand computed in Part B by 100 to obtain the 100-year demand and enter at the bottom of the chart. Enter the appropriate 100-year demands for each type of water delivered to the subdivision for each category.

Source of Supply	**100 Year Volume (ac-ft)**
Groundwater	1,098,300
Central Arizona Project Water ☐ Direct treatment and delivery ☐ Recovered water	
Surface Water ☐ Direct treatment and delivery ☐ Recovered water	
Effluent ☐ Direct treatment and delivery ☐ Recovered water	
Other	
Total 100-yr Volume	1,098,300

4. See A.A.C. R12-15-717 and R12-15-718 for documentation that should be submitted as evidence of continuous availability and legal availability (respectively) for each source of supply. Please reference attachment(s): Attachment D

PART E - FINANCIAL CAPABILITY

Please check one of the following and include attachments as necessary:

☐ The applicant has constructed adequate delivery, storage, and treatment works.

☐ The applicant has entered into written agreements requiring a potential developer to construct adequate delivery, storage, and treatment works.
Attachment: _____

☐ If the applicant is a city or town, the applicant has:

☐ Adopted a five year capital improvement plan that provides for the construction, or the commencement of construction, of adequate delivery, storage, and treatment works in a timely manner, and has submitted a certification by the applicant's chief financial officer that finances are available to implement that portion of the five-year plan; or

☐ Submitted evidence demonstrating that financing mechanisms are in place to construct adequate delivery, storage, and treatment works in a timely manner.

☒ If the applicant is a private water company, the applicant has received approval from the Arizona Corporation Commission for financing the construction of adequate delivery, storage, and treatment works.

PART F - CONSISTENCY WITH MANAGEMENT GOAL

Please check all that apply below:

☒ Enrollment of the water provider as a member service area in the Central Arizona Groundwater Replenishment District (Phoenix, Tucson and Pinal AMAs **ONLY**).
A separate application for membership must be filed with the Central Arizona Water Conservation District, and the membership documents **must be executed and recorded before** the Designation will be issued.

☐ Extinguishment of grandfathered groundwater rights dedicated to the municipal provider's water service area.
Provide evidence and reference the attachment: _____

☐ Other. Please specify: _____

PART G - WATER QUALITY

1. Are the well or wells from which water will be withdrawn by the municipal provider within one mile of a Water Quality Assurance Revolving Fund (WQARF) or Superfund site? ☐ Yes ☒ No.
   If "Yes", please submit a contaminant migration and mitigation analysis demonstrating that the water supply will continue to meet the water quality requirements in A.A.C. Title 18, Chapter 4, and reference as attachment: _____

2. ☒ Municipal provider is or will be regulated by the Arizona Department of Environmental Quality (ADEQ) or another governmental entity with equivalent jurisdiction. If this applies, independent proof of adequate water quality is not required, please skip to Part H.

3. If the municipal provider serves or will serve 15 customers or less, provide current (within the last 60 days) analytical results on water samples taken from a well or wells constructed *within the service area*, demonstrating that the water meets the water quality requirements in A.A.C. Title 18, Chapter 4, and reference as attachment: _____

NOTE: Information on the required water quality analyses may be found at the ADEQ website http://www.adeq.gov.

PART H - CONSISTENCY WITH MANAGEMENT PLAN

1. For the municipal or county jurisdiction within which the service area is located, list any water conservation ordinances and briefly describe the sections that apply to the water service area. If they will serve as evidence of your demand projections, please reference as attachment.

Arizona Revised Statue 45.312 (State Plumbing Code Standards for Low Flow Fixtures)

2. Generally describe any other current or proposed conservation practices, rates, fees, restrictions, policies and devices to be utilized within the service area to meet the conservation requirements of the Management Plan:

Low water use plumbing fixtures for commercial and residential, non-invasive arid-tolerant landscape plants for residential front yards and commercial landscaping. Reclaimed water re-use on park landscaping, school yards, athletic fields, road medians and trails.

NOTE: If demand estimates rely on these conservation requirements, please reference attachment: _____

PART I – FEES

Please calculate fees by completing the appropriate items below, and include the total fees with your application. Payment may be made by cash, check, or credit card. Checks should be made payable to the Department of Water Resources. **Failure to enclose the required fees will cause the application to be returned. Fees for designations of assured water supply are authorized by A.R.S. § 45-113.**

IF THIS WATER PROVIDER HAS NOT BEEN DESIGNATED PREVIOUSLY, OR IF THIS APPLICATION IS A MODIFICATION OF AN EXISTING DESIGNATION THAT INCLUDES EVALUATION OF PHYSICAL, LEGAL, AND CONTINUOUS AVAILABILITY OR CONSISTENCY WITH MANAGEMENT GOAL, USE THE FEE CALCULATION METHOD BELOW:

1. Basic Application fee (includes first 1,000 acre-feet) — $ **1000.00**
2. Per-acre-foot review fee (for water use in excess of the first 1,000 acre-feet):
   - Total acre-feet of current demand in this application: 1,348
   - Less first 1,000 acre-feet: -1000
   - Acre-feet subject to additional review fees 348 x $.50 per acre-foot: $174.00
3. **Subtotal (add items #1 and #2) NOT TO EXCEED $10,000** — $1174.00
4. Indicate the appropriate AMA and enter the associated **Public Notice Fee**: — $ 225.00

☐	Phoenix AMA	$ 52.00
☒	Tucson AMA	$ 225.00
☐	Pinal AMA	$ 125.00
☐	Prescott AMA	$ 75.00
☐	Santa Cruz AMA	$ 50.00

5. **TOTAL FEE DUE (add items #3 and #4 - NOT TO EXCEED $10,000):** $1,399

IF THIS IS A MODIFICATION OF AN EXISTING DESIGNATION APPLICATION AND DOES NOT INCLUDE AN EVALUATION OF PHYSICAL, LEGAL, AND CONTINUOUS AVAILABILITY OR CONSISTENCY WITH MANAGEMENT GOAL, USE THE FEE CALCULATION METHOD BELOW:

1. Basic Application fee (includes first 1,000 acre-feet) — $ **500.00**
2. Indicate the appropriate AMA and enter the associated **Public Notice Fee**: — $ _____

☐	Phoenix AMA	$ 52.00
☒	Tucson AMA	$ 225.00
☐	Pinal AMA	$ 125.00
☐	Prescott AMA	$ 75.00

ATTACHMENT A

PROPOSED SERVICE AREA MAP

Attached is the proposed water system master plan to service expansion areas.

ATTACHMENT B
DEMAND ESTIMATE

The Designation Demand Spreadsheet is attached.

Name of Municipal er: Sahuarita Water Company, LLC

Designation Application - Pro... Demand Figures

11/20/2006

Projection year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Population	14,990	15,744	18,013	20,916	25,018	30,863	36,340	41,018	45,795	48,742	51,096	54,140	56,138
Population On-Project SRP													
Population Off-Project SRP													
Total Residential Demand (AF/YR)	1,724.94	1,811.63	2,062.52	2,402.26	2,879.57	3,524.22	4,136.30	5,188.16	5,188.16	5,530.39	5,819.11	6,189.24	6,415.29
Residential On-Project SRP (AF/YR)													
Residential Off-Project SRP (AF/YR)	1,724.94	1,811.63	2,062.52	2,402.26	2,879.57	3,524.22	4,136.30	5,188.16	5,188.16	5,530.39	5,819.11	6,189.24	6,415.29
Non-Residential Demand (AF/YR)	163.00	193.00	306.00	326.00	334.00	345.00	393.00	409.00	427.00	448.00	455.00	544.00	555.00
Non-Residential On-Project SRP (AF/YR)													
Non-Residential Off-Project SRP (AF/YR)													
Total Deliveries	1,887.94	2,004.63	2,368.52	2,728.26	3,213.57	3,869.22	4,529.30	5,597.16	5,615.16	5,978.39	6,274.11	6,733.24	6,970.29
Total On-Project SRP Deliveries (AF/YR)													
Total Off-Project SRP Deliveries (AF/YR)													
Lost and Unaccounted for Water	188.79	200.46	236.85	272.83	321.36	386.92	452.93	559.72	561.52	597.84	627.41	673.32	697.03
L&U On-Project (AF/YR)													
L&U Off-Project (AF/YR)													
Lost and Unaccounted for Percent	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Projected demand (AF/YR)	2,076.74	2,205.09	2,605.37	3,001.09	3,534.93	4,256.14	4,982.23	6,156.88	6,176.68	6,576.23	6,901.52	7,406.57	7,667.32
Projected On-Project SRP demand (AF/YR)													
Projected Off-Project SRP demand (AF/YR)	2,076.74	2,205.09	2,605.37	3,001.09	3,534.93	4,256.14	4,982.23	6,156.88	6,176.68	6,576.23	6,901.52	7,406.57	7,667.32
GPCD	123.68	125.04	129.12	128.09	126.14	123.11	122.40	134.00	120.41	120.45	120.58	122.13	121.93
Current demand (AF)	984.30	984.30	984.30	984.30	984.30	984.30	984.30	984.30	984.30	984.30	984.30	984.30	984.30
Committed demand (AF/YR)	752.70	752.70	752.70	752.70	752.70	752.70	752.70	752.70	752.70	752.70	752.70	752.70	752.70
Projected demand not incl. C&C (AF/YR)	339.74	468.09	868.37	1,264.09	1,797.93	2,519.14	3,245.23	4,419.88	4,439.68	4,839.23	5,164.52	5,669.57	5,930.32
Annual estimated demand (AF/YR)	2,076.74	2,205.09	2,605.37	3,001.09	3,534.93	4,256.14	4,982.23	6,156.88	6,176.68	6,576.23	6,901.52	7,406.57	7,667.32
Effluent production (AF/YR)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Effluent % of total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
66% of residential @ 57 gpcd (AF/YR)		663.45	759.06	881.40	1054.25	1300.56	1531.36	1728.49	1929.79	2053.98	2153.18	2281.45	2365.64

Please provide an explanation of the assumptions used in estimating projected demand. If sufficient space is not available below, attach additional sheets:

Population Density Assumptions: 2.7 pphu Single-Family, 1.8 pphu Active-Adult, 1.9 pphu Multi-family, Residential Demand Assumptions: 101 gpcd Single-Family, 123 gpcd Active-Adult, 68 gpcd Multi-Family

Sources:	AF/YR:	Basis for Source Volume:
Groundwater or recovered water		
CAP water direct delivery		
SRP surface water direct delivery		
Other surface water		
Effluent direct delivery		
Colorado River water		
SUM	0.00	

Committed demand (AWS schedule, most recent annual report)

752.7 AF/YR

Current demand (total production, most recent annual report)

984.3 AF

NOTES:

Water treatment plant capacity owned by applicant, total mgd of all plants =

Wastewater treatment plant capacity owned by application, total mgd of al plants =

Recharge storage permitted and/or contracted, by source, af/yr by source =

Well capacity production wells =

Well capcacity recovery wells, well permit limitations =

Legal availability of each source, contracts, rights, permits (attach)

Contracts/allotments for direct effluent delivery customers =

Please provide a table of all recharge projects including facility name and number, storage permit number, recovery well permits and wells by 55 # and volume of each source of supply that can be stored at each facility.

Please list each service area well and indicate the production capacity:

Registration Number	GPM	Acre-feet per year	
55-611144	1400		

Source	Orig. DAWS	MOD
Direct renewable treatment capacity		
District water		
CAP M&I subcontract		
SRPMIC		
Other surface water		
Effluent		
SUM	0	0
Groundwater		
Pump capacity		
Current GW allowance (af/yr)		
LTS credits (af/yr)		
Effluent LTF recovery		
IR factor (X%)		
SUM	0	0.00
TOTAL		0.00

ATTACHMENT C
NEW HYDROLOGIC STUDY

Attached is the new hydrologic study prepared by Brown and Caldwell to support the additional demand detailed in this modification.

ATTACHMENT D

R12-15-717 Continuous Availability

The proposed source is groundwater. The water master plan in Attachment A details the proposed wells needed to meet the planned expansion demands.

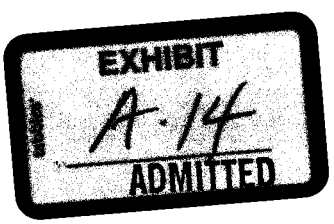
R12-15-718 Legal Availability

The applicant is a private water company, an application for extension of the CC&N is planned to be submitted to the ACC for consideration on November 26, 2007. The proposed source of water is groundwater to be withdrawn within the Tucson AMA. Sahuarita water Company currently has a service area right established (56-000373.0000).

EXHIBIT A-14

(November 21, 2007 Assured Water Supply Hydrology Report)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

(ATTACHMENT C OF MODIFICATION OF DESIGNATION OF AN ASSURED WATER SUPPLY APPLICATION)

Prepared for

SAHUARITA WATER COMPANY,
SAHUARITA, ARIZONA

November 21, 2007

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

SAHUARITA WATER COMPANY, SAHUARITA, ARIZONA

November 21, 2007

BROWN AND CALDWELL

110 South Church Avenue, Suite 2300,
Tucson, Arizona 85701

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ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

EXECUTIVE SUMMARY

The hydrogeologic analysis presented herein demonstrates the physical availability of 10,983 acre-feet per year (AF/yr) of local groundwater resources for 100 years for the existing and planned expansion of Sahuarita Water Company's (SWC) water service area. The physical availability demonstration provided by the hydrogeologic analyses supports a Modification of a Designation of an Assured Water Supply application for the Water Company. The planned expansion will serve potable groundwater resources to two proposed development projects including the Mission Peaks and Sahuarita Mission development projects, and an existing school site. Mission Peaks may also include development on an adjacent State Land parcel. Additional potable groundwater resources may also be served (bulk sales) to 500 existing off-site units at the adjacent Magee Ranch by a stand-pipe system. The existing school site includes the existing Sahuarita Unified School District Campus (K through 12). Additional development is also planned within the existing water service area including the Rancho Sahuarita Master-Planned Community. A total population of about 82,700 will be served potable groundwater resources by the Water Company in 2034, scheduled build out year, to about 32,400 housing units and associated commercial development.

Groundwater development from the local basinfill groundwater aquifer beneath SWC's existing water service area will be the principal source of water to meet projected SWC water demands. As of the date of this report, the SWC owns six wells and leases one well from the Town of Sahuarita. Groundwater is currently being withdrawn from two active wells, Well Nos. 14 and 18. Well No. 14, the leased Town of Sahuarita well, is also used to maintain lake levels of the Sahuarita Town Lake. The SWC has plans to install 10 new potable water supply wells to serve potable groundwater resources. Well No. 14 will be phased out for domestic use in 2009, but will continue to be used to maintain lake levels of the Sahuarita Town Lake by applying Type 1 water rights associated with the property area.

To demonstrate the physical availability of an Assured Water Supply (AWS) within the Tucson Active Management Area (AMA) utilizing groundwater resources, it is required that current, committed and projected groundwater withdrawals over 100 years will not result in the depth-to-water to exceed 1,000 feet from ground surface or depth to bedrock, whichever is less. Furthermore, groundwater must also be of acceptable quality for potable use. Lastly, the proposed water uses must be consistent with the Rules and Regulations of the Arizona Department of Water Resources (ADWR) pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

The methods applied for the analyses were pre-approved by staff of the ADWR Hydrology Division, and Assured and Adequate Water Supply offices during a pre-application meeting held in mid-2007. Interim water demand analyses were also performed at the request of ADWR staff. The hydrologic study area agreed to by ADWR staff at the pre-application meeting covers an area of about 500-square miles south to the Santa Cruz County line and north to southern portions of the City of Tucson just northeast of Interstate 10.

Compilation and analyses of current, committed and projected water demands within the hydrologic study area indicate that future net groundwater withdrawals within the hydrologic study area will not increase significantly as a result of significant reductions in projected agricultural pumpage. Current water demands within the hydrologic study area total about 105,000 AF/yr. These current demands include municipal, agricultural and industrial demands including mine pumpage. Of the total, about 32 percent is attributed to agricultural pumpage and about 33 percent is attributed to mining and industrial pumpage. The total includes

1,259 acre-feet (AF) of municipal water demand in 2006 for SWC or about 1 percent of total groundwater pumped with the hydrologic study area.

Projected demands within the hydrologic study area, which include current and committed water demands, total about 111,500 AF/yr. This is an increase of only about 6 percent from current pumpage. This total includes 10,983 AF/yr of projected pumpage for SWC in 2034, which is the scheduled build-out year, or about 10 percent of projected pumpage. Committed water demands associated with approved or pending study area AWS analyses on record with ADWR totals about 18,500 AF/yr. The insignificant increase from current water demand totals is attributed to a reduction of about 22,000 AF/yr of agricultural pumpage for Farmers Water Company, located adjacent east to SWC, as agricultural lands are retired and developed for residential uses. This projected reduction of agricultural groundwater usage for Farmers Water Company is documented in the hydrology study submitted to ADWR in 2006, along with an application of an Analysis of an AWS for the water company.

To assess the future hydrologic impacts of future groundwater development by SWC, a three-dimensional, numerical groundwater flow model ("SWC model") was constructed for the southern portion of the Tucson AMA. In order to ensure consistency with current modeling efforts by ADWR, the primary source of information and guidance in the development of the model was ADWR's Modeling Report No. 13 by Dale Mason and Liciniu Bota, *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Simulation and Application*, 2006 (ADWR, 2006) as well as the digital model files for the Tucson AMA model ("TAMA model"). The TAMA groundwater model was modified to incorporate new hydrogeologic data gathered from exploratory boring analyses and aquifer testing programs performed by Brown and Caldwell for the SWC in 2006 and 2007.

The groundwater model, incorporating current, committed and projected groundwater demands within an approximate 500-square mile hydrologic study area, was applied to project water-level conditions in 2107, a 100 year period. Computer simulations were performed including only 5 percent of about 20,000 AF of annual artificial recharge of Central Arizona Project water at the Pima Mine Road Recharge Project and with no recharge for the North Borrow Pit, both located just north of SWC. The hydrologic simulations analyses demonstrated that maximum depth-to-water in the vicinity of SWC's water supply wells is projected to range from 610 to 785 feet below land surface in 100 years. These projected depths meet the requirement for AWS analyses for the Tucson AMA in that depth-to-water in 100 years cannot exceed 1,000 feet from the ground level or depth-to-bedrock, whichever is less.

Groundwater quality analyses performed on groundwater samples collected from active wells and exploratory borings reveal favorable groundwater quality for potable use based on current regulatory limits. The proposed water uses will be consistent with the Rules and Regulations of ADWR, pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

The hydrologic analyses presented invoke a number of conservative elements in demonstrating the physical availability of sufficient groundwater resources. The principal elements are as follows:

- New wastewater treatment plant will be constructed for the new developments. No effluent reuse or artificial recharge of effluent generated by the new developments was included in the hydrologic simulations. Potentially up to 60 percent of equivalent volume of pumpage may be available for future reuse or recharge.

- Mine and agricultural water usage in the hydrologic study area will likely not be at current levels for 100 years. Hydrologic simulations assume current levels of pumpage will remain constant. Mine life will likely be exhausted, and agriculture usage will likely be retired and transferred to municipal uses. A significant net reduction in overall water usage will likely occur.

- Artificial recharge of Central Arizona Project (CAP) water at the Pima Mine Road Recharge Project will likely continue into the distant future and potentially be augmented in the future. Currently annual recharge totals about 20,000 AF/yr. Hydrologic simulations only applied 5 percent of the total as required by ADWR. North Borrow pit may also be in operation within the simulated period.

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

1. INTRODUCTION

This report is submitted to the Arizona Department of Water Resources (ADWR) to support a Modification of a Designation of an Assured Water Supply for the Sahuarita Water Company (SWC) (formerly Rancho Sahuarita Water Company) in Sahuarita, Arizona. The SWC's Certificate of Convenience and Necessity (CC&N) water service area is located in Pima County, Arizona within the Tucson Active Management Area (Tucson AMA). AMAs are areas designated by the ADWR as areas deemed to require active groundwater management by the State of Arizona. The SWC's water service area is included in the Upper Santa Cruz River groundwater basin.

In 1996, hydroLOGIC Consultants, LLC prepared the original application and supporting hydrology study for a Designation of an Assured Water Supply for Interchange Water Company for a total of 10,800 single family housing units. Interchange Water Company was the former name of SWC. The study demonstrated the physical availability of 3,551 acre-feet per year (AF/yr) of groundwater for 100 years. In 2003, hydroLOGIC Consultants, LLC conducted a subsequent hydrology study to support a Modification of an Assured Water Supply application for an additional 3,000 single-family housing units and associated commercial development. This study demonstrated the physical availability of an additional 1,149 AF/yr of groundwater, with a total physical availability of 4,700 AF/yr of groundwater for 100 years.

The SWC is concurrently, as of the date of this report, in the process of expanding the current limits of the CC&N water service area under the regulatory authority of the Arizona Corporation Commission (ACC). The intent of the proposed expansion is to serve potable groundwater resources to two proposed residential and commercial development projects west of the existing CC&N area and an existing school site surrounded by the existing CC&N area. The two proposed developments include the Mission Peaks and Sahuarita Mission projects. The existing school site includes the Sahuarita Unified School District Campus (K through 12). Figure 1.1 illustrates the locations of these proposed developments and the school site. Mission Peaks may also include development on an adjacent State Land parcel. Additional groundwater resources may also be served (bulk sales) to 500 existing off-site units at the adjacent McGee Ranch by a stand-pipe system. The existing school site includes the Sahuarita Unified School District Campus (K through 12). Additional development is also planned within the existing water service area that includes the Rancho Sahuarita Master-Planned Community. A total population of about 82,700 will be served potable groundwater resources by the SWC in 2034, scheduled build-out year, to about 32,400 housing units and associated commercial development.

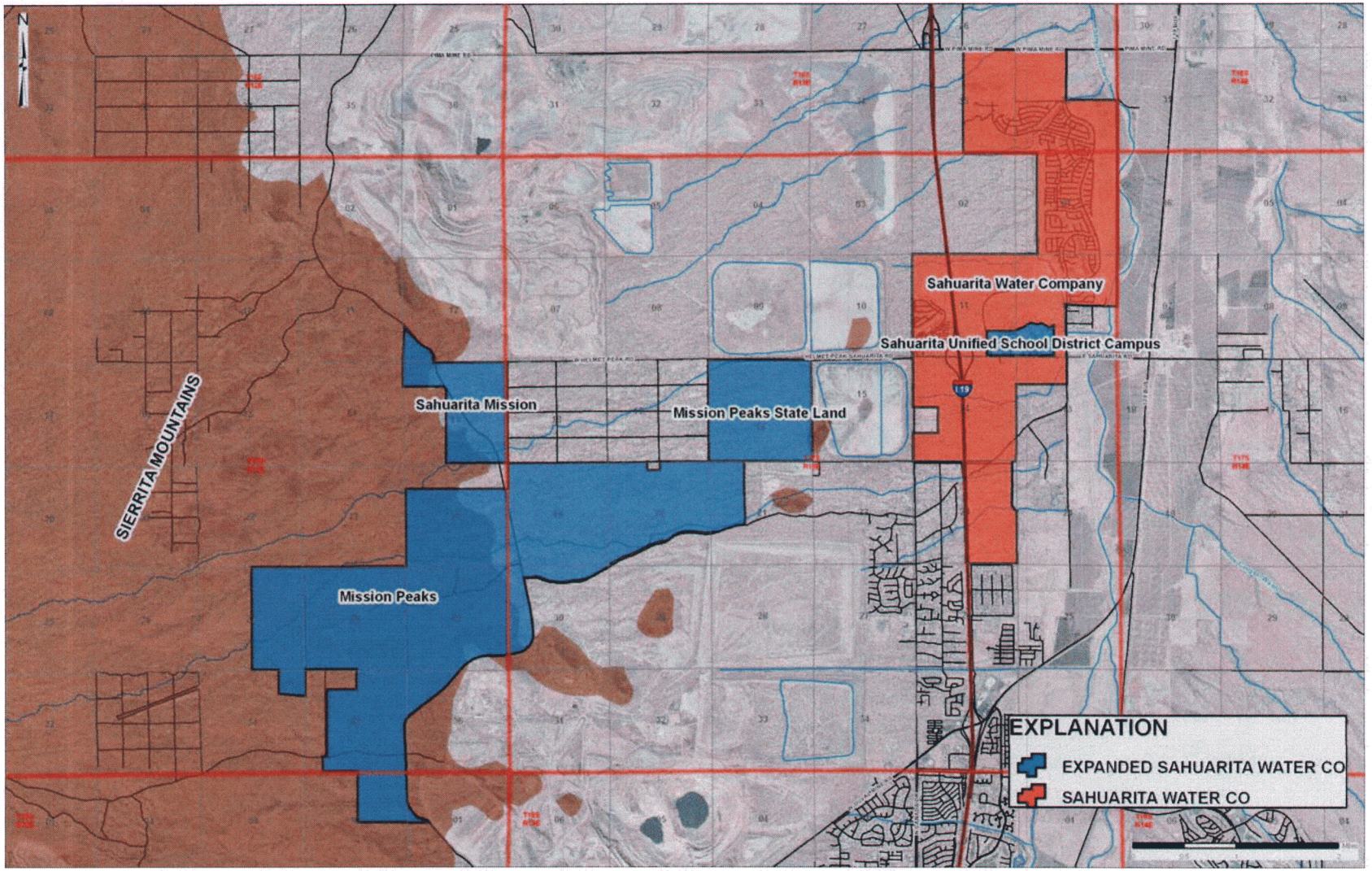


Figure 1-1 – Sahuarita Water Company's Certificate of Convenience and Necessity Current and Proposed Expanded Water Service Areas

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

2. SCOPE OF WORK

The purpose of the analysis presented in this report is to demonstrate that sufficient local groundwater resources are physically available for the proposed water uses for the next 100 years. The report presents sections describing elements of water demand, supply, and adequacy. The proposed water uses will be consistent with the Rules and Regulations of ADWR, pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576). To demonstrate the physical availability of an AWS within the Tucson AMA utilizing groundwater resources, it is required that current, committed and projected groundwater withdrawals over 100 years will not result in depth-to-water to exceed 1,000 feet from ground surface or depth to bedrock, whichever is less. Furthermore, groundwater must also be of acceptable quality for potable use. Methods applied for the analyses were presented and were in concurrence with staff of the ADWR Hydrology Division and Assured and Adequate Water Supply offices at a pre-application meeting held in mid-2007. Interim study area water demand analyses were performed at the request of ADWR staff. The hydrologic study area extent agreed to by ADWR at the pre-application meeting covers an area of about 500-square miles south to the Santa Cruz County line and north to southern portions of the City of Tucson just northeast of Interstate 10.

The scope of work for the hydrology study includes elements of demand, supply, and adequacy. Elements of demand include the compilation of past, current, committed, and projected water demands for SWC, including the new projected demand within the expanded CC&N area, other major water providers, and other water users within the defined hydrologic study area. The hydrologic study area with the locations of the principal water providers is shown on Figure 2.1. Elements of supply include an evaluation of the current hydrogeologic conditions to assess local groundwater resource availability. Elements of adequacy include calculations of physical availability of groundwater resources by quantifying projected water-level impacts in 100 years by three-dimensional groundwater computer modeling methods.

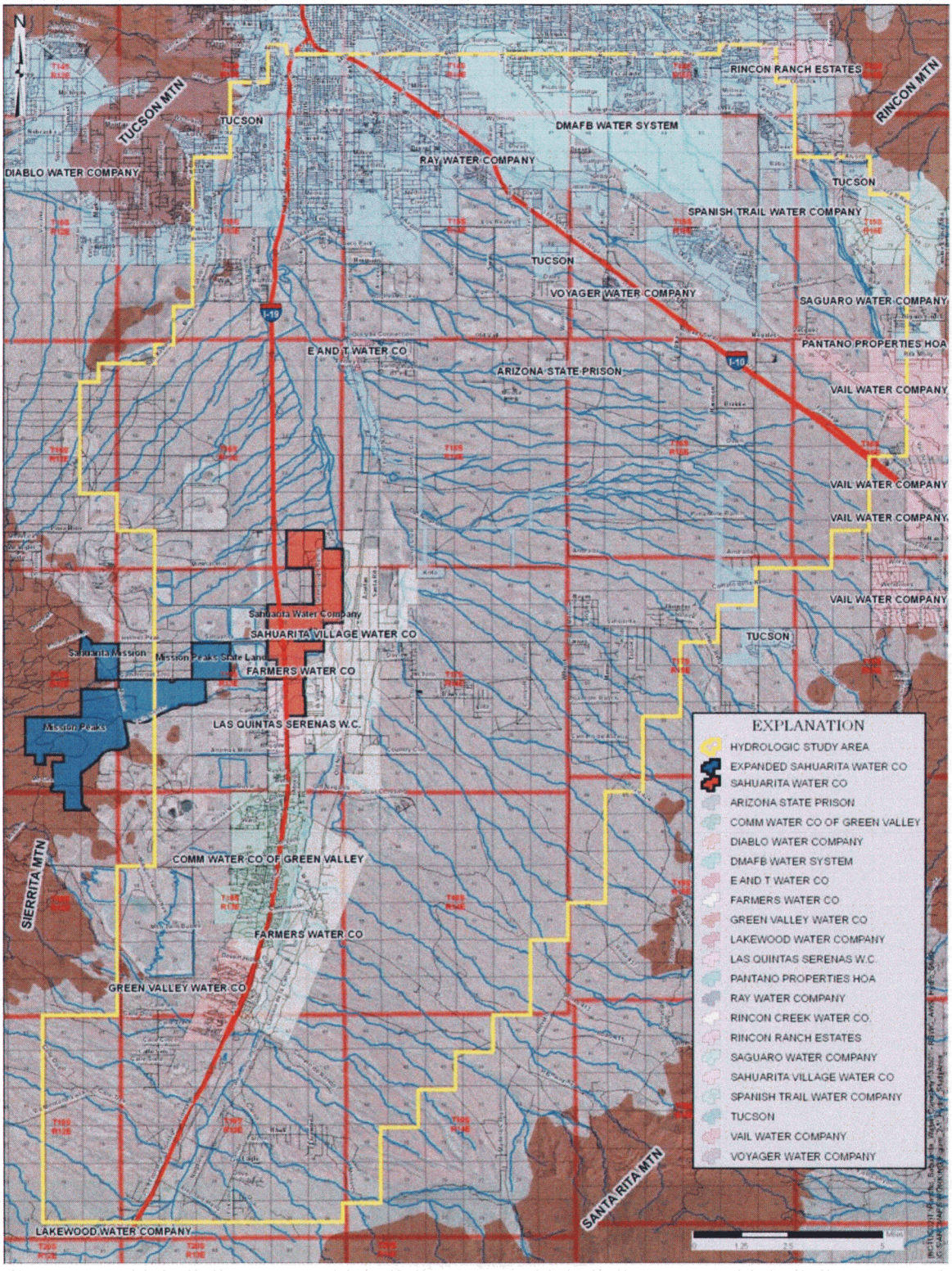


Figure 2-1 – Hydrologic Study Area

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

3. ELEMENTS OF DEMAND

3.1 SAHUARITA WATER COMPANY WATER DEMANDS

3.1.1 Current Water Demands

Potable water demands for SWC have grown in the past few years as a result of a strong housing market. By 2006, approximately 3,650 single-family and active-family adult housing units were served potable groundwater by the SWC. Table 3-1 below tabulates groundwater withdrawals for 2002 through 2006.

Table 3-1. SAHUARITA WATER COMPANY GROUNDWATER WITHDRAWALS (2002-2006) (AF)

2002	2003	2004	2005	2006
433.55	621.1	732.1	983.8	1259.8

From ADWR "55"File database, 2007 for Rancho Sahuarita Water Company Wells No. 14 (ADWR Registration No. 55-611142) and Well No. 18 (ADWR Registration No. 55-611144)

3.1.2 Projected Water Demands

As stated in Section 1.0, the SWC has plans to serve potable groundwater resources to an expanded water service area, as well as additional developments within the existing water service area of the Rancho Sahuarita Master-Planned Community. The expanded service area consists of two proposed residential and commercial development projects and an existing school site. The two proposed development projects include Mission Peaks and Sahuarita Mission development projects. The school site is the Sahuarita Unified School District Campus (K through 12). The locations of the proposed developments are shown on Figure 1.1. Mission Peaks development may also include development on an adjacent State Land parcel indicated on Figure 1.1. Additional potable water resources may also be served (bulk sales) to 500 existing off site units at the adjacent Magee Ranch by a stand-pipe system and is included in the water demand calculations.

The proposed developments will be built in phases. Build-out for all of these developments is projected for 2034. Table 3-2 below summarizes planned number and types of housing units, estimated square footage of associated commercial development, anticipated year of commencement of water service for the initial phase, and projected build-out year.

Table 3-2. SAHUARITA WATER COMPANY PROJECTED NEW DEVELOPMENTS AT BUILD-OUT (2034)								
			Residential				Schools	
Development	Commence Water Service -Initial Phase Year	Anticipated Build-out Year	Single-Family Units	Active-Adult Units	Multi-Family Units	Commercial (sq feet)	Elem. & Middle School (students)	High Schools (students)
Rancho Sahuarita	NA	2018	10,086	1,460		3,072,935	1,226	3,150
Mission Peaks & State Land Parcel	2010	2034	13,923[1]	2,371	1,506	1,105,336	956	5,343
Sahuarita Mission	2011	2023	3,000					
Sub Total			27,009	3,831	1,506			
Total			32,346 housing units			4,178,271 sq feet of commercial development		
1 = includes 500 units for the Magee Ranch								

Water demands were calculated with ADWR water demand constants from the Tucson Active Management Area Third Management Plan. Summary of water demand constants are tabulated in Table 3-3 below.

Table 3-3. SUMMARY OF WATER DEMAND CONSTANTS					
Development Type	Residential Occupancy Rate	Residential Water Demand Rate	Commercial Water Demand Rate	Elementary and Middle School Water Demand Rate	High School Water Demand Rate
	Capita Per Housing Unit (c/u)	Gallons Per Capita Per Day (gpcd)	Acre-feet Per Acre Per Year (AF/Ac/yr)	Gallons Per Student Per Day (gpsd)	Gallons Per Student Per Day (gpsd)
Single-Family Units	2.7	101			
Active-Adult Units	1.8	123			
Multi-Family Units	1.9	68			
Schools				25	43
Commercial			2.25		
Construction Water Use Rate = 10,000 gallons per lot					
Lost and Unaccounted for Water = 10 percent					

Based on the water demand constants in Table 3-3 and development parameters in Table 3-2, the total projected water demand at build-out year of 2034 for the SWC, including the expanded water service area, is calculated as 10,983 AF/yr. A water demand calculation spreadsheet is included as Appendix A.

3.2 HYDROLOGIC STUDY AREA WATER DEMANDS

3.2.1 Other Current Water Demands

Other current water demands (not including SWC) for the hydrologic study area were compiled from ADWR databases (2007a, 2007c and 2007c). Average recorded pumpage for 2002 to 2006 was considered representative of other current water demands. These water demands include water providers, agriculture and non-agriculture demands and are illustrated on Figure 3-1. These other current water demands total 103,072.5 AF/yr pumping from 335 wells within the hydrologic study area. Summary of water usage by sector for the hydrologic study area is tabulated in Table 3-4 below based on ADWR's water-use coding of water production wells (ADWR, 2007a).

Table 3-4. CURRENT WATER USAGE PER SECTOR

SECTOR[1]	WATER USAGE (AVERAGE 2002 TO 2006) AF/yr	PRECENT OF TOTAL
IRRIGATION	32,988.1	32.0%
MUNICIPAL	22,132.8	21.5%
MINING	20,358.2	19.8%
INDUSTRIAL	13,741.0	13.3%
MONITORING	5,706.1	5.5%
DOMESTIC	4,079.2	4.0%
OTHER - MINERAL EXPL.	1,215.4	1.2%
OTHER – PRODUCTION	1,135.7	1.1%
UTILITY (WATER CO)	715.4	0.7%
UNKNOWN	441.5	0.4%
NONE	228.7	0.2%
COMMERCIAL	207.3	0.2%
TEST	87.4	0.1%
STOCK	35.6	0.0%
TOTAL	**103,072.5**	100.0%

1 – Sector Data from ADWR Wells "55" Database, 2007A.

Exempt well pumpage was also included in the current demands, as requested by ADWR AWS staff to cover any "wildcat" subdivisions in the hydrologic study area. It was assumed that each exempt well in the hydrologic study area pumps about 1 AF/yr. A total of 1,041 exempt wells are included within the hydrologic study area and are also illustrated on Figure 3-1. As a result, an additional 1,041 AF/yr of exempt well pumping was included within the hydrologic study area.

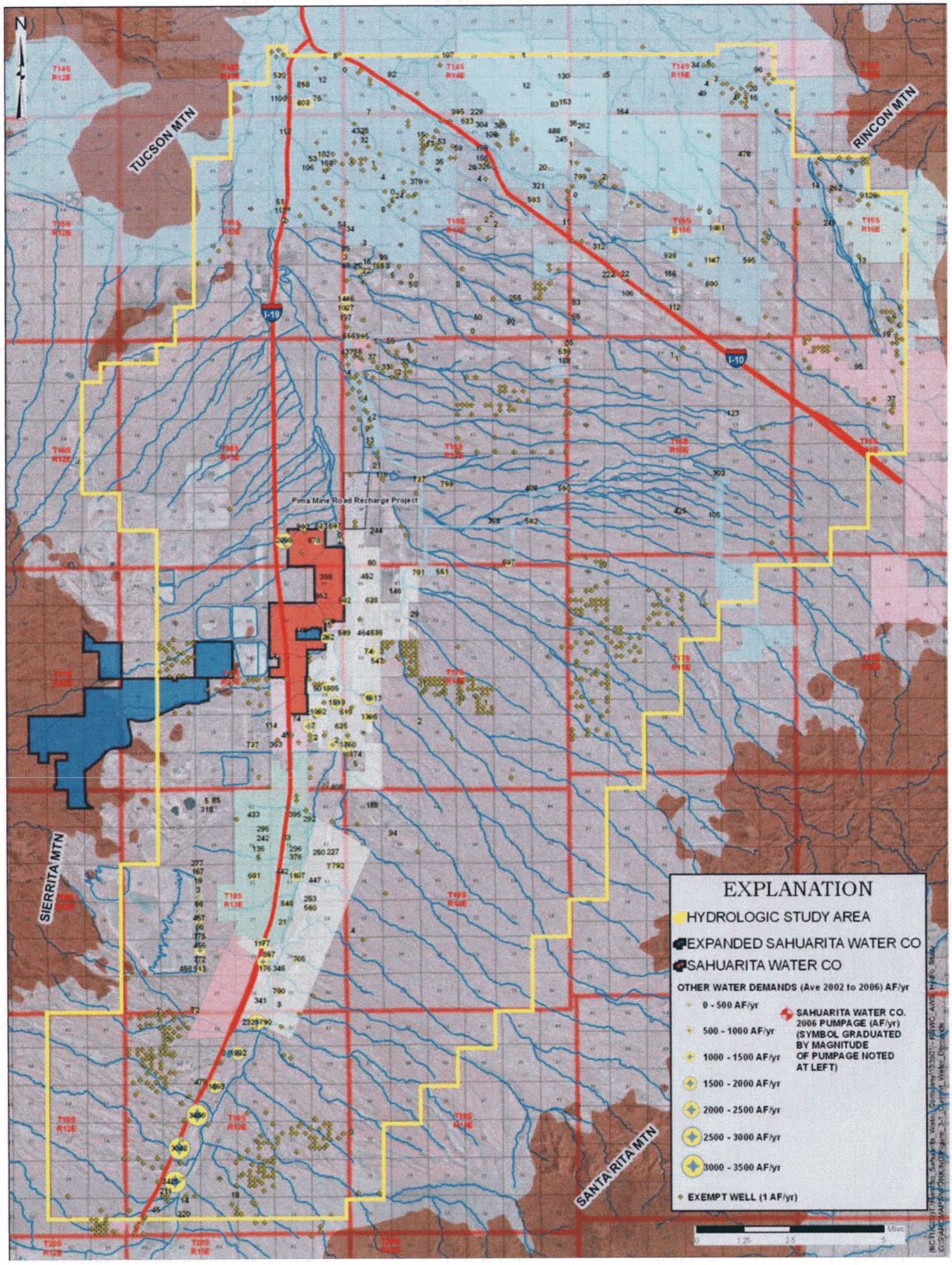


Figure 3-1 – Current Water Demands of the Hydrologic Study Area

3.2.2 Other Projected Water Demands

Projected water demands (not including SWC's current and expanded water service area water demands) include current and committed demands within the hydrologic study area. Current demands also include exempt well pumping, as mentioned in Section 3.2.1. Committed demands include approved and pending AWS demands not yet being served.

Based on interim discussions with ADWR AWS staff, ADWR requested that Brown and Caldwell quantify the full allotment of all active non-irrigation groundwater rights and unallocated service area rights within the hydrologic study area. Brown and Caldwell conducted an interim analysis by compiling the water rights within the hydrologic study area and comparing the total with average recorded pumpage for 2002 to 2006, which includes agricultural pumping.

ADWR provided Brown and Caldwell a listing of water rights in the study area from ADWR's Registry of Groundwater Rights (ROGR) database (2007b). Irrigation and Type 2 Non-Irrigation GFR were removed for the analysis, because it was conjectured that retirement of these irrigation rights will occur as growth of potable uses continue, and Type 2 Non-Irrigation may be moved anywhere throughout the Tucson AMA. Based on the analysis, total recorded pumpage for 2002 to 2006 was generally in agreement to total of groundwater rights. ADWR concurred that an average of 2002 to 2006 pumpage fully accounts for active non-irrigation groundwater water rights and could be utilized representing a portion of projected pumpage related to current demands.

An analysis of unallocated potable water demand was performed using ADWR's Assured and Adequate Water Supply database (2007c) to evaluate committed demands within the hydrologic study area. It was assumed that approved AWS analyses on record from 1975 through 2004 is part of the current demand being served and not part of committed demands. To evaluate this assumption, current 2006 recorded pumpage was compared to approved-AWS subdivision water demands from 1975 to 2004 within the hydrologic study area. If lot or demand information was not available in this database, Pima County Assessors information was reviewed for the information. ADWR water use constants were used to estimate water demands for these subdivisions. Similarly, approved applications associated with commercial demands were calculated by the acreage of the commercial project and utilizing a demand factor of 2.25 acre-feet per acre per year (AF/acre/year). The analysis determined that the total estimated water demands of approved AWS analyses through 2004 were approximately equivalent to the current demand, indicating that these demands can reasonably be assumed to part of the current demands.

As a result, committed demands are assumed to be any AWS analyses on record and approved or pending approval by ADWR from 2005 to the present. These data were compiled from ADWR Assured and Adequate Water Supply database (ADWR, 2007b). Water demands associated with applications approved prior to the year 2005 are considered currently being served and built-out, and therefore part of the current water demands. Water demands associated with applications approved from 2005 to present are classified as committed demands and are included in Table 3-5 below. These demands total to 15,008 AF/yr. Table 3-6 presents pending applications as of the date of this report totaling 479 AF/yr, also considered committed water demands.

Based on a review of Farmers Water Company AWS submittal for Sahuarita Farms (north half) and Continental Farms (south half) (Clear Creek Associates, 2006), much of the agricultural lands currently irrigated will become retired and be developed into residential subdivisions. Residential water demand based on Table 3-5 is 14,438 AF/yr. No build-out schedule for the residential development was noted. Continued irrigation demand will total 5,000 AF/yr. Current water demand for the water company based on average of 2002 to 2006 pumpage records totals 27,094 AF/yr. Assuming all current pumpage is attributed to agricultural uses, agricultural demands will be reduced by about 22,094 AF/yr.

Projected water demands within the hydrologic study area are illustrated on Figure 3-2.

Table 3-5. APPROVED ASSURED WATER SUPPLY APPLICATIONS (2005 TO PRESENT)

Water Provider	Application Name (Subdivision, Master Plan, Water Company, etc.)	Lots	Department File Number	Township		Range		Section	Demand (AF/yr)	Date Issued
Community Water Company of Green Valley	Las Campanas Blocks D & E, Lots 1-268 & Common Area A	268	27-401825	18	S	13	E	10	78.20	01/03/06
Community Water Company of Green Valley	La Joya Verde		27-401602	17	S	13	E	27	31.38	
Community Water Company of Green Valley	Las Campanas Blocks D & E, Lots 1-268 & Common Area A	268	27-401825	18	S	13	E	10	78.20	1/3/2006
Community Water Company of Green Valley	La Joya Verde		27-401602	17	S	13	E	27	31.38	
Community Water Company of Green Valley	La Joya Verde II		27-401633	17	S	13	E	35	14.86	
Community Water Company of Green Valley	La Joya Verde III		27-400885	17	S	13	E	35	42.76	
Community Water Company of Green Valley	La Joya Verde III		27-400886	17	S	13	E	35	46.26	
Community Water Company of Green Valley	La Joya Verde III		27-400887	17	S	13	E	35	26.24	
Farmers Water Company	De Anza Links II, Lots 1-17 and Common Areas A & B	17	27-401810	18	S	13	E	27 & 34	6.52	01/30/06
Farmers Water Company	Sahuarita Acres, Lots 1-71 and Common Area "A"	71	27-500023	17	S	14	E	8	21.81	04/09/07
Farmer's Water Company	Sahuarita Farms (N. half) and Continental Farms (S. half)[1]		28-500050						14,438.46	07/30/07
Green Valley Water District	Solar Del Viejo, Lots 1-81, Common Areas A & B	81	27-401607	18	S	13	E	22	26.65	03/17/05
Quail Creek Water	Stone House	222	27-401424	18	S	14	E	8	84.66	01/25/05
Ray Water Company	Cantera, an RCP Subdivision, Lots 1-143; Common Areas A, B & C; Blocks A & B	143	27-401727	15	S	14	E	10	57.06	11/15/05
Ray Water Company	Desert Point 2, Lots 1 - 45 and Common Areas "A" & "B"	45	27-402265	15	S	14	E	10	15.83	03/30/07
Undetermined	Swan Southlands Development	8525	28-401840	16	S	14	E		3117.36	06/12/06
								Total	**18,008 AF/yr**	

1 – Sahuarita Farms and Continental Farms developments to retire agricultural uses.

Table 3-6. PENDING ASSURED WATER SUPPLY APPLICATIONS

Department File Number	Application Name (Subdivision, Master Plan, Water Company, etc.)	Water Provider	Location	Demand (AF/yr)
27-700295.0000	La Joya Verde Rancho Abrego III, Lots 1-15 and Common Area "A"	Community Water Company of Green Valley	T17S, R13E, Sec 35	4.79
27-700275.0000	Las Campanas, Block C, Lots 1-283 and Common Area "A"	Community Water Company of Green Valley	T18S, R13E, Sec 10	91.14
27-700391.0000	La Jolla Verde Commercial	Community Water Company of Green Valley		16.00
27-401781.0000	Canoa Preserve	Farmers Water Company	T18S, R13E, Sec 35	36.38

Table 3-6. PENDING ASSURED WATER SUPPLY APPLICATIONS

Department File Number	Application Name (Subdivision, Master Plan, Water Company, etc.)	Water Provider	Location	Demand (AF/yr)
27-700354.0000	Madera Highlands, Villages 27 and 29, Common Areas "D", "E", "F" and "G"	Farmers Water Company	T18S, R13E Sec 12, 13; T18S, R14E, Sec 18	70.52
27-500014.0000	Canoa Ranch, Block 27 South, Lots 1-356 and Common Areas "A" and "B"	Green Valley Water Company	T19S, R13E, Sec 8, 9, 16, 17	108.08
51-402270.0000	Elephant Head Partnership LLC	N/A	T19S, R14E. Sec 30	63.70
27-700397	Ridgeline	New Water Provider	T19S, R14E. Secs 18-20, 29-30	88.49
			Total	**479 AF/yr**

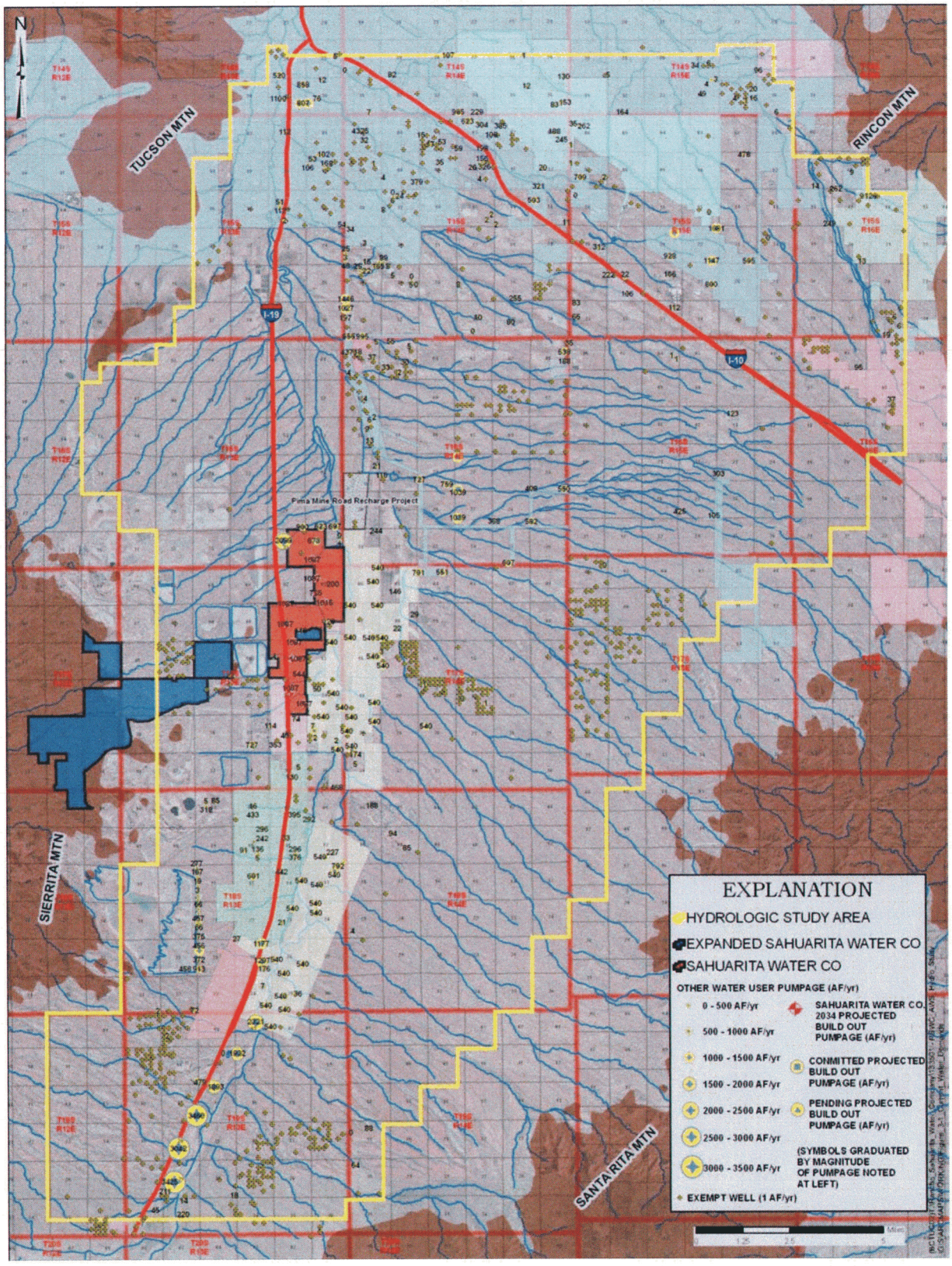


Figure 3-2 – Projected Future Water Demands of the Study Area

3.3 TOTAL WATER DEMANDS

Total water demands compiled for the hydrologic study area are tabulated in Table 3-7 below.

Table 3-7. SUMMARY OF TOTAL WATER DEMANDS WITHIN THE HYDROLOGIC STUDY AREA

Water Demands	Sahuarita Water Company (AF/yr)	Other Water Demands (AF/yr)	Exempt Wells (AF/yr)	Total (AF/yr)
Current	1,259.8	103,072.5	1,041	105,373.3
Projected	10,983	80,978.5[1]	1,041	93,002.5
Committed				18,008[2]
Pending Committed				479
Total Projected & Committed Water Demands in Hydrologic Study Area = 111,489.5 AF/YR				

1 – Includes reduction of agricultural pumpage for Farmers Water Company from 27,094 AF/yr to 5,000 AF/yr, an estimated reduction of 22,094 AF/yr.
2 – Includes 14,438 AF/yr future potable water demands for Farmers Water Company.

3.4 WATER SOURCE

Groundwater development from the local basinfill groundwater aquifer beneath the existing SWC's water service area will be the principal source of water to meet projected SWC water demands. The SWC, as of the date of this report, owns six wells and leases one well from the Town of Sahuarita. Information regarding these wells is included in Table 3-8 below. Groundwater is currently withdrawn from two active wells, Well Nos. 14 and 18. Well No. 14 is leased to the SWC by the Town of Sahuarita and is also used to maintain lake levels in the Sahuarita Town Lake.

Table 3-8. SAHUARITA WATER COMPANY WELLS

Well No.	ADWR Well Registration No.	Cadastral Location	Casing Diameter (inches)	Casing Materials	Well Depth (feet)	Upper Screen Depth (ft bls)	Lower Screen Depth (ft bls)	Drill Date
1	55-562962	D(17-13)11 dcd	8	Steel, Milled Slots, 12 cuts per foot, 3/16"x3" Slots	500	430	490	9/26/1997
12	55-611141	D(17-13)01 abb	24	Steel, Milled Slots, 24 rows, ¼"x3"	982	273	970	5/27/1970
14	**55-611142**	**D(17-13)01 acc**	**24**	**Steel, Milled Slots, 20 rows, ¼"x3"**	**1135**	**435**	**1135**	**10/9/1970**
17	55-611143	D(16-13)36 cbc	24	Steel, Milled Slots, 24 rows, ¼"x3"	1053	247	1030	12/20/1974
18	**55-611144**	**D(17-13)01 cdd**	**20**	**Steel, Slotted**	**905**	**424**	**890**	**4/18/1975**
19	55-611145	D(17-13)01 bac	24	Steel, Milled Slots, 24 rows, ¼"x3"	990	210	972	5/5/1981
20	55-611146	D(16-13)36 ddd	24	Steel, Milled Slots, 26 rows, ¼"x3"	975	240	975	9/22/1969

Note: Wells in bold are active wells as of the date of this report

Based on recent groundwater sampling and analysis, both wells, Well Nos. 14 and 18, produce potable groundwater. Other wells not utilized are considered to be beyond service life and plans are in place to abandon the wells. Well No. 1 has recently been converted to a monitoring well.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and phase out use of Well No. 14 for domestic use in 2009. This well will continue to be used to

maintain lake levels in the Sahuarita Town Lake by applying Type 1 water rights associated with the property area.

In 2006 and 2007 Brown and Caldwell conducted pilot hole and exploratory boring analyses programs to evaluate potential future well sites for the SWC. Groundwater production potential and groundwater quality were evaluated at 6 sites, and currently, as of the date of this report, evaluating 2 additional well sites. This pilot hole analysis conducted for Well Site No. 24 concluded that the well site is not a viable based on groundwater quality. This analysis is documented in a report titled *Well Site No. 24 Pilot Hole Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007b). Exploratory boring analyses were conducted at 5 additional well sites, Well Site Nos. 21, 22, 23, 25, and 26. Exploratory boring analyses at Well Site Nos. 21, 23, 25 and 26 revealed favorable groundwater production potential and groundwater quality. The exploratory boring analyses program is documented in a report titled *Well Site Nos. 21, 22, 23, 25, and 26 Exploratory Boring Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007c).

Table 3-9 tabulated water supply wells and future well sites to be utilized through build-out in year 2034 and beyond. As noted above, Well No. 14 will be phased out in 2009. Table 3-4 indicates whether groundwater production potential and groundwater quality has been confirmed or not as of the date of this report. Confirmation is noted where a well is existing or an exploratory boring analysis has been completed and verifying favorable groundwater production potential and groundwater quality for potable use. Well sites where confirmation has yet to be determined is slated for future exploratory boring analyses.

Figure 3-3 shows the location of these wells and future well sites. Other wells owned by the SWC, also noted on Figure 3-3, Well Nos. 1, 12, 17, 19, and 20, will not be used as a result of age and poor conditions of the wells.

Table 3-9. SAHUARITA WATER COMPANY ACTIVE AND FUTURE PLANNED WATER SUPPLY WELLS

Well	Active or Future Wells	ADWR Registration No.	Cadastral Location	Current or Anticipated Pump Capacity (gpm)	Groundwater Production Potential and Groundwater Quality Confirmed?	Projected Groundwater Production at Build-out (2034) (AF/yr)
Well No. 14	Active	55-611142	D-17-13 1ACC	1,900	Yes	0
Well No. 18	Active	55-611144	D-17-13 1CDD	1,400	Yes	1,014.9
Well Site No. 17R	Future	NA	D-16-13 36CCA	1,500	No	1,087.4
Well Site No. 19R	Future	NA	D-17-13 1BDB	1,500	No	724.9
Well Site No. 21	Future	NA	D-17-13 1CDB	1,000	Yes	1,087.4
Well Site No. 23	Future	NA	D-17-13 11BAA	1,500	Yes	1,087.4
Well Site No. 24B	Future	NA	D-17-13 11CAA	1,500	Yes	1,087.4
Well Site No. 25	Future	NA	D-17-13 14ABA	1,500	No	1,087.4
Well Site No. 26	Future	NA	D-17-13 14DDC	750	Yes	543.7
Well Site No. 27	Future	NA	D-17-13 23ACC	1,500	No	1,087.4
Well Site No. 28	Future	NA	D-17-13 23DDA	1,500	No	1,087.4
Well Site No. 30	Future	NA	D-17-13 14DBA	1,500	No	1,087.4
						Total = 10,983 AF/yr

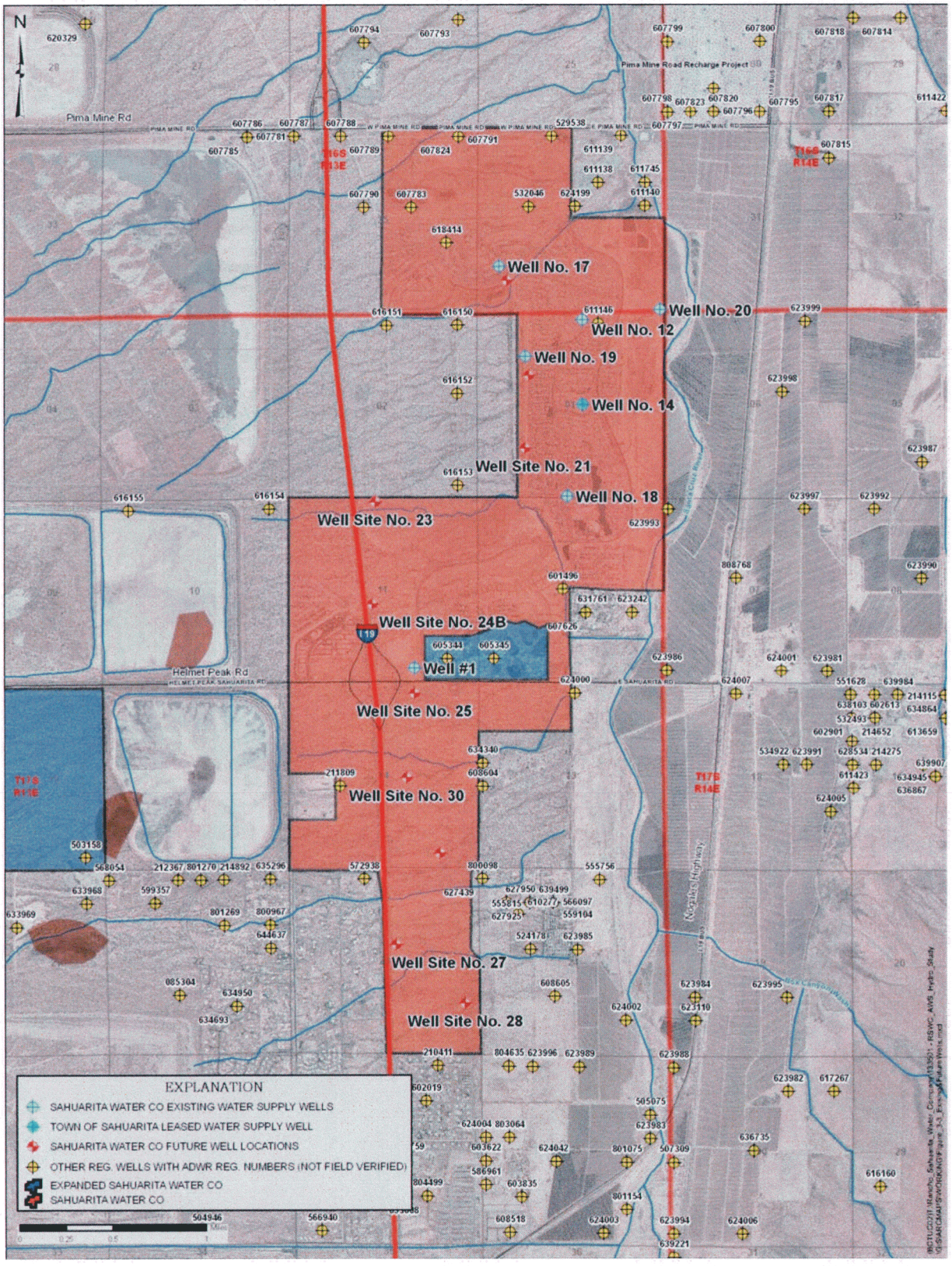


Figure 3-3 – Sahuarita Water Company's Existing and Future Planned Water Supply Well Locations

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

4. ELEMENTS OF SUPPLY

4.1 TOPOGRAPHY AND CLIMATE

The hydrologic study area consists of a moderately, southward sloping valley. The valley is defined to the southeast and west of the study area by the Santa Rita and Sierrita Mountains, respectively. Surface drainage is directed northward in the Santa Cruz River located east of the water service area. Land surface elevations within the study area range from about 2,900 feet above mean sea level (ft amsl) in the southern portion in the Green Valley area to 2,500 ft amsl north of the SWC's existing water service area near Tucson. The land surface slopes northward along the Santa Cruz River at an average rate of approximately 16 feet per mile in the existing water service area. Land surface also slopes eastward toward the river at an average rate of approximately 80 feet per mile within the existing water service area. Land surface altitudes rise to over 9,000 ft amsl in the Santa Rita Mountains southeast of the hydrologic study area, and to about 6,200 feet west of the hydrologic study area in the Sierrita Mountains.

Climate information was compiled from a weather station in the Sahuarita area (WRCC, 2007). Average annual high and low temperatures are reported at 84.7 and 48.1 degrees Fahrenheit, respectively. Average annual precipitation for 1956 to 1972 is reported as 10.62 inches.

4.2 GEOLOGIC SETTING

The hydrogeologic setting of the Upper Santa Cruz Valley in the Sahuarita area is composed of an aquifer system which is hydraulically bounded to the southeast by bedrock of the Santa Rita Mountains and to the west by bedrock of the Sierrita Mountains. The Santa Rita and Sierrita Mountains consist of low-permeable sedimentary, metamorphic and intrusive igneous rocks (Davidson, 1973). Bedrock of the Santa Rita Mountains outcrops approximately 12 miles southeast of the water service area. Bedrock of the Sierrita Mountains outcrops approximately 0.5 mile west of the central portion of the existing water service area.

Based on a regional geophysical study (Oppenheimer and Sumner, 1980) and exploratory boring analyses performed by Brown and Caldwell [2007b and 2007c]), depth to bedrock in the vicinity of the SWC existing water service area ranges from less than 800 feet in the southwestern portion of the water service to greater than 1,600 feet in the northeastern portion. For most of the water service area, depth to bedrock is generally between 1,000 and 1,600 feet in depth. A depth-to-bedrock map is presented as Figure 4-1.

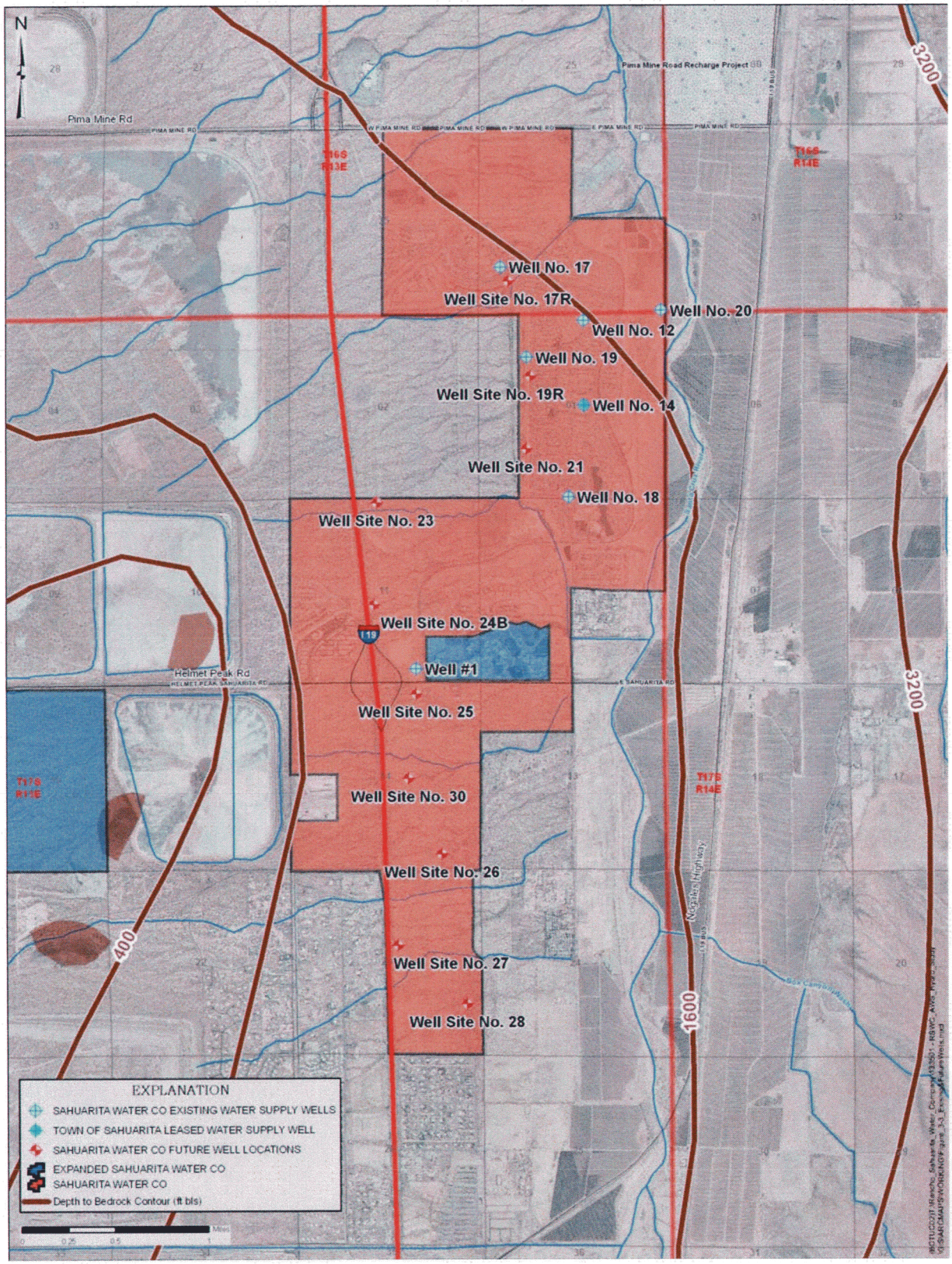


Figure 4-1 – Depth to Bedrock

4.3 HYDROGEOLOGIC CONDITIONS

4.3.1 Occurrence of Groundwater

The main aquifer beneath SWC's existing water service area penetrated by water supply wells in the area consists of saturated portions of the Fort Lowell formation (Qf) and upper and lower Tinaja beds (Tsu). These formations are basin-fill deposits. The Pantano formation (Tos) and underlying bedrock are relatively impermeable in comparison to overlying sediments. The Pantano formation (Tos) is suspected to be penetrated by some wells in the area and indicate favorable permeability characteristics where fracturing is suspected.

Groundwater flow is dictated by topography and by the spatial distribution of recharge and discharge, and generally flows to the north, northwest and west. Figure 4-2 depicts water level elevation contours constructed from 2005 to 2007 static water levels compiled from an ADWR (2007b) database and recent measurements performed by Brown and Caldwell (2007a and 2007b). Contours suggest a groundwater gradient of about 25 to 75 feet per mile. Northeast of the water service area, water level elevations are locally affected by artificial recharge of Central Arizona Project (CAP) water at the Pima Mine Road Recharge Project (PMRRP).

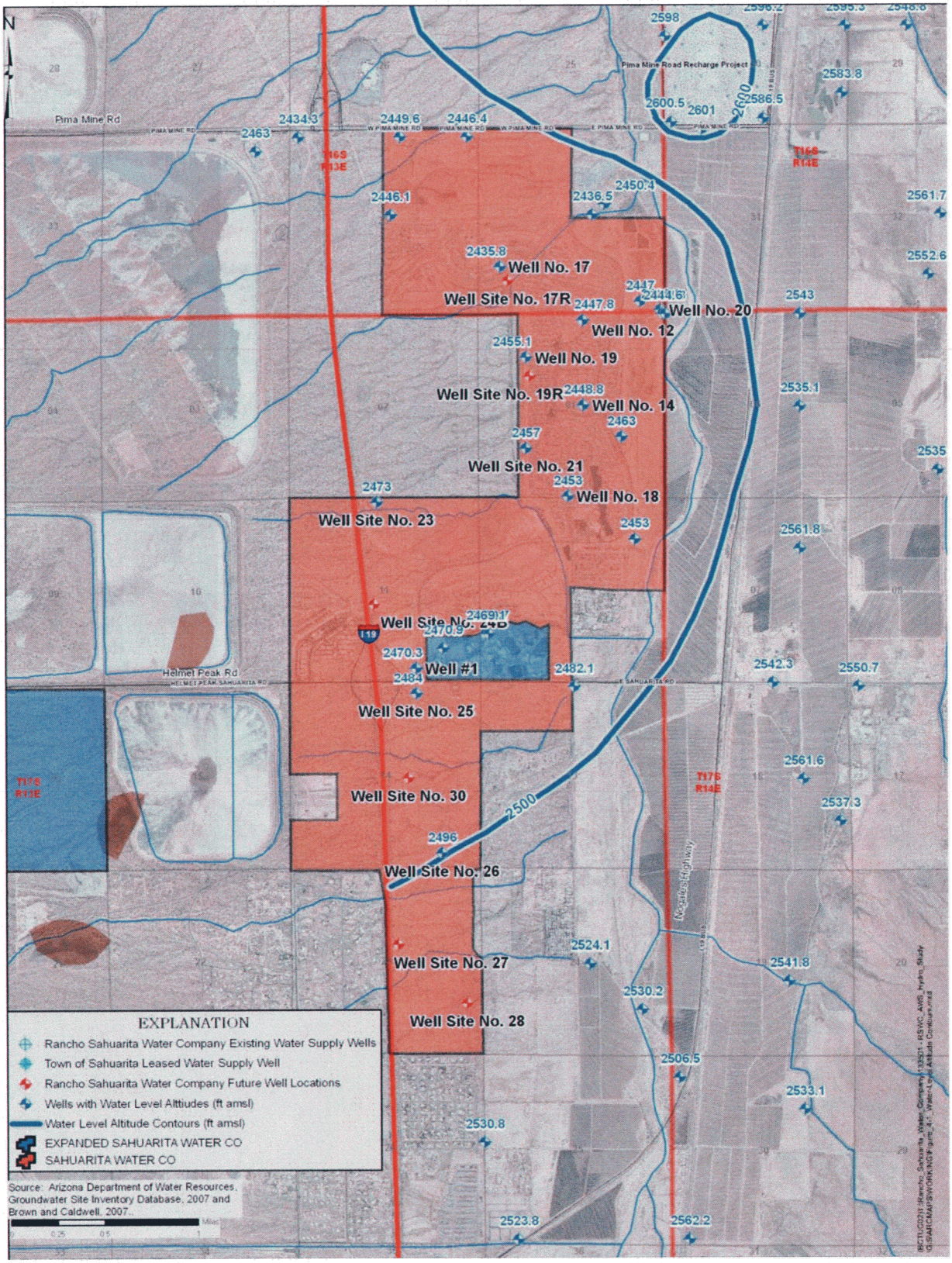


Figure 4-2 – Observed Water-Level Altitude Contours (2005-2007)

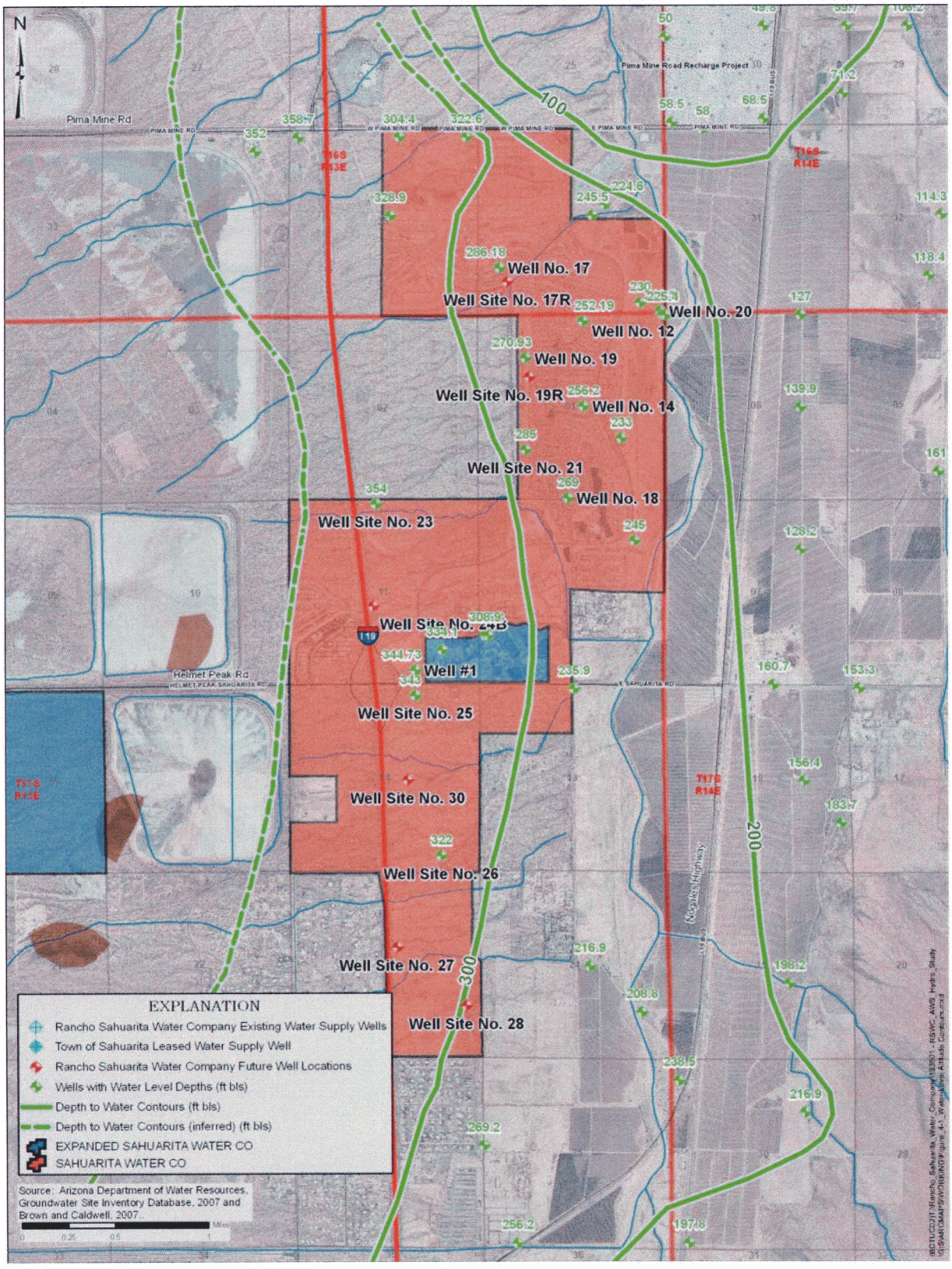


Figure 4-3 – Observed Water-Level Depth Contours (2005-2007)

Pilot testing of the PMRRP occurred between 1997 to 1999 when about 20,000 acre-feet (AF) of CAP water was artificially recharged in spreading basins. Full-scale operation of the facility began in December, 2001 when artificial recharge totaled about 30,000 AF/yr. Figure 4-3 depicts depth to water contours constructed from the same static water level data utilized in Figure 4-2 and indicates that depth to water ranges from less than 100 feet in the vicinity of the PMRRP. Along the Santa Cruz River, depth to water is between 200 and 300 feet. Depth to water increases to the west within the existing water service area from 200 to greater than 400 feet.

Hydrographs for a number of wells were constructed based on historical water level data to evaluate the historical groundwater conditions of SWC water service area. Hydrographs are included on Figure 4-4. Hydrographs generally indicate that in much of the area water levels have declined greater than 150 feet since the early 1960s. Since the 1980s, decline rates have reduced. In the vicinity of the PMRRP, water levels have increased or have been generally stable since about 2000.

Natural recharge to the aquifer system in the area occurs along the mountain front, as underflow from southern parts of the upper Santa Cruz River basin, and as stream channel recharge along the Santa Cruz River. The Santa Cruz River is an ephemeral stream east of SWC water service area, which only flows in response to significant precipitation events. Discharge of the aquifer system in the area occurs at water supply wells and as underflow to the central portion of the Tucson basin to the north.

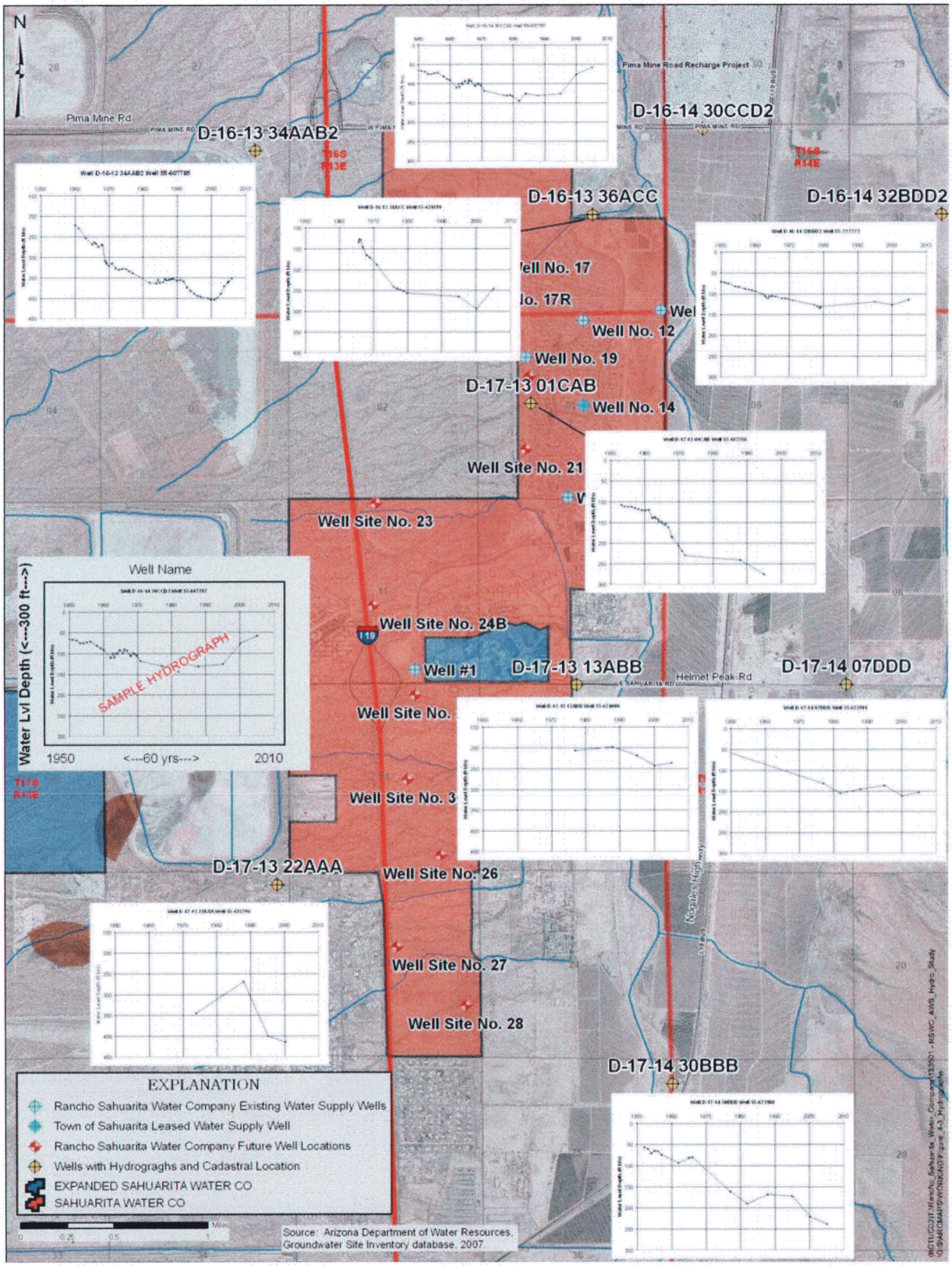


Figure 4-4 – Hydrographs

Based on Osterkamp (1973), rates of natural groundwater recharge at the mountain fronts and stream channels in the area range from 200 to 400 acre-feet (AF) per mile of mountain front or stream-channel. Based on these values and lengths of mountain front and ephemeral stream channels within the existing SWC water service area, annual local natural groundwater recharge is calculated at about 3,000 to 6,000 AF.

4.3.2 Aquifer Characteristics

Aquifer tests have recently been performed on four water supply wells within the vicinity of SWC. Brown and Caldwell conducted an aquifer test and analysis on the SWC's Well No. 14 in May 2006. This aquifer test and analysis is documented in a memorandum report, "Well Spacing/Well Impact Investigation –Rancho Sahuarita Water Company's Well #21 – D-17-13 01CDB," dated December 22, 2006. In addition, Brown and Caldwell conducted aquifer test and spinner flow meter survey analyses on the SWC's Well Nos. 12 and 19 in July 2007. These tests are documented in a report *Well Nos. 12 and 19 Aquifer Test Analyses and Well Production Evaluations* dated July 16, 2007 (Brown and Caldwell, 2007a). Lastly, Brown and Caldwell conducted an aquifer test and spinner flow meter survey analyses on Anamax Well No. 1 owned by Phelps Dodge Corporation and operated by Community Water Company of Green Valley. This test was performed in 2005. This aquifer test is documented in a memorandum report included as Appendix B.

Transmissivity (T-values) evaluated and specific capacities measured from these aquifer tests are summarized on Table 4-1, along with pertinent information regarding the test and well. Location of the wells and noted T-values and specific capacities are included on Figure 4-5.

Table 4-1. WELLS WITH AQUIFER TEST AND SPINNER FLOW METER SURVEYS

Well	ADWR Registration No.	Cadastral Location	Surface Elevation (ft amsl)	Date of Test	Duration (hr)	Static Water Level (ft bls)	Tested Rate (gpm)	Pumping Water Level (ft bls)	Measured Specific Capacity (gpm/ft)	T-Value (gpd/ft)	Analysis T	Upper Perforations (ft bls)	Lower Perforations (ft bls)
Well No. 12	55-611142	D-17-13 1ABB	2700	5/3/2007	24	252.2	536	269	32.7	65,325	Ave DD/Rec	273	970
Well No. 14	55-611144	D-17-13 1ACC	2706	5/25/2006	24	256.4	1811	331	24.3	73,300	Rec	435	1,135
Well No. 19	55-611145	D-17-13 1BAC	2726	5/10/2007	24	270.92	520	283	44.4	134,900	Ave DD/Rec	210	972
Anamax No. 1	55-608518	D-17-13 25CCD	2781	7/27/2005	10	270	1885	297	69.9	227,000	Rec	601	1,885

Notes: ft amsl = feet above mean sea level
hr = hour
ft bls = feet below land surface
gpm = gallons per minute
gpm/ft = gallons per minute per foot of drawdown
gpd/ft = gallons per day per foot of drawdown
DD = water-level drawdown analysis
Rec = water-level recovery analysis

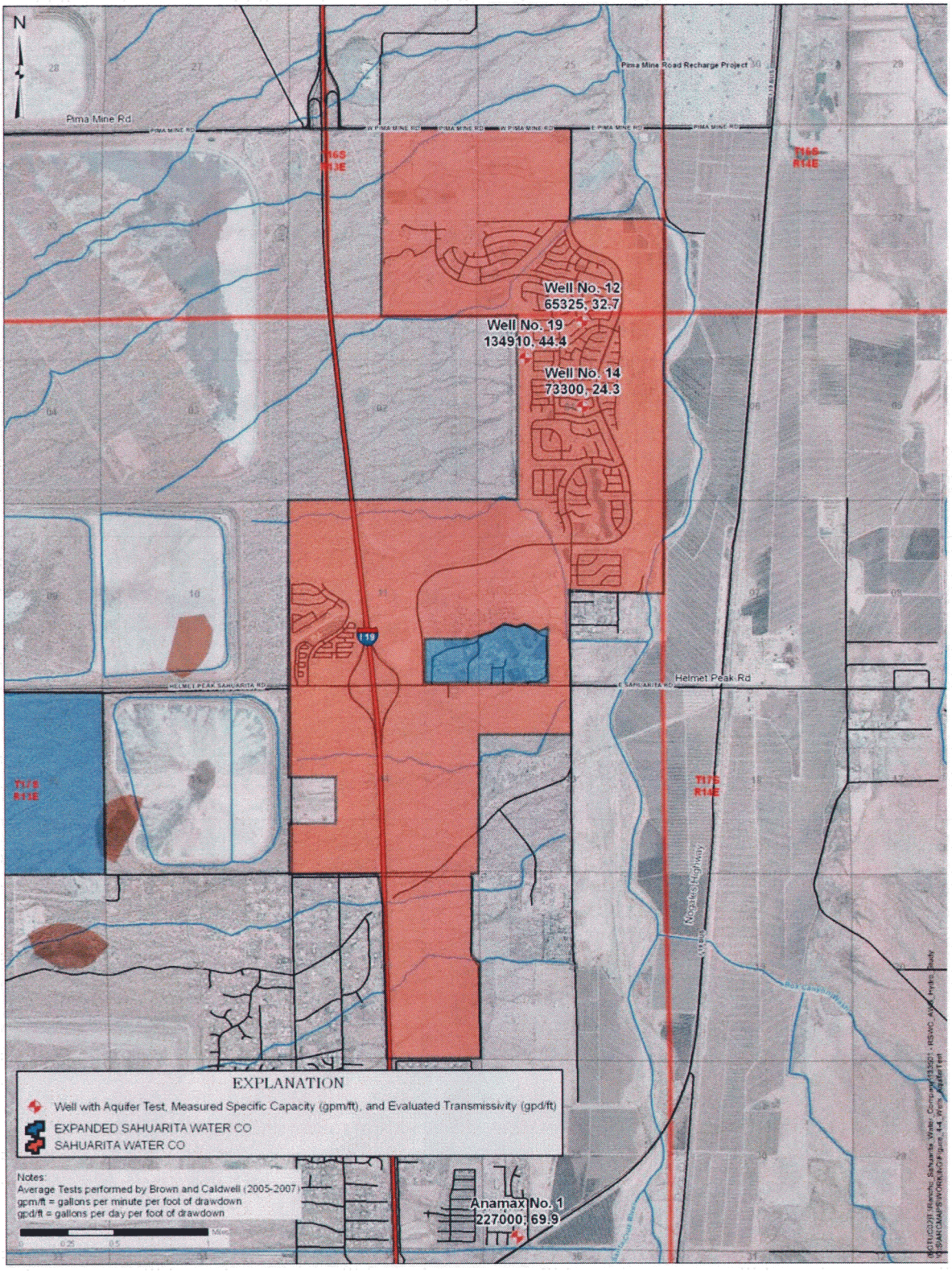


Figure 4-5 – Wells with Aquifer Tests

Spinner flow meter surveys provided information on hydraulic characteristics of basin-fill deposits penetrated by the wells. Tables 4-2, 4-3 and 4-4 provide a summary of spinner flow meter survey analyses for Well Nos. 12 and 19 and the Anamax Well No. 1, respectively, including an estimation of hydraulic conductivity (K-values) of depth intervals in the well.

Table 4-2. WELL NO. 12 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[2]
273 to 340[1]	179	33.3	67	2.67	43
355 to 475	156	29.2	120	1.30	21
525 to 875	201	37.5	350	0.57	9

Note:

1 – Upper depth interval represents top of the screened interval. Survey evaluated flow below a depth of 318 feet, depth of access port, therefore flow characteristics of well not evaluated above this depth. Calculated hydraulic parameters for this zone are considered minimum values.

2 – Calculated by applying the average transmissivity value of drawdown and recovery analyses.

Table 4-3. WELL NO. 19 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[2]
282 to 430[1]	197	37.9	148	1.33	46
460 to 480	66	12.6	20	3.30	114
665 to 800	257	49.5	135	1.90	66

Notes:

1 – Upper depth of interval represents the dynamic pumping level during the survey. Survey evaluated flow below a depth of 318 feet, depth of access port, therefore flow characteristics of well not evaluated above this depth. Calculated hydraulic parameters for this zone are considered minimum values.

2 – Calculated by applying the average transmissivity value of drawdown and recovery analyses.

Table 4-4. ANAMAX NO. 1 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[1]
600 to 780	473	25	180	2.62	42
820 to 900	600	32	80	7.50	121
940 to 980	165	9	20	8.25	66

Table 4-4. ANAMAX NO. 1 SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (feet bls)	PRODUCTION (gpm)	PERCENTAGE OF FLOW (percent)	THICKNESS (feet)	GALLONS PER MINUTE PER FOOT	ESTMATED HYDRAULIC CONDUCTIVITY (feet per day)[1]
1,020 to 1,075	282	15	55	5.13	83
1,135 to 1,160	149	8	25	5.96	96
1,235 to 1,760[2]	214	11	525	0.41	7

Notes:
1 – Calculated by applying the transmissivity value of recovery analyses.
2 – Penetrates conglomerate likely associated with Pantano formation not basin fill deposits.

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR RANCHO SAHUARITA WATER COMPANY

5. ELEMENTS OF ADEQUACY

5.1 GROUNDWATER MODELING ANALYSES

To assess the future hydrologic impacts of future groundwater development by SWC, a three-dimensional, numerical groundwater flow model ("SWC model") was constructed for the southern portion of the Tucson AMA. In order to ensure consistency with current modeling efforts by ADWR, the primary source of information and guidance in the development of the model was ADWR's Modeling Report No. 13 by Dale Mason and Liciniu Bota, *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Simulation and Application*, 2006 (ADWR, 2006), as well as the digital model files for the Tucson AMA model ("TAMA model"). Model construction, parameterization, and groundwater inflows and outflows adhere strictly to the information provided in the above report for the SWC model domain. Digital model files for the steady-state, transient, and predictive model simulations developed by ADWR were used directly to generate the SWC model to avoid any potential deviations from ADWR's model development and construction. ADWR's Tucson AMA modeling report should be referenced for information regarding the hydrogeologic conceptualization for the SWC numerical model (ADWR, 2006).

The following discussion presents the details of the numerical groundwater model, methods used in its construction, and the results of two coupled transient simulations. The groundwater flow model was constructed using the MODFLOW 2000 computer code (Harbaugh et al, 2000). Development and Quality Assurance/Quality Control (QA/QC) of this numerical model was fully integrated with a Geographic Information System (GIS) (ARCGIS 9.1, ESRI, 2005) and standard format data sets to ensure that all results and compiled information will be fully compatible with current spreadsheet, database, GIS, and modeling software packages. All relevant hydrogeologic and groundwater demand data collected during the course of these analyses were also stored within the GIS and were imported directly into the modeling software. Groundwater Vistas, version 5.05 build 2 (ESI, 2007), was used to facilitate pre- and post-processing of the numerical model files. A digital version of this update to the Groundwater Vistas software is included in Appendix C, the compact disk containing the model files and supporting digital materials for this study.

5.2 DEVELOPMENT OF THE NUMERICAL FLOW MODEL

Two, coupled, transient groundwater simulations were developed to simulate past, current, and future groundwater conditions; however, both were based upon the same general numerical framework and have identical model grid construction and hydraulic parameterization. The simulations vary only in the modeled timeframes and allocation of groundwater pumping and PMRRP artificial recharge.

The first simulation ("base simulation") is based upon ADWR's transient TAMA groundwater model and simulates groundwater conditions from 1941 through 1999. Simulated water levels from ADWR's TAMA steady-state model were imported and used as initial conditions. Three main modifications were made to ADWR's TAMA model to create the SWC model: 1) model cell dimensions were refined to uniform ¼ mile by ¼ mile spacings, 2) the model domain was limited to the southern portion of the Tucson AMA, and 3) transmissivity values in the immediate vicinity of the SWC service area were updated in model layer 3 (representing the middle and lower Tinaja beds and the Pantano Formation) to reflect recent aquifer testing

data within and adjacent to the SWC service area. Additional information regarding these modifications to ADWR's TAMA model is presented in the following sections.

The second simulation ("AWS simulation") simulates the time period from 2000 through the end of 2107. This timeframe includes the 100-year projection period required for the purposes of this AWS hydrology study. Initial water level conditions were taken directly from the end of the last stress period for the base simulation (end of 1999). Table 5-1 presents the specifications of the SWC model. Specific details of the model construction including full inputs and water budget components can be found in Appendix C, as well as in ADWR's TAMA model report (ADWR, 2006).

Table 5-1. SPECIFICATIONS OF THE NUMERICAL FLOW MODEL

Model Characteristics	Specifications
Active Model Domain	~470 square miles, ~301,000 acres
Units	Time: Days Length: Feet
Coordinate System	UTM 1927, NAD 12N GIS: lateral units in meters, vertical units in feet
Model Grid	130 rows by 96 columns, 37440 total cells, 18732 active cells
Cell Size	1320 feet by 1320 feet ¼ mile by ¼ mile
Layering – 3 Layers	Layer 1: Younger Alluvium and Fort Lowell Formation; Type 1 Unconfined Aquifer Layer 2: Upper Tinaja Beds; Type 3 Unconfined/Confined Aquifer Layer 3: Middle and Lower Tinaja Beds and Pantano Formation; Type 2 Unconfined/Confined Aquifer
Hydraulic Parameters	Distribution of hydraulic conductivity and storage values for Layers 1 and 2 identical to those from the Tucson AMA model Vertical Leakance values identical to those from the Tucson AMA model. Regional transmissivity values for Layer 3 based upon the Tucson AMA model. Local transmissivity values (vicinity of SWC service area) based upon interpolated/kriged distribution within 2-mile radius of recent aquifer testing locations.
MODFLOW Packages	Basic, Block-Centered Flow, Discretization, Output Control, Solver, Well, Constant Head, Evapotranspiration, Recharge
Base Simulation Stress Periods	1941 through 1999, 59 years 59 Transient, 1-year stress periods, 12 time steps per stress period. 1.2 multiplier

Table 5-1. SPECIFICATIONS OF THE NUMERICAL FLOW MODEL	
AWS Simulation Stress Periods	2000 through 2107, 108 years 108 stress periods, 12 time steps per stress period, 1.2 multiplier
Recharge	Base Simulation: Identical to TAMA Model AWS Simulation: Based upon TAMA Base Case Future Model Simulation (Pima Mine Road recharge curtailed, recharge held at ADWR year 2025 estimates elsewhere)
Wells	Base Simulation: 1316 flux cells, identical to TAMA Model AWS Simulation: Imported as 1625 separate, grid independent, multi-layer analytical features (~1500 active pumping wells) (compiled as standard MODFLOW well file)
Boundary Conditions	Constant head boundaries along northern and southern edges of model domain for all layers
Initial Conditions	Base Simulation: TAMA Steady-state model heads AWS Simulation: Heads from end of Base Simulation (end of 1999)
Solution Method	Preconditioned Conjugate Gradient Solver Package version 2

5.2.1 Model Grid

The model grid was georeferenced to exactly match the alignment and location of ADWR's TAMA model domain and was uniformly refined to ¼ mile by ¼ mile spacings, producing for four model cells per original ADWR cell. The full extent of the model grid is shown on Figure 5-1 and was generated by removing the northernmost 59 rows from ADWR's TAMA model and refining the cell spacings by half. The location for the northern boundary of the RSWC model is located within Township 14 North, and was selected based upon the following criteria:

- It is a suitable distance (more than 13 miles) away from the northern boundary of the SWC service area; thus, limiting boundary effects
- It is just south of the historic, central Tucson groundwater basin pumping area, limiting the number of pumping wells with uncertain future pumping rates within the model domain and reducing the potential effects of sharp spatial (gradient) or temporal water level changes on boundary cell inputs
- It is just south of a major shift in the direction of groundwater flow from south to north, towards the northeast following the path of the Rillito River.

The location of the southern boundary of the model domain overlies that of the TAMA model. Moving upwards from Layer 3, model layers are regionally less extensive, representing the exposure of deeper hydrostratigraphic units at ground surface. The lateral extent of active cells for each model layer exactly matches those defined by ADWR for the southern portion of the Tucson AMA (ADWR, 2006).

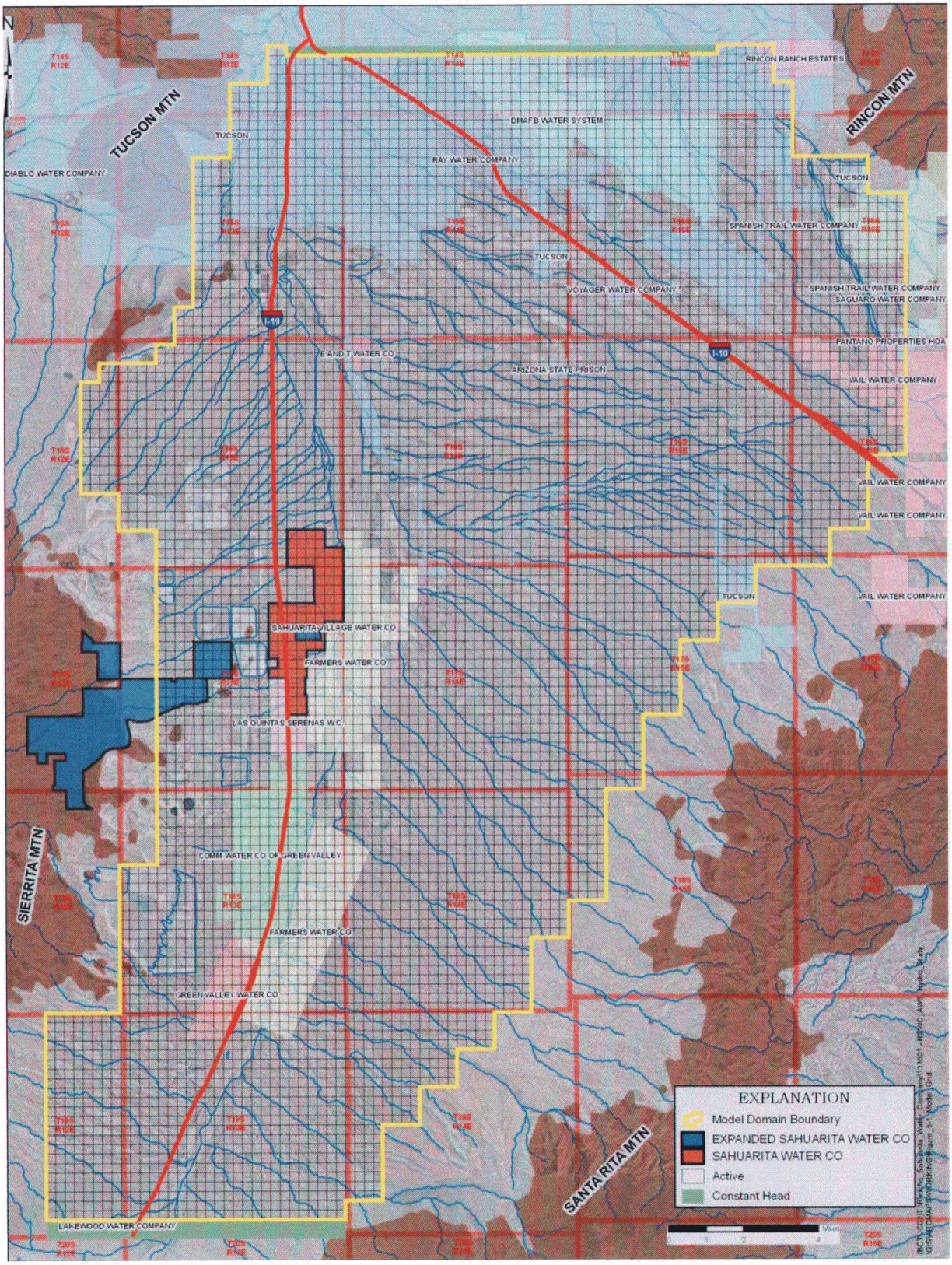


Figure 5-1 – Model Grid

5.2.2 Layering

General layer information is presented above in Table 5-1 and provided digitally in Appendix C. Elevations for layer top and bottom contacts are identical to those estimated by ADWR for the TAMA model, and were not modified for the SWC model domain.

5.2.3 Aquifer Parameters

All hydraulic conductivity, vertical leakance, and storage parameters are identical to those estimated by ADWR for the TAMA model. However, Layer 3 transmissivity values in the vicinity of the SWC service area were modified based upon recent aquifer test information for four wells screened within the deep aquifer system. Section 4.3.2 provides information for these tests, well information, and the resultant transmissivity and hydraulic conductivity estimates. Figure 4-5 shows the locations of the tested wells.

The following methodology was used to assign updated transmissivity values to Layer 3. The screened intervals for each tested well were compared to the estimated top elevations of Layer 3 (or bottom of Layer 2) from the TAMA model for each well site. Depth specific hydraulic conductivity values derived from spinner flow meter surveys were then multiplied by the thickness of each tested well's screened interval within Layer 3. This produced transmissivity values reflective of the aquifer characteristics of only Layer 3. Note that Well No. 14 did not have a spinner flow meter survey performed at its location, so the estimated transmissivity value for Layer 3 was based upon the overall hydraulic conductivity value from the aquifer test and the portion of the screened interval penetrating Layer 3. Table 5-2 presents the well-specific transmissivity values used to develop a local distribution for Layer 3.

Table 5-2. ESTIMATED LAYER 3 TRANSMISSIVITY VALUES

Well	TESTED TRANSMISSIVITY VALUE (feet squared per day)	GENERALIZED DEPTH TO TOP OF LAYER 3 ADWR TAMA Model (feet bls)[1]	ESTIMATED TRANSMISSIVITY VALUE FOR LAYER 3 (feet squared per day)[2]
Well No. 12	8,732	~600	2,475
Well No. 14	9,798		8,572
Well No. 19	18,032		13,200
Anamax No. 1	30,344		27,000

Notes:
1 – Model cells at and near these wells show a depth to the top of Layer 3 of generally 600'.
2 – Calculated using results of aquifer testing presented in Section 4.3.2. The estimated value from the Anamax well was conservatively rounded downwards due to the high productivity of the deepest aquifer units at that location.

These estimated transmissivity values were then kriged along with bounding transmissivities from the TAMA model Layer 3. The bounding values were located approximately two miles away from the north-south trend of the tested wells to produce a smoothed distribution of local transmisivity estimates within the regional array. The new kriged estimates were imported into the SWC model and used in both the base and AWS simulations. Note that these estimates were not allowed to influence Layer 3 model transmissivities more than 2 miles away from the linear trend of the test wells, and throughout the remainder of Layer 3 the original TAMA model transmissivity values were maintained. Incorporation of these transmissivity values were not deemed to adversely affect the TAMA model calibration, as discussed below in Section 5.2.8. The full distribution of all Layer 3 transmissivity values can be seen in the digital files provided in Appendix C.

5.2.4 Boundary Conditions

Transient proscribed head cells were used as boundary conditions for both the northern and southern boundaries of the model domain with no-flow boundaries to the east and west. Boundary conditions for the SWC model can be viewed on Figure 5-1.

Southern Proscribed Head Boundary Conditions

The locations of the southern proscribed head boundary cells are identical to those in ADWR's TAMA model. For the base simulation (1941-1999), the southern proscribed head values are identical to those in ADWR's TAMA transient model. For the AWS simulation (2000-2107), the southern proscribed head values are identical to those specified in ADWR's TAMA Base Case Future Model simulation through year 2025. Beyond this time frame the head values are held constant at the estimated 2025 value.

Northern Proscribed Head Boundary Conditions

In order to conservatively estimate the future impact of pumping in the northern portions of the Tucson AMA on water levels in the SWC model domain, the following methodology was followed. Initially, ADWR's TAMA Base Case Future Model simulation was run with the final stress period extended through 2107. From the year 2000 on, SWC existing and future pumping were updated and simulated explicitly within the model at their reported and projected pumping rates and proper locations. This essentially updated the TAMA Future model to reflect SWC's most recent projected pumping volumes. This approach also allowed for conservatively high water level decline estimates in the central Tucson basin for the next 100 years. As previously stated, the northern boundary of the SWC model is located along row 59 of ADWR's TAMA model grid. Head values from this row from the updated TAMA Future model simulation were exported for the full model period (1941-2107) and used as proscribed head values for the both the SWC base and AWS simulations. This methodology produced continuous proscribed head declines along the northern AWS model boundary throughout the AWS model time frame and also incorporated any impact of SWC's own future pumpage upon the proscribed head inputs.

5.2.5 Wells

For the base simulation, a total of 1316 pumping wells were included as flux cells. Pumping was applied at the same locations, layers, and magnitudes as those specified in the TAMA model. By the end of the simulation (end of 1999), approximately 116,000 AF/yr of pumping is simulated within the model domain.

For the AWS simulation, a total of 1625 individual pumping well locations were included in the model domain as grid independent analytical wells, which are compiled as standard flux cells during model runs. Table 5-3 below summarizes the various methods used to assign pumping in the AWS simulation. For the time period from year 2000 through 2006, all annual demands were imported directly from the tabulated groundwater withdrawals recorded in ADWR's "pumpyear" database at the appropriate registered well locations. Future committed demands were tabulated in two separate ways. Demands approved prior to 2005 were calculated by averaging the recorded annual pumping for the five year period from 2002 through 2006. These average pumping values were applied for the time period from 2007 through 2107 with the exception of future pumping for SWC and Farmers Water Company, which were both replaced with new AWS demands from recent permits. This approach is conservative in that it accounts for a total future committed demand in excess of both the approved amount as well as exceeding the amount of pumping recorded for only 2006. For all committed AWS demands approved after 2005 within the model domain, the permitted annual pumping was included in the model at "new" wells at the location of the new developments. All pending AWS demands were also simulated at their full requested demand amounts beginning in 2008 at the locations of the planned developments. Additionally, all exempt wells within the model domain were pumped at 1 AF/yr (1041 wells). Pumping by demand type can be found in Table 3-6, and total pumping

applied to the model at build-out totals 111,489.5 AF/yr. By then end of year 2107 of the AWS simulation, approximately 111,000 AF/yr of pumping is still sustained in the model, accounting for 98 percent of the total demand and including 100 percent of the SWC build-out demand. Detailed pumping information regarding well locations, pumping schedules, and demand type is provided in GIS format in Appendix Z.

Table 5-3. ALLOCATION OF GROUNDWATER PUMPING

AWS SIMULATION TIME PERIOD	ASSIGNED GROUNDWATER PUMPING
2000 – 2006	Recorded pumping from ADWR records
2007 – 2107	Average of recorded pumping for 2002-2006 Committed Demands since 2005 Pending Demands Projected SWC Demand Exempt Well Pumping

5.2.6 Recharge and Evapotranspiration

For the base simulation, the magnitude and distribution of recharge is identical to that of the TAMA model. For the AWS model, groundwater recharge was imported from the TAMA Future model simulation, with the exception of future recharge at the Pima Mine Road Recharge Project (PMRRP) and the North Borrow Pit, both located north of SWC. The reported average annual recharge volume at PMRRP since the onset of full scale operations (2000 through 2005) was calculated and only 5 percent of this value was allowed to recharge at the site, representing the "cut to the aquifer" as specified by the A.R.S. § 45-852.01C. The average of reported recharge volumes for the PMRRP was approximately 21,386 AF/yr, and the simulated future recharge rate for the facility from 2008 through 2107 was approximately 1,069 AF/yr. No recharge was simulated for the North Borrow Pit.

5.2.7 Stress Periods and Initial Conditions

For the base simulation, 59 annual stress periods with 12 time steps each were used to simulate the time period from 1941 through 1999, matching the design of the TAMA model. Heads from the TAMA steady state model were used as the initial conditions. For the AWS simulation, 108 annual stress periods with 12 time steps each were used to simulate the time period from 2000 through 2107. Initial conditions were imported from the end of the base simulation.

5.2.8 Calibration

Because the SWC model was based strictly upon the framework of the ADWR TAMA model, the base simulation and early stress periods of the AWS model were qualitatively calibrated by comparing the groundwater contours and cell specific water levels with those from ADWR's transient TAMA model (ADWR, 2006). The SWC model accurately reproduced ADWR's water level conditions throughout the model domain during the 1941-1999 time periods; thus, the model was deemed to adhere to the appropriate calibration standards met by the TAMA model. Figure 5-2 presents a comparison of the simulated water levels in 2006 versus recently observed water levels.

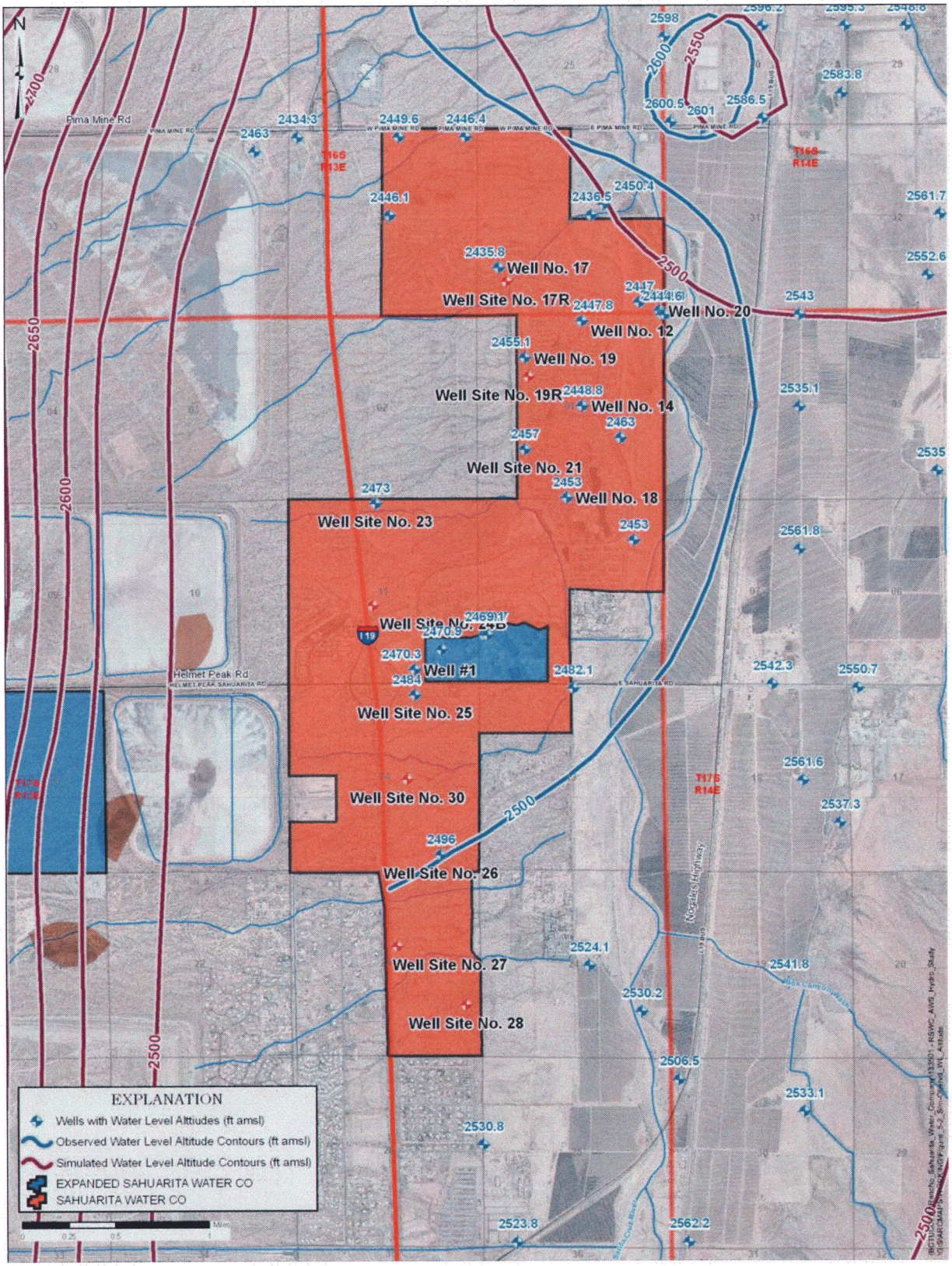


Figure 5-2 – Simulated and Observed Water Level Altitudes (2005-2007)

5.3 MODEL RESULTS

Detailed model simulation results are provided in MODFLOW and GIS formats in Appendix Z.

5.3.1 Water Levels Altitudes

Figure 5-3 presents model predicted groundwater altitudes in 2107 in the vicinity of SWC. In order to remove any potential bias due to effects of the inclusion of updated Layer 3 transmissivity values on the overall model calibration, the drawdown from the SWC model (from 1999 to 2107) was subtracted from ADWR's TAMA model simulated water levels for the end of 1999 to produce a final simulated head distribution. Groundwater elevations range from 2,001 to 2,072 ft amsl at the SWC service area, and flow generally proceeds from all directions towards the pumping center comprised by SWC, Community Water Company of Green Valley, and Farmers Water Company.

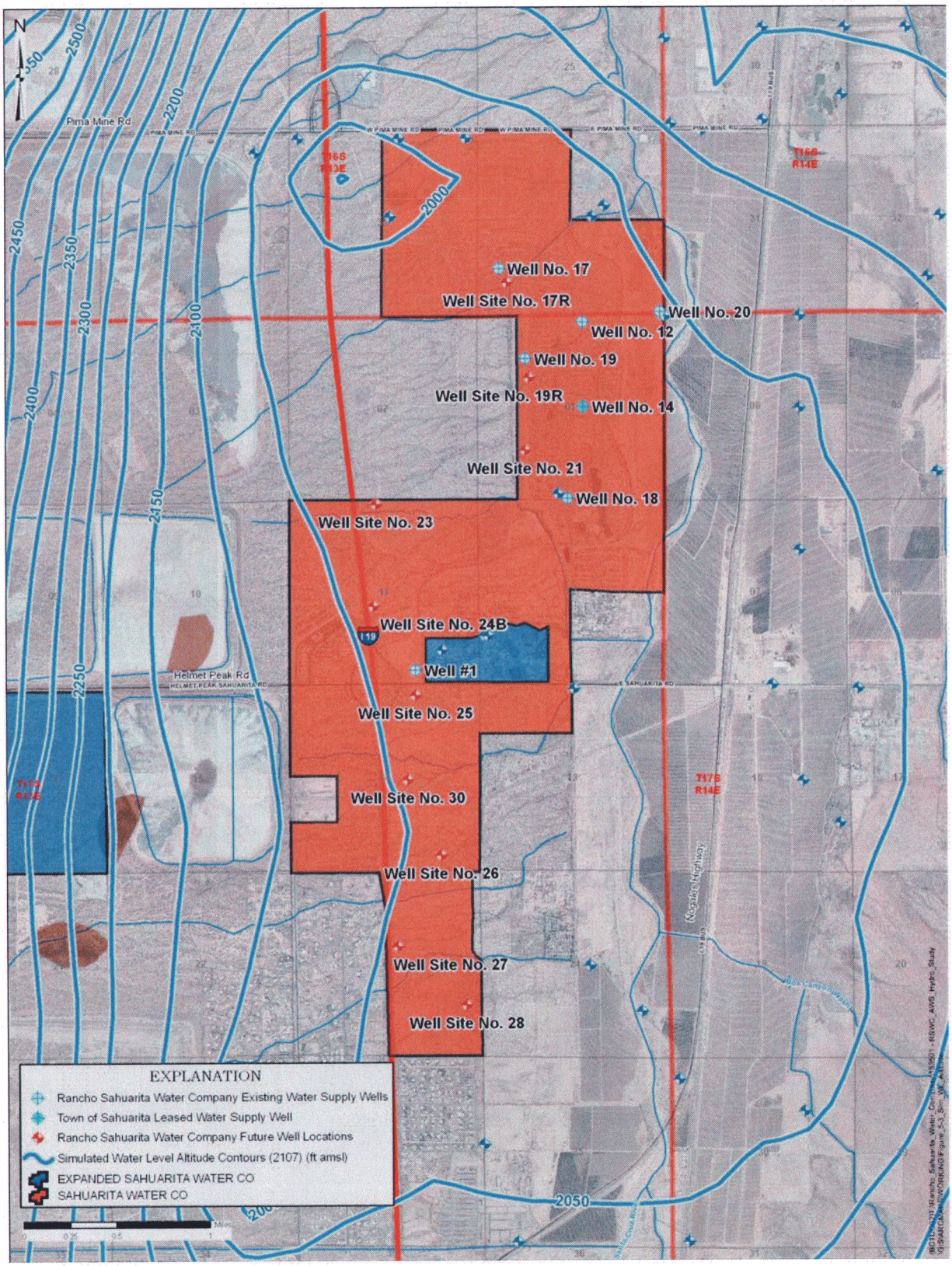


Figure 5-3 – Simulated Water Level Altitudes (2107)

5.3.2 Depth to Water

Figure 5-4 presents model simulated depths to water in 2107 in the vicinity of SWC. As described above, these depths-to-water were calculated by subtracting the final 100-year simulated head distribution discussed above from ground surface elevations for each model cell. Estimated depths-to-water at the SWC service area range from 610 to 785 feet below land surface (ft bls), with the greatest depths occurring in the eastern and southern portions.

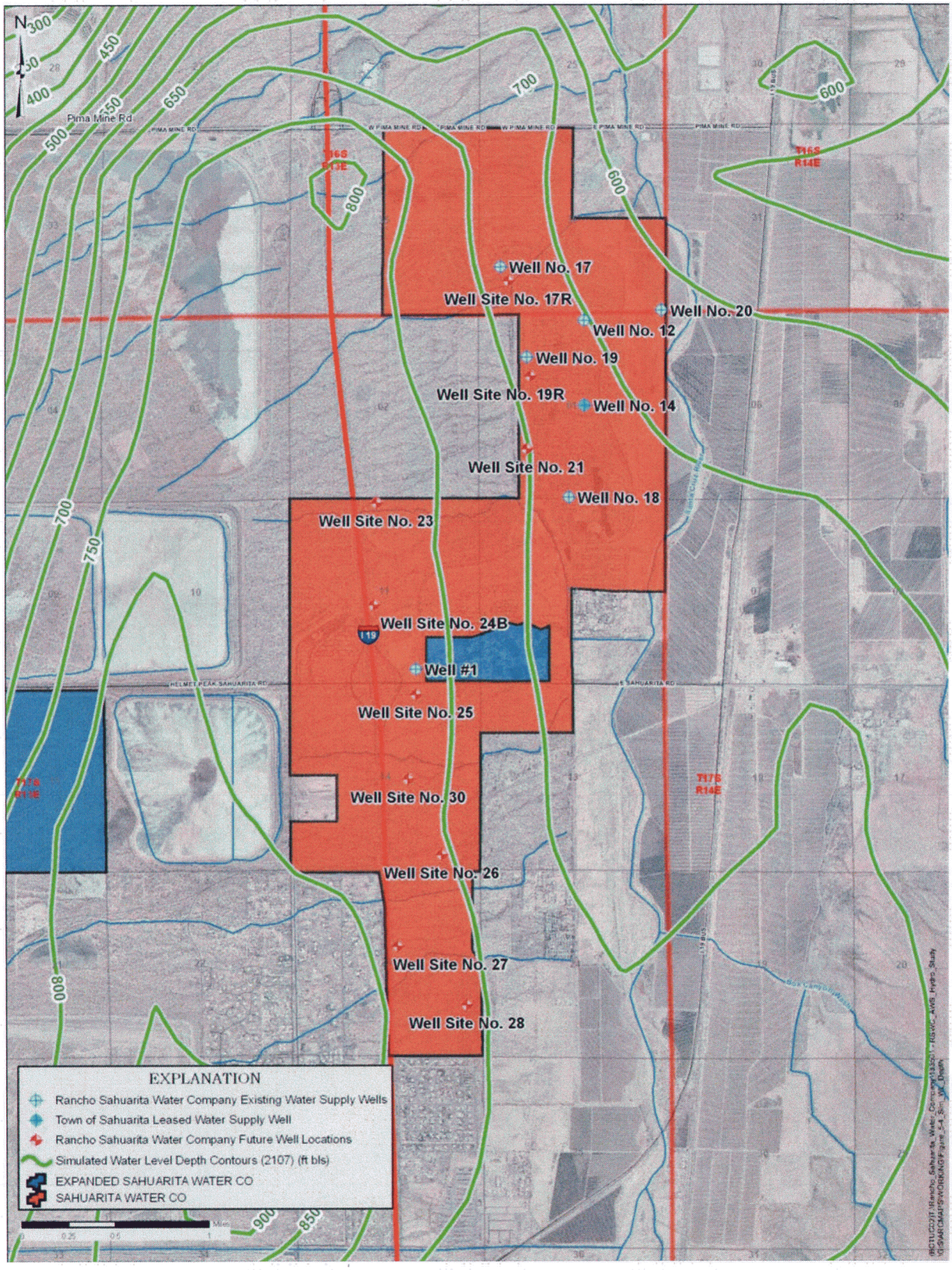


Figure 5-4 – Simulated Water Level Depths (2107)

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR SAHUARITA WATER COMPANY

6. CONCLUSIONS

The hydrogeologic analyses presented herein demonstrate the physical availability of 10,983 AF/yr of local groundwater resources for 100 years for the existing and planned expansion of SWC's water service area. The planned expansion is to serve potable groundwater resources to two proposed development projects including the Mission Peaks and Sahuarita Mission development projects, and an existing school site. The school site includes the Sahuarita Unified School District Campus (K through 12). Mission Peaks development may also include development on an adjacent State Land parcel. Additional potable groundwater resources may also be served (bulk sales) to 500 existing off site units at the adjacent Magee Ranch by a stand-pipe system. Additional development is also planned within the existing service area within the Rancho Sahuarita Master Planned Community.

To demonstrate the physical availability of an Assured Water Supply within the Tucson AMA utilizing groundwater resources, it is required that current, committed and projected groundwater withdrawals over 100 years will not result in depth-to-water to exceed 1,000 feet from ground surface or depth-to-bedrock, whichever is less. Furthermore, groundwater must also be of acceptable quality for potable use. Lastly, the proposed water uses must be consistent with the Rules and Regulations of ADWR pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

To assess the future hydrologic impacts of future groundwater development by SWC, a three-dimensional, numerical groundwater flow model ("SWC model") was constructed for the southern portion of the Tucson AMA. In order to insure consistency with current modeling efforts by ADWR, the primary source of information and guidance in the development of the model was ADWR's Modeling Report No. 13 by Dale Mason and Liciniu Bota, *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Simulation and Application*, 2006 (ADWR, 2006) as well as the digital model files for the Tucson AMA model ("TAMA model"). The groundwater model was modified to incorporate new hydrogeologic data gathered from exploratory boring analyses and aquifer testing programs performed by Brown and Caldwell for the SWC in 2006 and 2007.

The groundwater model, incorporating current, committed and projected groundwater water demands within an approximate 500-square mile hydrologic study area were applied to project water-level conditions in 2107, a 100 year period. Computer simulations were performed with only 5 percent of about 20,000 AF of annual artificial recharge of Central Arizona Project water at the Pima Mine Road Recharge Project and with no recharge for the North Borrow Pit, both located just north of SWC. The hydrologic simulations analyses demonstrated that maximum depth-to-water in the vicinity of SWC's water supply wells will range from 610 to 785 ft bls in 100 years. These projected depths meet the requirement for AWS analyses for the Tucson AMA in that depth to water in 100 years can not exceed 1,000 feet from the ground level or depth-to-bedrock, which ever is less.

Groundwater quality analyses performed on groundwater samples collected from active wells and exploratory borings reveal favorable groundwater quality for potable use based on current regulatory limits. The proposed water uses will be consistent with the Rules and Regulations of ADWR, pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

The hydrologic analyses presented invoke a number of conservative elements in demonstrating the physical availability of sufficient groundwater resources. The principal elements area as follows:

- New wastewater treatment plant will be constructed for the new developments. No effluent reuse or artificial recharge of effluent generated by the new developments was included in the hydrologic simulations. Potentially up to 60 percent of equivalent volume of pumpage may be available for future reuse or recharge.

- Mine and agricultural water usage in the hydrologic study area will likely not be at current levels for 100 years. Hydrologic simulations assume current levels of pumpage will remain constant. Mine life will likely be exhausted, and agriculture usage will likely be retired and transferred to municipal uses. A significant net reduction in overall water usage will likely occur.

- Artificial recharge of Central Arizona Project (CAP) water at the Pima Mine Road Recharge Project will likely continue into the distant future and potentially augmented in the future. Currently annual recharge totals about 20,000 AF/yr. Hydrologic simulations only applied 5 percent of the total as required by ADWR. North Borrow pit may also be in operation within the simulated period.

ASSURED WATER SUPPLY HYDROLOGY REPORT FOR RANCHO SAHUARITA WATER COMPANY

7. LIMITATIONS

Report Limitations

This document was prepared solely for SWC in accordance with professional standards at the time the services were performed and in accordance with the contract between SWC and Brown and Caldwell, dated February 12, 2007. This document is governed by the specific scope of work authorized for SWC; it is not intended to be relied upon by any other party, except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by SWC and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

APPENDIX A

Sahuarita Water Company Projected Water Demand Calculations

Rancho Sahuarita Water Company Modification of Assured Water Supply Designation Demands

Demand Criteria

2.7	pphu	Single-family
1.8	pphu	Active-Adult
1.9	pphu	Multi-family
101	gpcd	Single-family
123	gpcd	Active-Adult
68	gpcd	Multi-family

2.25	af/ac/yr	Commercial
25	gpsd	Elementary and Middle School
43	gpsd	High School
10,000	gal/lot	construction water
10	%	Lost and unaccounted for water

			Residential										Non-Residential								
			Mission Peaks			Rancho Sahuarita			huarita Mission				Mission Peaks			Rancho Sahuarita					
	Phase	Year	Single Family Units	Active Adult Units	Multi-Family Units	Single Family Units	Active Adult Units	Multi-Family Units	Single Family Units	Residential Demand (af/yr)	Total Units	Construction Water (ac/yr)	Commercial (Sq. Ft)	High Schools (students)	Elem. & Middle School (students)	Commercial (Sq. Ft.)	High Schools (students)	Elem. & Middle School (students)	Non-Residential Demand (af/yr)	Total Water Use (af/yr)	Lost and Unaccounted for Water (af/yr)	Total with Lost and unaccounted for (ac/yr)
		2006				3251	404	0		1093	3655					89000	1159		5	1098	110	1208
		2007				3732	489			1261	4221	17				353196	1226		77	1356	136	1492
		2008				5116	654			1725	5770	48				441305	1226	2900	163	1936	194	2129
		2009				5373	687			1812	6060	9				947252	1226	3044	193	2014	201	2215
1	I	2010	100	100	174	5,895	731			2063	7000	29	30000	478	2028	1503252	1226	3150	306	2398	240	2637
2	I	2011	400	300	174	6261	785		240	2402	8160	36	60000	478	2028	1849738	1226	3150	326	2764	276	3040
3	I	2012	950	600	174	6790	785		480	2880	9779	50	90000	478	2028	1979630	1226	3150	334	3263	326	3590
4	I	2013	1775	900	600	7390	785		720	3524	12170	73	120000	478	2028	2159630	1226	3150	345	3942	394	4337
5	I	2014	2375	1361	1000	7990	785		960	4136	14471	71	150000	478	3315	2363986	1226	3150	393	4600	460	5060
6	I	2015	2975	1561	1226	8590	785		1200	4658	16337	57	180000	478	3315	2639935	1226	3150	409	5125	512	5637
7	I	2016	3574	1761	1506	9190	785		1440	5188	18256	59	340000	478	3315	2827935	1226	3150	427	5674	567	6241
8	I	2017	3692	1961	1506	9790	785		1680	5530	19414	36	500000	478	3315	3072935	1226	3150	448	6014	601	6615
9	I	2018	3692	2161	1506	10086	1089		1920	5819	20454	32	640855	478	3315	3072935	1226	3150	455	6306	631	6937
10	II	2019	4192	2371	1506	10086	1460		2160	6189	21775	41	815210	956	5343	3072935	1226	3150	544	6774	677	7451
11	II	2020	4692	2371	1506	10086	1460		2400	6415	22515	23	1034481	956	5343	3072935	1226	3150	555	6993	699	7692
12	II	2021	5192	2371	1506	10086	1460		2640	6641	23255	23	1034481	956	5343	3072935	1226	3150	555	7219	722	7941
13	II	2022	5692	2371	1506	10086	1460		2880	6867	23995	23	1034481	956	5343	3072935	1226	3150	555	7445	745	8190
14	II	2023	6192	2371	1506	10086	1460		3000	7057	24615	19	1034481	956	5343	3072935	1226	3150	555	7631	763	8394
15	II	2024	6692	2371	1506	10086	1460		3000	7209	25115	15	1034481	956	5343	3072935	1226	3150	555	7780	778	8558
16	II	2025	7192	2371	1506	10086	1460		3000	7362	25615	15	1034481	956	5343	3072935	1226	3150	555	7933	793	8726
17	II	2026	7692	2371	1506	10086	1460		3000	7515	26115	15	1034481	956	5343	3072935	1226	3150	555	8085	809	8894
18	III	2027	8681	2371	1506	10086	1460		3000	7817	27104	30	1105336	956	5343	3072935	1226	3150	559	8406	841	9247
19	III	2028	9431	2371	1506	10086	1460		3000	8046	27854	23	1105336	956	5343	3072935	1226	3150	559	8628	863	9491
20	III	2029	10181	2371	1506	10086	1460		3000	8275	28604	23	1105336	956	5343	3072935	1226	3150	559	8857	886	9743
21	III	2030	11431	2371	1506	10086	1460		3000	8657	29854	38	1105336	956	5343	3072935	1226	3150	559	9254	925	10180
22	III	2031	12181	2371	1506	10086	1460		3000	8886	30604	23	1105336	956	5343	3072935	1226	3150	559	9468	947	10415
23	III	2032	12931	2371	1506	10086	1460		3000	9115	31354	23	1105336	956	5343	3072935	1226	3150	559	9697	970	10667
24	III	2033	13681	2371	1506	10086	1460		3000	9344	32104	23	1105336	956	5343	3072935	1226	3150	559	9926	993	10919
25	III	2034	13923	2371	1506	10086	1460		3000	9418	32346	7	1105336	956	5343	3072935	1226	3150	559	9984	998	**10983**

Assumptions

Sahuarita Mission
Based on 600 Acres at 5 RAC
Buildout 240 units/yr starting 2011

Mission Peaks
3,624 SF units added per Matt Lawsons request (6/21/07)
Based on Water Master Plan prepared July 2006
Estimated 25 yr Buildout, starting April 2010

Rancho Sahuarita
Residential and Commerical uses revised per Cort's projections (6/15/07)
Based on Water Master Plan Prepared November 2006
Estimated 10 yr Buildout
School estimates based on current and max number of students at Sahuarita and DeAnza Schools

Updated 10/24/07

APPENDIX B

Anamax No. 1 Aquifer Test Letter Report

Suite 2300, 110 South Church Avenue
Tucson, Arizona 85701

Tel: (520) 624-5744
Fax: (520) 791-2738

September 26, 2005

BROWN AND CALDWELL

Mr. Norris West
Community Water Company of Green Valley
1501 South La Cañada Drive
Green Valley, Arizona 85622

128730.001.003

Subject: Evaluation at Anamax No. 1 Well

Dear Mr. West:

Brown and Caldwell conducted a well evaluation at the existing Anamax No.1 well in Green Valley, Arizona. Work completed included: 1) video logging after completion of well rehabilitation by brushing and bailing, 2) test pumping, 3) constant rate pumping accompanied by spinner logging and zonal groundwater sampling, and 4) measurement of water level recovery after completion of step 2. All pump removal and installation, well rehabilitation, and video logging were completed by Layne Christensen. Spinner logging and depth-discrete sampling were completed by Welenco. Laboratory analysis of water samples were completed by Legend Laboratories.

Results from the 10-hr constant rate pumping test indicate a transmissivity of approximately 227,000 gallons per day per foot (gpd/ft). Results from the spinner test indicate that approximately 87 percent of the total flow is contributed from the basin-fill alluvial aquifer, which based on well lithologic information extends to a depth of approximately 1,300 feet below ground surface (bgs). Zonal groundwater samples were collected from four different depths and one composite sample. The arsenic concentrations exceeded the maximum contaminant level (MCL) that will be effective in January 2006 for all five samples collected. However, the arsenic concentrations are not believed to be representative of zone-specific conditions in the aquifer but rather the result of long-term vertical mixing of water qualities from different depths. A detailed summary of all the associated well evaluation activities and findings are summarized below.

WELL EVALUATION AND DOWNHOLE TESTING

A well production evaluation was conducted on the Anamax No.1 well on July 27, 2005. The evaluation consisted of test pumping, spinner flowmeter survey, zonal groundwater sampling, and a water level recovery test.

The Anamax No. 1 well was originally completed to a total depth of 2,516 feet with the perforated interval from 601 to 2,516 feet. The well penetrated basin-fill alluvium to a depth of 1,300 feet, conglomerate from 1,300 to 1960 feet, and arkose and siltstone to the total depth (Montgomery 2005). Currently the Anamax No. 1 well is open to a depth of approximately 1,885 feet.

Prior to conducting the downhole testing, a test pump was installed to a depth of approximately 560 feet bgs. A series of increasing pumping rates were conducted to evaluate the well specific capacity. At a pumping rate of approximately 3,280 gallons-per-minute (gpm) a drawdown of approximately 49 feet was measured resulting in a specific capacity of 67 gpm/foot of drawdown. Although only pumped for approximately 120 minutes at this rate, this indicated that Anamax No.1 well was a highly productive well. Based on this result it was decided to conduct the spinner-logging at a pumping rate of 2,000 gpm.

Geophysical Logging

Geophysical logging consisted of a spinner flowmeter survey. The spinner flowmeter survey is used to measure the groundwater flow rates (velocities) within a producing well. These measurements identify the more permeable zones and their relative contribution to the total flow of the production well. The flowmeter survey consisted of three logging runs, each at different line speeds. Because the spinner output is directly proportional to the fluid movement past the impeller, three different logging profiles are obtained to provide comparison of velocity profiles and increase the accuracy of flow rate calculations.

Analysis of the spinner log data indicates that at a pumping rate of 1,885 gpm, the basin-fill alluvial aquifer from the top of the perforations at 600 feet bgs to 1,300 feet bgs contributes approximately 87 percent (1,639 gpm) of the total flow. Thirteen percent (246 gpm) of the production then comes from the conglomerate. Within the alluvial aquifer, six main intervals of groundwater influx were identified, differentiated partly by hydraulic conductivity values. Two discrete water-bearing intervals were apparent within the conglomerate aquifer. The distribution of the groundwater production intervals in the Anamax No. 1 well and corresponding lithology is shown in Table 1.

TABLE 1. SPINNER FLOWMETER ANALYSIS

INTERVAL DEPTH (FEET, BLS)	PERCENTAGE OF FLOW (PERCENT)	GENERALIZED GEOLOGY
601 to 750	9	Alluvium
750 to 900	43	
940 to 1,040	10	
1,040 to 1,075	12	
1,130 to 1,160	7	
1,235 to 1,260	6	
1,350 to 1,410	6	Conglomerate
1,520 to 1,760	7	

Groundwater Sampling

Following the flowmeter survey, depth-specific groundwater samples were collected in the Anamax No.1 well with a wire-line sampling tool. The samples were collected to characterize the water quality throughout the screened portion of the aquifer, and were obtained from specific depths in the well based on analysis of the spinner flowmeter log and reported geologic strata penetrated by the well. The zonal samples were collected at depths of 790, 1,000, 1,100, and 1,270 feet. A composite sample from the pump discharge was also collected. All five samples were analyzed for arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, fluoride, nitrate, nitrite, sulfate, and total dissolved solids (TDS). Results of the laboratory analysis for each sample are presented in Appendix A. Results for selected constituents are summarized in Table 2.

TABLE 2. DEPTH-SPECIFIC SAMPLING ANALYTICAL RESULTS

SAMPLE INTERVAL (feet bls)	CONSTITUENT				
	TOTAL DISSOLVED SOLIDS	SULFATE	ARSENIC	FLUORIDE	CHROMIUM
Composite	275	64.3	0.017	1.74	<0.005
790	244	61.5	0.017	1.81	<0.005
1,000	283	73.1	0.015	2.28	<0.005
1,100	282	61.1	0.014	2.19	0.006
1,270	331	88.3	0.014	1.48	0.008
MCL	500a	250a	0.010	4	0.1

All concentrations in milligrams per liter (mg/L)
bls = below land surface
MCL = maximum contaminant level (Federal Standard)
aSecondary Maximum Contaminant Level (not enforceable)
Arsenic MCL as of January 23, 2006

Similar to all constituents that were analyzed (Appendix A), concentrations of the selected constituents shown on Table 2 for each depth-specific sample and the pump discharge sample appear to be moderately consistent. TDS concentrations ranged from 331 to 244 milligrams per liter (mg/L), sulfate from approximately 61 to 88 mg/L, arsenic from 0.014 to 0.017 mg/L, fluoride from 1.48 to 2.28 mg/L and chromium from less than 0.005 to 0.008.

Aquifer Test

During the flowmeter survey and sampling activities, the well was pumped for approximately 10 hours at a constant average rate of 1,885 gallons per minute (gpm). A plot of the water level decline within the well is presented on Figure 1. Based on this data a total of 27 feet of drawdown occurred resulting in a specific capacity of 70 gpm/ft of drawdown. This value is slightly lower than the specific capacity measured the previous day at a pumping rate of over 3,200 gpm, indicating that the well is well-developed. Following the cessation of pumping, a water level recovery test was conducted to obtain an estimate of aquifer transmissivity. A semi-log plot of the aquifer test data is presented as Figure 2. Review of the Theis Recovery Plot indicates a transmissivity of approximately 227,000 gallons per day per foot (gpd/ft).

Findings

Based on the zonal sampling results, the high arsenic concentrations encountered in the Anamax No. 1 well would appear to be distributed throughout the entire portion of the alluvial and conglomerate aquifers screened. However, several conditions indicate that most likely that the zonal sampling results do not reflect ambient conditions in the local aquifer regarding vertical distribution of water quality. These include:

- The consistency of the analytical results for each constituent in all samples,
- The length of the perforated interval in the well (i.e. groundwater production from potentially multiple aquifer units and variable litholgy), and
- Historic well use (non-pumping for an extended period of time).

Recognized throughout many developed alluvial basins within the Basin and Range Physiographic Province in Arizona, an important hydrogeologic characteristic to consider that appears to prevail in the local aquifer system comprising the Anamax No. 1 well is the occurrence of a vertical hydraulic gradient. Hydraulic gradients can develop due to differences in the hydraulic conductivity of alluvial deposits together with long-term groundwater level declines from over-pumping or increases from recharge. The vertical hydraulic gradient would occur in the perforated portion of the well casing and potentially the annulus. Thus, under static conditions, water in the upper portion of the screened aquifer will migrate downward within the well casing and then, deeper in the well, horizontally into adjacent strata. The presence of

significant arsenic concentrations in the upper-most sample (790 feet bgs) combined with high percentage of flow originating from the 750 – 900 feet bgs portion of the well suggests that this interval may be a primary source of the arsenic. Further studies would be needed to more definitively address this.

Conclusions

Although relatively old and unused for a number of years, Anamax No. 1 well is a highly productive well. Based on the well production evaluation it could likely sustain a pumping rate of over 3,000 gpm with a pump setting, using current depths to water, of approximately 375 to 400 feet below ground surface. Water quality appears to be very consistent for the constituents analyzed throughout the screened portion of the Anamax No. 1 well. However, the results do not appear to be representative of local aquifer conditions due to the reasons stated above. Long-term continuous pumping of the well could result in changes in water quality as water from the upper portions of the aquifer are purged from the system and further diluted from groundwater produced throughout lower sections of the well. It is unknown if the concentration of arsenic would be significantly reduced. Historic water quality data from the Anamax No. 1 well, if available, could be an indication. Conversely, operating the well on an intermittent or seasonal basis could result in no significant changes in water quality due to the current suggested hydraulic conditions within the well.

If you have any questions please do not hesitate to contact either of the undersigned at 520-624-5744.

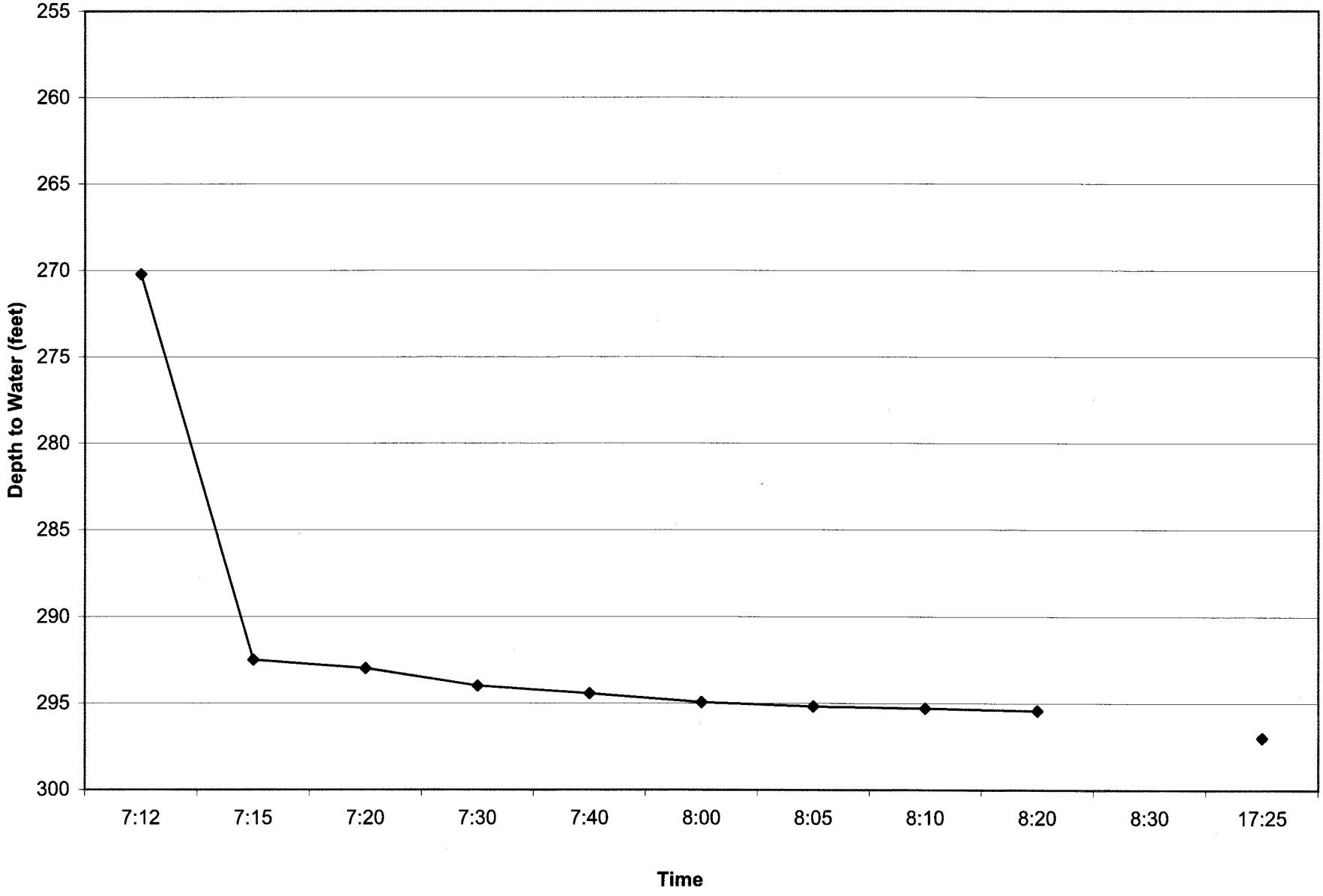
Very truly yours,

BROWN AND CALDWELL

Steve Brooks, R.G.
Supervising Hydrologist

Michele Mahal
Staff Scientist II

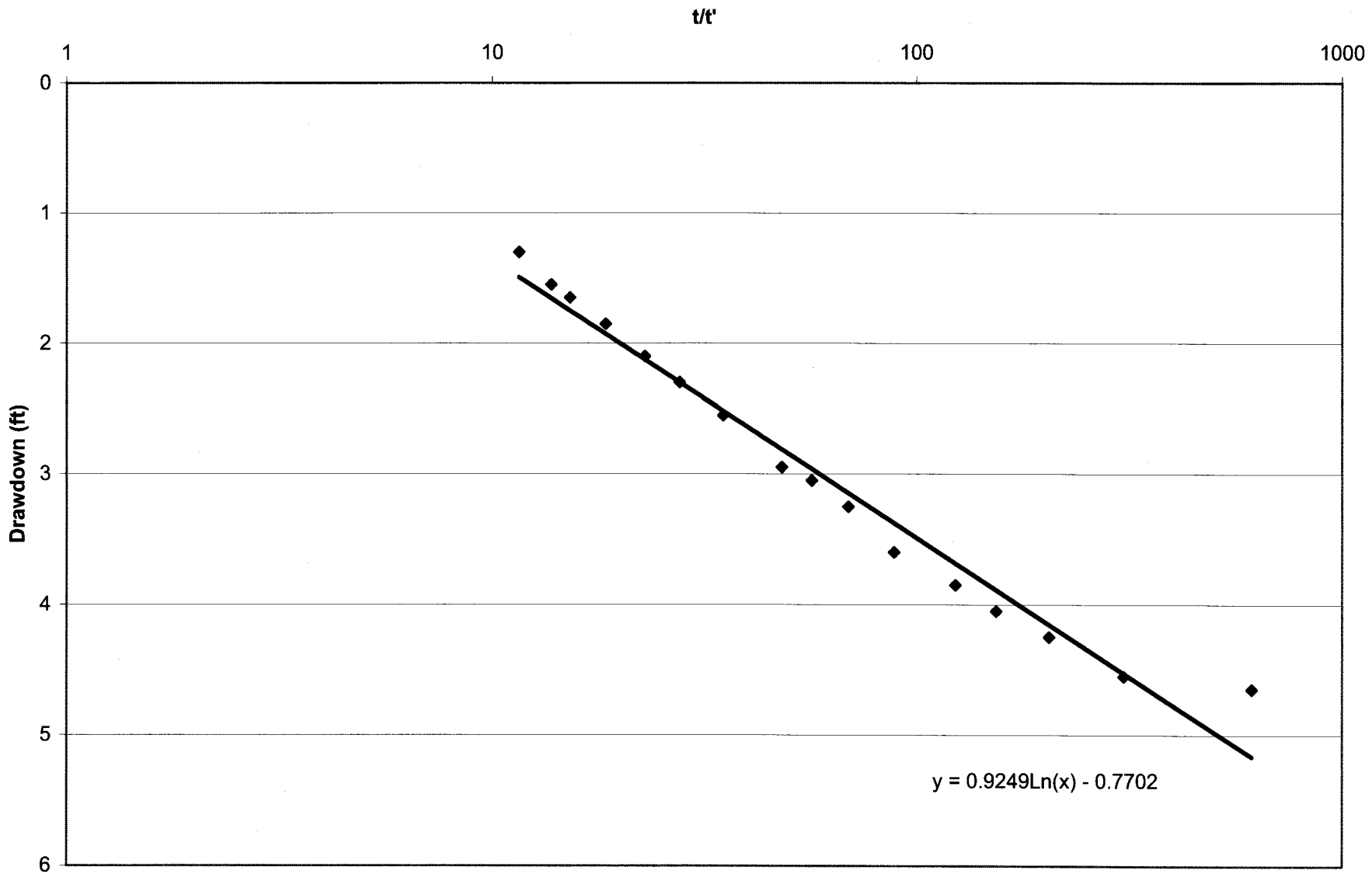
Figure 1
Anamax #1 Well - Spinner Test Drawdown Data at Q = 1,885 gpm



BROWN AND CALDWELL

P:\CommunityWtr_Green Valley\128730_AnamaxWell\DELIVERABLES\Reports\to CWCGV\Figure 1.xls

FIGURE 2
Anamax No. 1 Well - Recovery Data



P:\CommunityWtr_Green Valley\128730_AnamaxWell\DELIVERABLES\Reports\to CWCGV\Figure 2.xls

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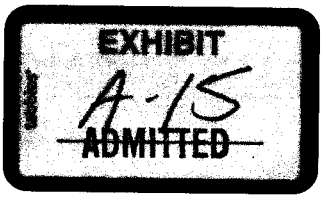
APPENDIX Z

MODFLOW and GIS Formats Data Files (Compact Disk Only in ADWR and SWC Submitted Reports)

EXHIBIT A-15

(ADWR March 27, 2008 Administrative Completeness Review Letter)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



ARIZONA DEPARTMENT OF WATER RESOURCES
Office of Assured and Adequate Water Supply
2nd Floor, 3550 N. Central Ave, Phoenix, AZ 85012
Telephone 602 771-8585
Fax 602 771-8689

Janet Napolitano
Governor

Herbert R. Guenther
Director

March 27, 2008

Kristen Whatley
Westland Resources, Inc.
4001 E. Paradise Falls Drive
Tucson, AZ 85712

Re: Application for a Modification of a Designation of Assured Water Supply
Sahuarita Water Company LLC (DWR No. 86-401203.0001)
Administrative Completeness Review

Dear Kristen Whatley:

We received your application for a Modification of a Designation of Assured Water Supply on November 23, 2007. During our administrative review, we have determined your application to be incomplete. Please provide the following items to the Department:

1. A final decision and order from the Arizona Corporation Commission extending the area of the Sahuarita Water Company Certificate of Convenience and Necessity (CC&N) to include the proposed subdivisions and approving any financing of the required infrastructure.

2. Signatory Authority
   The application for modification of designation of assured water supply that was submitted on November 23, 2007 was signed by J.V.C. Chalfant. Only an authorized member of a limited liability company can sign the application. A managing member is presumed to be authorized to sign; any other member should have signed authorization from the principal members of the LLC. Our records indicate that the managing member of the Sahuarita Water Company, LLC is Sharpe & Associates, Inc, whose President is Robert M. Sharpe. Please have Mr. Sharpe sign an amended first page of the application and submit along with an Application Revision form which can be found at www.azwater.gov.

3. Please provide the following additional maps and figures:
   a. Depth-to-water for the year 2107
   b. Total drawdown in feet for the year 2107
   c. Location of dewatered cells in the model for the year 2107

4. Water availability that is stated to be served by standpipes (i.e. for Magee Ranch, ~ 500 lots), is not considered to be a dependable source of supply. This supply cannot be considered as part of this application. Please revise the report accordingly.

5. The hydrologic study appears to be based on two existing wells and 10 wells projected to be drilled and completed in the future. Based on statements in the hydrologic reports, it is unclear whether all of the 10 proposed wells are suitable for production. Please explain whether each of the 10 proposed wells are likely to be used to withdraw groundwater to meet the demands within the service area. Please note that the volume of groundwater that will be physically available is limited to the volume withdrawn from existing wells or "from proposed wells that the Director determines are likely to be constructed for future uses of the applicant." A.A.C. R12-15-716(B)(1)(a). Also, please be aware that changes in the location of one or more wells may affect the determination of physical availability for the designation,

6. From the reports provided by Brown & Caldwell, boring locations #22 D(17-13) 1dac and # 24b D(17-13) 11caa were not recommended as future sites for production wells due to groundwater quality issues. It is unclear whether these sites were incorporated as future production sites in the actual MODFLOW groundwater flow model. Please explain in a narrative whether these wells were incorporated into the model.

7. ADWR found a recent issuance in 2008, of a General Industrial Use (GIU) permit to withdraw an additional 6,000 ac-ft/yr from D(17-14) 17bdd. This volume needs to be added at the appropriate location into the model as a committed demand. This GIU pumpage has been permitted for 20 years, 2008 - 2028.

8. ADWR has reviewed the most recent GWSI water level data and found that the plotted groundwater elevation data for the year 2005 (Figure 5-2) does not match the GWSI data west of Interstate 19. It remains unclear if the water levels found on the west side of Figure 5-2 simulate actual groundwater conditions and are similar to those found in the ADWR TAMA model. Please address this issue in a narrative response.

9. Though it was stated that the base case simulation and early stress periods of the AAWS model were qualitatively calibrated by comparing groundwater contours and cell specific water levels to those of the ADWR transient TAMA model, the level or degree to which the models match is unknown and has not been discussed. This needs to be addressed, justified and discussed in a narrative and figurative format.

10. Ongoing decline rates were incorporated as part of the MODFLOW groundwater flow model. Hydrographs were presented for review, but were not compared to model simulations of depth to water for trends in decline of groundwater (see Figure 4-4: Hydrographs). It is unclear if the model simulates the hydrographs as seen in Figure 4-4. No information has been presented that clearly demonstrates that the modified TAMA model matches the trends of water levels seen in the hydrographs presented. The modeled depth to water should be included as part of the hydrographs to allow for a ready comparison of groundwater decline trends. A narrative must also be provided.

11. Not far from the western edge of the current CC&N of the Sahuarita Water Company, the depth to bedrock is very shallow, approaching 400 ft below land surface. When the depth to bedrock map is overlaid onto the 2107 projected depth to water map, it appears that immediately west of the current CC&N, the aquifer may become dewatered in 100 years. Please provide a map clearly indicating where the aquifer dewaters, as well as a narrative of the long-term impacts from dewatering to the groundwater supplies needed for the water provider.

12. No geologic cross-sections were provided that illustrate where the shallow bedrock has been

encountered. Please provide a geologic cross-section (east-west) that clearly illustrates where the shallow depth-to bedrock is found.

13. As a result of the shallow depth to bedrock west of the water company's pumping wells, the saturated thickness of the aquifer is limited. Of specific concern is that the 100 year depth to water (Fig. 5-4) appears to far exceed the known depth to bedrock and available saturated thickness west of the production wells. Provide a narrative that addresses this area of possible dewatering and the effect on the supply for this application.

14. ADWR has reviewed the 2005-2007 water level elevations, seen in Fig. 5-2, and it is uncertain whether the water elevation contours are representative of the groundwater conditions seen in the ADWR TAMA model for the western edge of the model. Figure 5-2 indicates that these water level elevations are simulated. Provide evidence that supports these groundwater elevations in the western portion of the model. In addition, the gradient implies that there may be substantial flux/recharge as a result of the simulated elevations. This must also be clarified and fully supported in a narrative.

15. It is unclear, from the information presented, where the natural recharge is occurring in the model and exactly at what annual amount. The range from 3000 - 6000 ac-ft is a very broad range of recharge values. Please provide sufficient support in narrative, tabular and figurative formats that clearly indicate where and in what amounts the recharge is occurring.

16. Layer 3 of the model has been assigned a constant transmissivity value. Given that layer 3 starts at about 600 feet below land surface, and the 100 year DTW is greater than 600 ft, it appears that the transmissivity value would remain constant even with drawdown in this layer. This does not appear to be reasonable. It is suggested that since groundwater may be produced from Layer 3 during the 100 year simulation that a bottom be added to the Layer 3, not an assigned transmissivity value. It is suggested that the model be modified to include a bottom to Layer 3.

17. It is unclear if a sensitivity analysis was conducted, with regards changes in Layer 3 and the establishment of constant heads to the North edge of the model. Please address this in a narrative.

18. It was stated in Water Level Altitudes 5.3.1, p 5-9: that "In order to remove any potential bias due to effects of the inclusion of the updated Layer 3 transmissivity values on the overall model calibration, the drawdown from the SWC model (from 1999 to 2107) was subtracted from the ADWR TAMA model simulated water levels for the end of 1999 to produce a final simulated head distribution." It is unclear if this is reasonable. Please provide justification for this with a more detailed discussion.

19. Committed water demands on page 3-5 of the report indicate 15,008 af/yr while Table 3-5 indicates 18,008 af/yr. This number was calculated from the values listed in Table 3-5 which yielded a result of 18,117.63 af/yr. A table must be provided which clearly states what the applicant included in the model. The table must show the projected demand, the committed demand, and the current demand, as well as any future changes (reduction in agricultural pumping). The total should equal the total demand (100 year supply).

20. Although the report mentions the grid spacing was refined from ½ mile spacing to ¼ mile spacing, there is no discussion as to why this change was made or how the parameters were adjusted as a result. The applicant must provide figures of hydraulic parameters, recharge,

wells, boundary conditions, geology, and initial water levels which show what changes were made when ADWR's 2006 TAMA groundwater model ½ mile grid spacing was discritized to ¼ mile grid spacing. The applicant must also provide a discussion for each figure presented (how the ADWR TAMA ½ mile data was modified during the conversion to ¼ mile grid spacing). If there were any major discrepancies, please discuss the effect this discrepancy had on the model results.

21. Please provide a table of parameter values obtained through the aquifer test and spinner flow meter surveys which were used in the model (for example the final T values). Also include a figure which shows the extent of the area discritized using the new T values for use in the model, which includes the original T values used in the TAMA groundwater model and the modified T values.

22. The applicant must provide details concerning the modification of the ADWR TAMA Base Case Future Model simulation. As stated in the report, the simulation which had run through year 2025 was extended through 2107 using SWC existing and future pumping. Please provide a figure showing the locations and pumping information used to update the TAMA Base Case simulation. Include in an accompanying discussion any effects this change had on the simulation, and if there were any major discrepancies caused by the addition of this data.

23. Water level contour maps have been provided throughout the report. However, the applicant must provide water level altitude figures and water level depth figures for the entire model area (and not just the SWC area). Include in an accompanying discussion any discrepancies noted (such as dry cells within the model area and changes in flow direction).

24. The applicant must provide a table for the year 2107 with information on drawdown for each SWC well used in the AWS simulation. The table must also provide measured water levels, final water levels from the base simulation, and final water levels from the AWS simulation. A hydrograph showing projected water levels, measured water levels, and simulated water levels from 1941 through 2107 can also be created for each SWC well used in the AWS simulation.

25. Although evapotranspiration (ET) is mentioned in the report on page 5-7, there is no discussion of ET within that section. Based on the output for stress period 108 ET was included within the model. The applicant must provide an ET discussion within the report.

26. The applicant must provide a zone budget for the modeled area. Please discuss the flux across the northern and southern boundaries and how this flux may impact the model results. The flow in and out of the model for the southern and northern boundary was compared and by the end of the simulation almost 4,000 af/yr of water is entering the model area from the northern boundary. The amount of water entering the model area from the southern boundary appears to be too large (should range between 20,000 and 24,000 af/yr). If these values are to be used in the model, there must be a discussion on the effect flow out of the model through the south boundary and flow into the model through the north boundary have on the model results.

27. The applicant must expand the calibration discussion. The submitted report states "the base simulation and early stress periods of the AWS model were qualitatively calibrated by comparing the groundwater contours and cell specific water levels with those from ADWR's transient TAMA model". The applicant must provide a table for the base simulation and early stress periods of the AWS model which compares cell specific water levels with those from the TAMA model. The applicant must also provide model scale figures (not site specific figures)

which compare the groundwater contours in the base simulation and early stress periods of the AWS model with those in the TAMA model. Major discrepancies need to be discussed, as well as the effect of that discrepancy (if any) on the model results.

28. The report did not mention if a sensitivity analysis was completed as part of the model process. The applicant must do a sensitivity analysis by changing area parameters (for example recharge along the boundaries, hydraulic conductivity, changes in agricultural recharge, specific yield) and provide a discussion about the process and results in the report.

29. The applicant must phase mine pumpage and tailings pile recharge out of the model.

30. The report did not make clear if FICO agricultural recharge was decreased as areas urbanized. The applicant must reduce FICO agricultural recharge in addition to the reduction in agricultural pumping.

31. The applicant must address the bedrock on the west side of the model. In order to accomplish this, the applicant should put a bottom on layer three and recalculate a hydraulic conductivity value based on the layer three transmissivity and a saturated thickness. In the simulation provided the water levels fell below bedrock west of Sahuarita Water Companies Certificate of Convenience and Necessity service area.

Please submit the requested information to the Office of Assured Water Supply within 60 days of this notice. Our review of your application has stopped and will resume when we receive the missing items. If you do not respond to this letter within the 60-day time frame, the director of the Department may take action to deny the application and close the file.

After the model has been modified to reflect the above comments, the Department may still have further issues and comments based upon the modified modeling results

If you have any questions regarding the contents of this letter or the application in general, please do not hesitate to contact Diane Kusel at (520) 770-3800.

Sincerely,

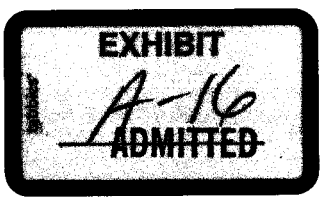
John Schneeman, Manager
Office of Assured and Adequate Water Supply

JFS/djk

EXHIBIT A-16

(Brown and Caldwell July 7, 2008 Technical Report
in Response to ADWR March 27, 2008
Administrative Completeness Review Letter)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



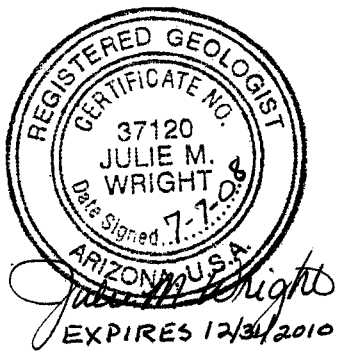
BROWN AND CALDWELL

110 South Church Ave., Suite 2300
Tucson, Arizona 85701
Tel: 520-624-5744
Fax: 520-791-2738

Technical Memorandum Report

Technical Memorandum Report

Subject:	Technical Memorandum Report - Sahuarita Water Company Modification of Designation of an Assured Water Supply -- Supplemental Hydrology Study (DWR No. 401203.0001)
Date:	July 7, 2008
To:	Mr. John Schneeman – Manager, Arizona Department of Water Resources Office of Assured and Adequate Water Supply
From:	Buck Schmidt, Principal Hydrologist, Brown and Caldwell Brent Cain, Senior Hydrologist, Brown and Caldwell
Copy to:	Mr. Mark Seamans - Sahuarita Water Company Ms. Kristen Watley, P.E., WestLand Resources, Inc.
Reviewed by:	Julie M. Wright, R.G., Senior Hydrogeologist, Brown and Caldwell
Project No:	130267



1. INTRODUCTION

The following technical memorandum report documents a supplemental hydrology study to support an Application for Modification of the Designation of Assured Water Supply (DAWS) for Sahuarita Water Company (SWC) (DWR No. 401203.0001). The original application was submitted to the Arizona Department of Water Resources (ADWR) on November 23, 2007. The original hydrology study to support the application is titled *Assured Water Supply Hydrology Report for Sahuarita Water Company (Attachment C of Modification of Designation of an Assured Water Supply Application)* dated November 21, 2007 (Brown and Caldwell, 2007a) and should be referenced in review of this technical memorandum report. This technical memorandum report sequentially addresses itemized comments presented in a March 27, 2008 letter documenting ADWR's Administrative Completeness Review of the application.

For reference, Table 1 provides a listing of the nomenclature and descriptive information for the various groundwater models and simulations discussed and presented in this report and associated figures. Unless otherwise indicated, all reported water levels, contours and discussions are based on Layer 3 of the models.

Limitations:

This document was prepared solely for Sahuarita Water Company in accordance with professional standards at the time the services were performed and in accordance with the contract between Sahuarita Water Company and Brown and Caldwell dated November 30, 2007. This document is governed by the specific scope of work authorized by Sahuarita Water Company; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Sahuarita Water Company and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Table 1. Model and Simulation Nomenclature

Model Name	Timeline	Model Domain	Notes
ADWR TAMA Model ADWR TAMA Base Case Future	1941-1999 2000-2107	Full TAMA Full TAMA	ADWR original model ADWR original model with SWC pumping added
SWC Base Model	1941-1999	Southern ½ of TAMA	All parameters same as ADWR TAMA, including Transmissivity
SWC Revised Base Model	1941-1999	Southern ½ of TAMA	Updated Transmissivity in vicinity of SWC
SWC Revised AWS Model ("AWS Model")	2000-2107	Southern ½ of TAMA	Updated Transmissivity in vicinity of SWC; revised western boundary; predictive simulation

2. RESPONSES TO ADWR COMMENTS

Comment No. 1. A final decision and order from the Arizona Corporation Commission extending the area of the Sahuarita Water Company Certificate of Convenience and Necessity (CC&N) to include the proposed subdivisions and approving any financing of the required infrastructure.

Response No. 1. A final Decision and Order from the Arizona Corporation Commission (ACC) for extension of Sahuarita Water Company Certificate of Convenience and Necessity (CC&N) is anticipated to be issued no later than the beginning of October 2008. Sahuarita Water received an application sufficiency letter on May 27, 2008. The ACC is required to render a decision on the CC&N Application within 150 days from the issuance of the Sufficiency Letter.

Comment No. 2. Signatory Authority: The application for modification of designation of assured water supply that was submitted on November 23, 2007 was signed by J.V.C. Chalfant. Only an authorized member of a limited liability company can sign the application. A managing member is presumed to be authorized to sign; any other member should have signed authorization from the principal members of the LLC. Our records indicate that the managing member of the Sahuarita Water Company, LLC is Sharpe and Associates, Inc., whose President is Robert M. Sharpe. Please have Mr. Sharpe sign an amended first page of the application and submit along with an Application Revision form which can be found at www.azwater.gov.

Response No. 2. Attachment A is a revised first page of the Application and Application Revision Form, both signed by Robert M. Sharpe.

Comment No. 3. Please provide the following additional maps and figures:

a) Depth-to-water for the year 2107;

b) Total drawdown in feet for the year 2107; and

c) Location of dewatered cells in the model for the year 2107.

Response No. 3. The following maps are based on Layer 3 head values from the SWC Revised AWS model simulation:

a) Figure 1 – 2107 Simulated Depth to Water Contours – SWC Revised AWS Model;

b) Figure 2 – 2107 Simulated Water Level Drawdown Contours – SWC Revised AWS Model; and

c) Figures 3 and 4 – Layer 1 and Layer 2 Simulated Dewatered Model Cells in 2107 – SWC Revised AWS Model.

Comment No. 4. Water availability that is stated to be served by standpipes (i.e., for Magee Ranch, approximately 500 lots), is not considered to be a dependable source of supply. This supply cannot be considered as part of this application. Please revise the report accordingly.

Response No. 4. Sahuarita Water Company intends to provide a potable water source via standpipe to the Magee Ranch area located outside of the proposed CC&N expansion area. The area is not currently served by any municipal water provider. This demand is included in the projected water demand that will be pumped and served by SWC for physical availability considerations.

Comment No. 5. The hydrologic study appears to be based on two existing wells and 10 wells projected to be drilled and completed in the future. Based on statements in the hydrologic reports, it is unclear whether all of the 10 proposed wells are suitable for production. Please explain whether each of the 10 proposed wells are likely to be used to withdraw groundwater to meet the demands within the service area. Please note that the volume of groundwater that will be physically available is limited to the volume withdrawn from existing wells or "from proposed wells that the Director determines are likely to be constructed for future uses of the applicant." A.A.C. R12-15-716(B)(1)(a). Also, please be aware that changes in the location of one or more wells may affect the determination of physical availability for the designation.

Response No. 5. As noted, SWC has plans to utilize one active well (Well No. 18) and drill 10 new water supply wells by 2034. Two of three new wells, Well Nos. 17 and 19, will be permitted as replacement wells that will replace two inactive wells. These inactive wells are considered to be beyond service life. One of the current active wells, Well No. 14, will be phased out in 2009, but will continue to be used to maintain lake levels in the Sahuarita Town Lake by applying Type 1 water rights associated with the property area.

Plans to install the new wells are documented in the water master plan developed by WestLand Resources Incorporated titled *Sahuarita Water Company, LLC Water System Master Plan* dated November 8, 2007, which has been previously provided to ADWR. (Tabulated on Table 13 in Section 5.3.1 and shown on Exhibit 2 - Sahuarita Water Co. Future Water System Master Plan of the report).

Summary tabulation of these planned wells and projected average annual withdrawal in 2034 (buildout year) is shown on Table 2 below as previously presented in the original hydrology report (Table 3-9, Brown and Caldwell, 2007a).

In 2006 and 2007, SWC conducted pilot hole and exploratory boring analyses programs to evaluate potential future well sites. Groundwater production potential and groundwater quality were evaluated at eight potential well sites. The pilot hole analysis conducted for Well Site No. 24 concluded that the well site is not viable based on groundwater quality. This analysis is documented in a report titled *Well Site No. 24 Pilot Hole Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007b) which has been previously provided to ADWR. Exploratory boring analyses were conducted at seven additional well sites, Well Site Nos. 20R, 21, 22, 23, 24B, 25, and 26. Exploratory boring analyses at Well Site Nos. 21, 23, 24b, 25 and 26 revealed favorable groundwater production potential and groundwater quality while Well Site Nos. 20R and 22 revealed unfavorable groundwater quality potential. These analyses are documented in two reports titled *Well Site Nos. 21, 22, 23, 25, and 26 Exploratory Boring Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007c) which has been previously provided to ADWR, and *Well Site Nos. 20R and 24B Exploratory Boring Analyses Report* dated April 18, 2008 (Brown and Caldwell, 2008a.)

In 2008, SWC installed a new water production well (Well No. 23) at one of the exploratory boring sites with favorable groundwater production potential and groundwater quality. The well provides favorable groundwater yield and groundwater quality with the exception of dissolved arsenic. The well completion report including aquifer testing and analysis, and Phase II/Phase V Safe Drinking Water Act New Source approval constituents analytical reports are documented in a report titled *Sahuarita Water Company Well No. 23 Completion Report* dated June 21, 2008 (Brown and Caldwell, 2008b). A wellhead treatment system is currently being planned and designed as of the date of this report to comply with the potable water arsenic standard.

Table 2. Sahuarita Water Company Active and Future Planned Water Supply Wells

Well	Active or Future Wells	ADWR Registration No.	Cadastral Location	Current or Anticipated Pump Capacity (gpm)	Favorable Groundwater Production Potential and Groundwater Quality Confirmed?[1]	Projected Groundwater Production at Buildout (2034) (AFY)
Well No. 14	Active	55-611142	D-17-13 1ACC	1,900	Yes	0
Well No. 18	Active	55-611144	D-17-13 1CDD	1,400	Yes	1,014.9
Well Site No. 17R	Future	NA	D-16-13 36CCA	1,500	Yes	1,087.4
Well Site No. 19R	Future	NA	D-17-13 1BDB	1,500	Yes	724.9
Well Site No. 21	Future	NA	D-17-13 1CDB	1,000	Yes	1,087.4
Well Site No. 23	Installed/ Inactive	55-216840	D-17-13 11BAA	1,500	Yes	1,087.4
Well Site No. 24B	Future	NA	D-17-13 11CAA	1,500	Yes	1,087.4
Well Site No. 25	Future	NA	D-17-13 14ABA	1,500	Yes	1,087.4
Well Site No. 26	Future	NA	D-17-13 14DDC	750	Yes	543.7
Well Site No. 27	Future	NA	D-17-13 23ACC	1,500	No	1,087.4
Well Site No. 28	Future	NA	D-17-13 23DDA	1,500	No	1,087.4
Well Site No. 30	Future	NA	D-17-13 14DBA	1,500	No	1,087.4

Notes:

[1] = Exploratory boring drilled, existing well or well installed at site if "Yes" noted. Well head treatment or blending may be required for these wells to comply with maximum contaminant level for dissolved arsenic.

NA = Not applicable
gpm = gallons per minute
AFY = acre feet per year

Total = 10,983 AFY

No exploratory boring analyses or well installation and testing has been preformed at Well Site Nos. 27, 28, and 30. However, based on regional information, it is likely that these sites will be viable well sites with only the potential requirement of treatment or blending to comply with the potable water arsenic standard.

Comment No. 6. From the reports provided by Brown and Caldwell, boring location #22 D(17-13) 1dac and # 24b D(17-13) 11 caa were not recommended as future sites for production wells due to groundwater quality issues. It is unclear whether these sites were incorporated as future production sites in the actual MODFLOW groundwater flow model. Please explain in a narrative whether these wells were incorporated into the model.

Response No. 6. These sites were not included in the model as future pumping locations. See Response No. 5.

Comment No. 7. ADWR found a recent issuance in 2008, of a General Industrial Use (GIU) permit to withdraw an additional 6,000 acre feet per year (AFY) from D(17-14) 17bdd. This volume needs to be added at the appropriate location into the model as a committed demand. This GIU pumpage has been permitted for 20 years, 2008 to 2028.

Response No. 7. This new water demand has been incorporated in the SWC Revised AWS model run. The pumping is evenly applied across four wells from the simulated time period from 2008 to 2028 (20 years) at the cadastral location specified for the GIU permit. The simulated pumping time period for this demand corresponds to stress periods 9 through 28. Figure 5 displays the locations of future GIU pumping.

Comment No. 8. ADWR has reviewed the most recent GWSI water level data and found that the plotted groundwater elevation data for the year 2005 (Figure 5-2) does not match the GWSI data west of Interstate 19. It remains unclear if the water levels found on the west side of Figure 5-2 simulate actual groundwater conditions and are similar to those found in the ADWR TAMA model. Please address this issue in a narrative response.

Response No. 8. The SWC Base model (1941-2000) accurately reproduced the water level distribution from ADWR's transient TAMA model through the year 2000 (Figure 6). Head distributions from both the TAMA and SWC Base models demonstrate a steep, eastern trending gradient along the western boundary of the SWC service area. This gradient is presumed to be representative of natural and mine related recharge entering the relatively shallow aquifer system at the model boundary. Thus, the simulated water levels from the SWC models are representative of those found in the ADWR TAMA model and its underlying conceptualization of the hydrogeology west of the SWC service area. Additional information and discussion is provided in Response No. 9.

Comment No. 9. Though it was stated that the base case simulation and early stress periods of the AAWS model were qualitatively calibrated by comparing groundwater contours and cell specific water levels to those of the ADWR transient TAMA model, the level or degree to which the models match is unknown and has not been discussed. This needs to be addressed, justified and discussed in a narrative and figurative format.

Response No. 9. As stated in section 5.2 of the original report, a base model was developed that contained three modifications to ADWR's TAMA model. The modifications were: 1) model cell dimensions were refined to uniform ¼ mile by ¼ mile spacings; 2) the model domain was limited to the southern portion of the Tucson AMA; and 3) transmissivity values in the immediate vicinity of the SWC service area were updated in model Layer 3 to reflect recent aquifer testing data within and adjacent to the SWC service area. In order to assess the SWC model's agreement with the TAMA calibration, a base model (SWC Base) was created which included the grid refinement and the domain refinement, but used the Layer 3 transmissivity values from ADWR's TAMA model. Figure 6 shows a comparison of water level contours for the TAMA model and the SWC Base model for the year 1999. The results from both models are in close agreement, indicating that the calibration standards met by ADWR for the TAMA transient model are also met by the AWS model. The minor discrepancies observed between water levels are due to a finer grid discretization; however, the calibration statistics for the SWC Base model for 1999 meet the same standards as those for the southern portion of ADWR's TAMA model. See Response No. 27 for additional information regarding the SWC model calibration and Chapter 5 of ADWR's Modeling Report No. 13, Regional Groundwater Flow Model of the Tucson Active Management Area (2006) for information on the TAMA model calibration.

Comment No. 10. Ongoing decline rates were incorporated as part of the MODFLOW groundwater flow model. Hydrographs were presented for review, but were not compared to model simulations of depth to water for trends in decline of groundwater (Figure 4-4: Hydrographs). It is unclear if the model simulates the hydrographs as seen in Figure 4-4. No information has been presented that

clearly demonstrates that the modified TAMA model matches the trends of water levels seen in the hydrographs presented. The modeled depth to water should be included as part of the hydrographs to allow for a ready comparison of groundwater decline trends. A narrative must also be provided.

Response No. 10. Attachment B includes comparative hydrographs for selected wells. Figure 7 shows the location of these wells. A comparison of observed versus simulated depths to water shows that the AWS model accurately reproduces the observed trends in water level changes over time. The model was able to reproduce both long term trends in water levels as well as shorter term variations due to pumping changes and the initiation of recharge at the Pima Mine Road facility. Simulated water level elevations also adequately mimic those observed at SWC and other nearby observation wells. This hydrograph analysis supports the model calibration as discussed in further detail in Response No. 27.

Comment No. 11. Not far from the western edge of the current CC&N of the Sahuarita Water Company, the depth to bedrock is very shallow, approaching 400 feet below land surface (bls). When the depth to bedrock map is overlaid onto the 2107 projected depth to water map, it appears that immediately west of the current CC&N, the aquifer may become dewatered in 100 years. Please provide a map clearly indicating where the aquifer dewaters, as well as a narrative of the long-term impacts from dewatering to the groundwater supplies needed for the water provider.

Response No. 11. To address this comment, water levels from the AWS model submitted in the original hydrology study were investigated. Simulated water levels for 2107 were compared to the estimated depth to bedrock. After 100 years of future conditions, depths to water at SWC were generally estimated to reach a maximum of 800 feet bls. This depth corresponds to a groundwater elevation of approximately 2000 feet amsl. Thus, it was concluded that the 800-foot depth to bedrock (Figure 4-1; Brown and Caldwell, 2007a) would provide an appropriately conservative estimate of the portion of aquifer that could become dewatered over the course of a 100-year simulation. To account for this, the area west of the 800-foot depth to bedrock contour, reflecting depths less than 800 feet, was converted to a no flow boundary for the full predictive simulation in the SWC Revised AWS model (Figure 1). This approach was deemed appropriately conservative for two reasons: 1) both observed and simulated water level elevations generally trend upwards to the west of the SWC service area, suggesting that it is likely that portions of the aquifer with depths to bedrock less than 800 feet are likely to remain saturated, and 2) the "dewatered" portion of the aquifer was removed from the active model domain at the beginning of the year 2000, although it is apparent that this zone will remain saturated for a significant period of time into the future. With this updated no flow boundary in Layer 3, the effects of the aquifer boundary are magnified. Simulated drawdown at the SWC service area increased and depths to water after 100 years increased by a maximum of approximately 110 feet relative to the results of the earlier hydrology study. However, as demonstrated in the previously submitted aquifer testing and well analyses reports, significant quantities of viable aquifer still remain below this depth within the SWC service area and at the current and proposed pumping locations. Thus, sufficient groundwater supplies remain for SWC even with the inclusion of a dewatered aquifer zone immediately to the west.

With the exception of exempt wells, all pumping locations within the estimated dewatered zone were moved to the east and into the updated active model domain. This insured that all current, committed, and pending demands are fully included in the predictive simulation. Additionally, per the previous meetings and correspondence with ADWR, recharge within this dewatered zone was moved immediately to the east to insure its inclusion in the active model domain.

Comment No. 12. No geologic cross-sections were provided that illustrate where the shallow bedrock has been encountered. Please provide a geologic cross-section (east-west) that clearly illustrates where the shallow depth-to bedrock is found.

Response No. 12. Geologic cross-sections are contained in two reports titled *Well Site Nos. 21, 22, 23, 25, and 26 Exploratory Boring Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007c) which has been previously provided to ADWR, and *Well Site Nos. 20R and 24B Exploratory Boring Analyses Report* dated April 18, 2008 (Brown and Caldwell, 2008a.)

Comment No. 13. As a result of the shallow depth to bedrock west of the water company's pumping wells, the saturated thickness of the aquifer is limited. Of specific concern is that the 100 year depth to water (Figure 5-4) appears to far exceed the known depth to bedrock and available saturated thickness west of the production wells. Provide a narrative that addresses this area of possible dewatering and the effect on the supply for this application.

Response No. 13. Please refer to Response No. 11.

Comment No. 14. ADWR has reviewed the 2005-2007 water level elevations, seen in Figure 5-2, and it is uncertain whether the water elevation contours are representative of the groundwater conditions seen in the ADWR TAMA model for the western edge of the model. Figure 5-2 indicates that these water level elevations are simulated. Provide evidence that supports these groundwater elevations in the western portion of the model. In addition, the gradient implies that there may be substantial flux/recharge as a result of the simulated elevations. This must also be clarified and fully supported in a narrative.

Response No. 14. The simulated water elevation contours presented in Figure 5-2 (of the previously submitted hydrology study) for the AWS model simulation match the magnitude and distribution of those in the ADWR TAMA model. Responses No. 8 and No. 9 and Figure 6 provide additional narrative and figurative support for this comment. Approximately 2,300 AFY of recharge is applied along this localized portion of the model boundary in the year 2000 for both the ADWR TAMA model and all SWC models. This flux/recharge represents inflows from both mountain front recharge and mine recharge and is included in ADWR's transient and predictive TAMA models and applied in identical magnitudes to the SWC model. The magnitude of recharge applied to each cell of the SWC model in 2107 is shown in Figure 12 and provided in shapefile format in Attachment Z (RCH_RevAWS.shp).

Comment No. 15. It is unclear, from the information presented, where the natural recharge is occurring in the model and exactly at what annual amount. The range from 3,000 to 6,000 acre feet is a very broad range of recharge values. Please provide sufficient support in narrative, tabular and figurative formats that clearly indicate where and in what amounts the recharge is occurring.

Response No. 15. Recharge is consistent with the ADWR TAMA model with the exception of the reduction of artificial recharge for future time periods as noted in section 5.2.6 of the original hydrology study (Brown and Caldwell, 2007a). As discussed in Response No. 11 and previously discussed with ADWR personnel, recharge immediately to the west of the SWC service area was moved eastward in the SWC Revised AWA predictive run in order to account for the updated no flow boundary in Layer 3. Recharge cells were moved laterally to the east along the updated no flow boundary. Additionally, Figure 12 shows the recharge contained in the model in 2107, and the full spatial distribution and magnitude of annual recharge rates is provided in shapefile format (RCH_RevAWS.shp) in Appendix Z. Included with the shapefile is an associated database (RCH_RevAWS.dbf) file that presents detailed recharge information in a standard tabular format.

A comparison of the water budgets for the TAMA and SWC models is presented in Table 9. From the MODFLOW water budgets, approximately 47,000 AFY of recharge is applied in 1999 in the SWC models; this volume of recharge is reduced by approximately 9,000 AFY by the year 2107, due

to (1) fluctuations in natural and agricultural recharge from the predictive TAMA simulation and (2) the reduction and removal of artificial recharge at the Pima Mine Road and North Borrow Pit recharge facilities.

Comment No. 16. Layer 3 of the model has been assigned a constant transmissivity value. Given that layer 3 starts at about 600 feet bls, and the 100 year DTW is greater than 600 feet, it appears that the transmissivity value would remain constant even with drawdown in this layer. This does not appear to be reasonable. It is suggested that since groundwater may be produced from Layer 3 during the 100-year simulation that a bottom be added to the Layer 3, not an assigned transmissivity value. It is suggested that the model be modified to include a bottom to Layer 3.

Response No. 16. This issue was previously addressed in meetings and correspondence with ADWR personnel. Please refer to Response No. 11 for a discussion of the agreed-upon approach.

Comment No. 17. It is unclear if a sensitivity analysis was conducted, with regards changes in Layer 3 and the establishment of constant heads to the North edge of the model. Please address this in a narrative.

ADWR Explanation: Please reference the explanation provided with item #28.

Response No. 17. In addition to the SWC Base model where transmissivity values were identical to ADWR's TAMA model, a second base run was simulated, the SWC Revised Base model. The SWC Revised Base model includes the grid refinement, model domain refinement, and transmissivity value refinement in the vicinity of the SWC service area. Figure 10 shows a comparison of the water levels in the ADWR TAMA model versus the SWC Revised Base model in the year 1999. The increased transmissivity values in the vicinity of SWC service area result in localized head values that are generally up to 50 feet higher than the water levels simulated in the TAMA model; however, this increase in water levels did not significantly impact the agreement with observed water level trends in the vicinity of the SWC service area. Additional discussion related to this Comment is provided in Response No. 28.

Comment No. 18. It was stated in Water Level Altitudes 5.3.1, p 5-9: that "In order to remove any potential bias due to effects of the inclusion of the updated Layer 3 transmissivity values on the overall model calibration, the drawdown from the AWS model (from 2000 to 2107) was subtracted from the ADWR TAMA model simulated water levels for the end of 1999 to produce a final simulated head distribution." It is unclear if this is reasonable. Please provide justification for this with a more detailed discussion.

Response No. 18. Because the model calibration and results were deemed to be within appropriate levels and for the sake of consistency, all simulated water level elevations and depths to water presented in the attached figures and graphs are now based upon the SWC Revised series of model simulations, which incorporate the updated localized transmissivity values for Layer 3.

The inclusion of the updated transmissivity distribution in the SWC Revised Base model caused water levels in some areas to be above those simulated in the SWC Base model, which match those in ADWR's TAMA model. To assess the significance of this variation upon estimated depths to water, drawdown values from the SWC Revised AWS model simulations were subtracted from simulated 1999 water levels from the SWC Base model. This allowed the use of the calculated drawdown from the updated SWC model, which incorporates recent aquifer testing and dewatered aquifer estimates, while eliminating any nonconservative "bias" from water levels that are simulated in the SWC Revised model as being higher than ADWR estimates. The data contained in Table 3 below demonstrate that even if the SWC Base model water levels in 2000 are used as an initial data set to

subtract drawdown from, depths to water in 2107 at SWC wells still remain above the 1,000 foot depth to water AWS criteria. Response No. 24 provides a listing of 2107 water level and depth to water estimates derived solely from the results of the SWC Revised Models.

Table 3. Projected 2107 Water Levels Depths and Altitudes for SWC Water Supply Wells Based Upon ADWR TAMA Model Results for 1999

Well	Cadastral Location	Simulated Water Level in 2000 SWC Base	Simulated Drawdown in 2107 SWC AWS	Calculated Water Level in 2107	Calculated Depth to Water in 2107
Well No. 14	D-17-13 1ACC	2444.7	522.1	1922.6	783
Well No. 18	D-17-13 1CDD	2451.6	525.6	1926.0	795
Well Site No. 17R	D-16-13 36CCA	2412.0	505.2	1906.7	918
Well Site No. 19R	D-17-13 1BDB	2434.0	519.9	1914.1	896
Well Site No. 21	D-17-13 1CDB	2443.6	524.5	1919.2	806
Well Site No. 23	D-17-13 11BAA	2448.2	523.8	1924.4	801
Well Site No. 24B	D-17-13 11CAA	2471.6	531.2	1940.4	801
Well Site No. 25	D-17-13 14ABA	2474.0	534.5	1939.5	885
Well Site No. 26	D-17-13 14DDC	2480.5	533.1	1947.3	890
Well Site No. 27	D-17-13 23ACC	2484.0	533.4	1950.5	872
Well Site No. 28	D-17-13 23DDA	2475.7	528.4	1947.3	863
Well Site No. 30	D-17-13 14DBA	2483.8	535.9	1947.9	901

Comment No. 19. Committed water demands on page 3-5 of the report indicated 15,008 AFY while Table 3-5 indicated 18,008 AFY. This number was calculated from the values listed in Table 3-5 which yielded a result of 18,117.63 AFY. A table must be provided which clearly states what the applicant included in the model. The table must show the projected demand, the committed demand, and the current demand, as well as any future changes (reduction in agricultural pumping). The total should equal the total demand (100 year supply).

Response No. 19. Committed demands are assumed to be any AWS analyses on record and approved or pending approval by ADWR from 2005 to the present. These data were compiled from ADWR's Assured and Adequate Water Supply database (ADWR, 2008). Water demands associated with applications approved prior to the year 2005 are considered currently being served and built-out, and therefore part of the current water demands. Water demands associated with applications approved from 2005 to present are classified as committed demands and are included in Table 4 below. These demands total to 24,316 AFY for the hydrologic study area. Table 5 presents pending applications as of the date of this report totaling 14,619 AFY, also considered committed water demands.

Based on a review of Farmers Water Company AWS submittal for Sahuarita Farms (north half) and Continental Farms (south half) (Clear Creek Associates, 2006), much of the agricultural lands currently being irrigated will be retired and developed into residential subdivisions. Residential water demand and continued irrigation demands for Farmers Water Company and FICO, based on Table 3, is 14,438 AFY. No build-out schedule for the residential development was noted. Current water demand for the water company based on an average of 2002 to 2006 pumpage records totals 27,094 AFY; however irrigation return flow to the underlying aquifer system also occurs. Based on pumpage and irrigation return flow values presented in Farmers Water Company AWS submittal, about 20 percent of pumpage returns to the aquifer system as irrigation return flow (Clear Creek Associates, 2006). Subtracting this percentage off of current pumpage (27,094 AFY – 6,134 AFY = 20,960 AFY) and comparing this to projected pumpage (14,438 AFY), a net decrease in pumpage is

calculated as 6,522 AFY. This is considered a conservative estimate because future irrigation return flow from continued irrigation pumpage was not considered.

Exempt well pumpage was also included in the projected demands, as requested by ADWR AWS staff, to cover any "wildcat" subdivisions in the hydrologic study area. It was assumed that each exempt well in the hydrologic study area pumps about 1 AFY. A total of 998 exempt wells are included within the hydrologic study area, thus an additional 998 AFY of exempt well pumping was included in the model.

Additional projected future irrigation pumping for Farmers Investment Company (FICO) and pumping to supply Sahuarita Lake by Sahuarita Water Company are also included in Table 6.

Table 4. Approved Assured Water Supply Applications (2005 to Present)

Water Provider	Application Name (Subdivision, Master Plan, Water Company, etc.)	Lots	Department File Number	Township		Range		Section	Demand (AFY)	Date Issued
Community Water Company of Green Valley	Las Campanas Blocks D & E, Lots 1-268 & Common Area A	268	27-401825	18	S	13	E	10	78.20	01/03/06
Community Water Company of Green Valley	La Joya Verde		27-401602	17	S	13	E	27	31.38	
Community Water Company of Green Valley	La Joya Verde II		27-401633	17	S	13	E	35	14.86	
Community Water Company of Green Valley	La Joya Verde III		27-400885	17	S	13	E	35	42.76	
Community Water Company of Green Valley	Las Campanas Blocks C, Lots 1-263 and Common Area A		27-700275	18	S	13	E	10	91.14	10/01/07
Community Water Company of Green Valley	La Joya Verde III		27-400886	17	S	13	E	35	46.26	
Community Water Company of Green Valley	La Joya Verde Rancho Abrego III, Lots 1-15 and Common Area A		27-700295	17	S	13	E	35	4.79	
Community Water Company of Green Valley	La Joya Verde III		27-400887	17	S	13	E	35	26.24	
Farmers Water Company	De Anza Links II, Lots 1 - 17 and Common Areas A & B	17	27-401810	18	S	13	E	27 & 34	6.52	01/30/06
Farmers Water Company	Canoa Preserve		27-401781	18	S	13	E	35	36.38	
Farmers Water Company	Madera Highlands, Villages 27 and 29, Common Areas D, E, F and G		27-700354	18	S	12, 13	E		70.52	
Farmers Water Company	Sahuarita Acres, Lots 1-71 and Common Area "A"	71	27-500023	17	S	14	E	8	21.81	04/09/07

Table 4. Approved Assured Water Supply Applications (2005 to Present)

Water Provider	Application Name (Subdivision, Master Plan, Water Company, etc.)	Lots	Department File Number	Township		Range		Section	Demand (AFY)	Date Issued
Farmer's Water Company	Sahuarita Farms (N. half) and Continental Farms (S. half)[1]		28-500050						14,438.46	07/30/07
Green Valley Water District	Solar Del Viejo, Lots 1-81, Common Areas A & B	81	27-401607	18	S	13	E	22	26.65	03/17/05
Quail Creek Water	Stone House	222	27-401424	18	S	14	E	8	84.66	01/25/05
Ray Water Company	Cantera, an RCP Subdivision, Lots 1 - 143; Common Areas A, B & C; Blocks A & B	143	27-401727	15	S	14	E	10	57.06	11/15/05
Ray Water Company	Desert Point 2, Lots 1 - 45 and Common Areas "A" & "B"	45	27-402265	15	S	14	E	10	15.83	03/30/07
Saguaro Water Company	Bluff Creek, Lots 1 - 40 and Common Areas A & B	40	27-500011	15	S	16	E	24	16.98	09/20/07
Undetermined	Ridgline		27-700397						88.49	02/14/08
Undetermined	Swan Southlands Development	8525	28-401840	16	S	14	E		3117.36	06/12/06
Rosemont Mine General Industrial Use Permit (20 years)				17	S	14	E	17	6,000	
								Total	**24,316AFY**	

Notes:

[1] = Sahuarita Farms and Continental Farms developments to retire agricultural uses and reduce irrigation return flow.

AFY = acre feet per year

Table 5. Pending Assured Water Supply Applications

Department File Number	Application Name (Subdivision, Master Plan, Water Company, etc.)	Water Provider	Location	Demand (AFY)
27-700391.0000	La Jolla Verde Commercial Center	Community Valley of Green Valley	T17S, R13E, Sec 35	47.22
51-402270.0000	Elephant Head Partnership, LLC	N/A	T19S, R14 E, Sec. 30	63.70
28-700456.0000	Canoa Preserve II	Farmers Water Company	T18S, R13E, Sec 35 & 36	120.06
27-500014.0000	Canoa Ranch, Block 27 South, Lots 1-356 and Common Areas "A" and "B"	Green Valley Water Company	T19S, R13E, Sec 8, 9, 16, 17	108.80
28-700486.0000	Arizona State Trust Land – Houghton Rd Corridor Area Conceptual Plan Project	Undetermined	T15S R15E, Sec 1, 2, 11, 12, 13, 14, 23, 24, 25, 36; T15S R16E, Sec 7, 18, 19, 29, 30, 31, 32; T16S R16E, Sec 5	14,231
			Total	**14,570 AFY**

Notes:

AFY = acre feet per year

Table 6. Summary of Total Water Demands Within the Hydrologic Study Area

Water Demands	Sahuarita Water Company (AFY)	Other Water Demands (AFY)	Exempt Wells (AFY)	Total (AFY)
Current	-	75,978[1]	-	75,978
Committed[3]				24,316
Pending Committed[3]				14,570
Projected	10,983	9,262[2]	998	21,243
			Total Water Demands in Hydrologic Study Area = 136,107 AFY	
			Total Water Demands in Hydrologic Study Area in 2107[3] = 130,107 AFY	

Notes:

[1] – Includes reduction of agricultural pumpage and increase in residential pumpage for Farmers Water Company

[2] – Includes FICO projection of continued irrigation pumping of 5,000 AFY, 4062 AFY of pumping to offset agricultural recharge from retired FICO lands, and 200 AFY pumping for Sahuarita Lake

[3] – Includes all applications submitted since 2005 and 6,000 AFY for Rosemont Mine which ends by 2028

AFY = acre feet per year

Beginning in 2008, committed demands discussed above were separated into those approved prior to 2005, and those approved in 2005 or later; these demands were simulated as follows:

Committed demands approved prior to 2005 were simulated as an average, calculated from the recorded annual pumping for the five-year period from 2002 through 2006. Water demands associated with these applications were therefore treated as current demands, currently being served and already at build out. The total amount of this average annual pumping is slightly higher than the full committed demands approved prior to 2005, thus the use of this approach was deemed to be conservative and accurate in that it allows reported pumping to occur at appropriate well locations. These average pumping values were applied to the appropriate wells for the time period from 2008 through 2108.

For all committed AWS demands within the hydrologic study area approved after 2005, the permitted annual pumping was included in the model at "new" wells at the location of the new developments.

All pending AWS demands were also simulated at their full requested demand amounts beginning in 2008 at the locations of the planned developments. Additionally, all exempt wells within the model domain were pumped at 1 AFY(998 wells).

Projected pumping for Sahuarita Water Company, Farmers Water Company, and FICO were updated with new AWS demands starting in 2008. The Sahuarita Water Company pumping was also increased by approximately 200 AFY to supply Sahuarita Lake. Projected pumpage by FICO for future agricultural usage was set at 5,000 AFY starting in year 2013 (conservative estimate corresponding to assumed residential build-out time frame) and was further increased by an additional 4,062 AFY starting in year 2023 in order to offset the impact of future agricultural recharge coming from previously retired irrigated lands. This methodology follows the same approach employed by Farmers Water Company in their approved AWS submittal (Clear Creek and Associates, 2006). Because it is unknown exactly which lands FICO plans on retaining for future agricultural activities, the model recharge array was not modified, and the calculated excess "return flow" recharge rate of 4,062 AFY to the local aquifer system was removed from the model by additional pumping at FICO wells. The magnitude of excess agricultural recharge was taken directly

from Farmers Water Company's AWS and assumes an irrigation return of 20 percent of agricultural pumpage (Clear Creek and Associates, 2006). The year 2023 was selected for the initiation of this excess pumping to account for the time lag (approximately 10 years) between the reduction in FICO irrigation pumping and when it is estimated to reach the regional aquifer system as recharge. Total simulated pumping by Farmers Water Company and FICO (both committed demand pumping and pumping to offset recharge at retired agricultural lands) totaled 23,500 AFY at build-out.

The current committed and projected demand summary presented in Table 5 is fully reflected in actual pumping for the 100-year simulation. Adjustments to the total demand shown in Table 5 were made in model inputs to account for: (1) an additional 4,062 AFY of pumping to offset agricultural recharge associated with retired irrigation land, and (2) the offset from the discontinuation of pumping at the Rosemont mine beginning in 2028 of 6,000 AFY. Thus total pumping applied to the model within the hydrologic study area at build-out totals 130,107 AFY. By the end of year 2107 of the AWS simulation, approximately 129,193 AFY of pumping is still sustained (including the additional pumping to offset future agricultural recharge by FICO), accounting for 99.3 percent of the total demand and including 100 percent of the SWC DAWS build-out demand. Detailed pumping information regarding well locations, pumping schedules, and demand type is provided in GIS format in Attachment Z. In addition, Figure 5 shows the locations and relative pumping in 2107 of both the committed and pending demands as well as the Rosemont Mine GIU demand that ends in 2028.

Comment No. 20. Although the report mentions the grid spacing was refined from ½ mile spacing to ¼ mile spacing, there is no discussion as to why this change was made or how the parameters were adjusted as a result. The applicant must provide figures of hydraulic parameters, recharge, wells, boundary conditions, geology, and initial water levels which show what changes were made when ADWR's 2006 TAMA groundwater model ½ mile grid spacing was discritized to ¼ mile grid spacing. The applicant must also provide a discussion for each figure presented (how the ADWR TAMA ½ mile data was modified during the conversion to ¼ mile grid spacing). If there were any major discrepancies, please discuss the effect this discrepancy had on the model results.

Response No. 20. The grid spacing was refined to ¼ mile in order to provide a finer resolution for the study area. All parameters remain exactly as they were in the original TAMA model, except for the noted transmissivity changes in Layer 3. Parameters that are independent of the cell size (i.e., storage and hydraulic conductivity) were simply applied to four cells instead of a single cell. Parameters such as evapotranspiration and recharge, which can vary in magnitude with cell size, were also assigned to four cells per TAMA cell to insure that the areal extents and magnitudes of flux from the TAMA model remained unchanged. Quality control (QC) was performed to verify that all inputs matched the original model. The grid refinement was facilitated by GIS and Groundwater Vistas functionality, and no discrepancies were identified in the QC step. All model parameters are provided in Attachment Z as shapefiles.

Comment No. 21. Please provide a table of parameter values obtained through the aquifer test and spinner flow meter surveys which were used in the model (for example the final T values). Also include a figure which shows the extent of the area discritized using the new T values for use in the model, which includes the original T values used in the TAMA groundwater model and the modified T values.

Response No. 21. Aquifer testing information and shapefiles of the transmissivity distributions are also included in digital format in Attachment Z (see folder SWCAquiferTestsData and shapefiles K_Base_allLayers.shp and K_RevAWS_allLayers.shp). Table 7 is a replica of the original report's Table 5-2 with data from one additional well. Aquifer testing and analysis at Well 23 occurred after

the submittal of the original study, results from this well were incorporated into this supplemental hydrology report. Because the depth to Model Layer 3 is only 200 feet at Well 23, the estimated transmissivity value was not adjusted. Figure 8 shows the location of the updated transmissivity values within the model domain. Figure 16 shows the full extent of the modified Layer 3 transmissivity distribution including the original transmissivity values used in the TAMA groundwater model.

Table 7. Estimated Layer 3 Transmissivity Values

Well	Tested Transmissivity Value (ft^2 per day)	Generalized Depth to Top of Layer 3 ADWR TAMA Model (feet bls)[1]	Estimated Transmissivity Value for Layer 3 (ft^2 per day)[2]
Well No. 12	8,732	~600	2,475
Well No. 14	9,798		8,572
Well No. 19	18,032		13,200
Anamax No. 1	30,344		27,000
Well No.23[3]	26, 734[4]	~200	27,000

Notes:

1 – Model cells at and near these wells show a depth to the top of Layer 3 of approximately 600', except Well No. 23, which showed a depth of approximately 200'.

2 – Calculated using results of aquifer testing presented in Section 4.3.2 of the original report. The estimated value from the Anamax well was conservatively rounded downward due to the high productivity of the deepest aquifer units at that location.

3 – Brown and Caldwell, 2008b

4 – Well No. 23 transmissivity values ranged from 26,734 to 33,417 ft^2 per day.

ft^2 = feet squared

bls = below land surface

Comment No. 22. The applicant must provide details concerning the modification of the ADWR TAMA Transient Future Model simulation. As stated in the report, the simulation which had run through year 2025 was extended through 2107 using SWC existing and future pumping. Please provide a figure showing the locations and pumping information used to update the TAMA Base Case simulation. Include in an accompanying discussion any effects this change had on the simulation, and if there were any major discrepancies caused by the addition of this data.

Response No. 22. The TAMA Base Case Future Model simulation was run to generate transient, proscribed head values for the northern boundary of the SWC model for 100 years. To accomplish this, the only revision in pumping that was made was to SWC wells, which were pumped at the rates and locations presented on Figure 5 and summarized in Table 3-9 of the original report. The TAMA Base Case model was then extended from year 2025 to 2107 to evaluate the trends in declining head values across the region chosen for the northern boundary of the SWC model. As expected, the addition of SWC's projected pumping and the extension of the model timeline through 2107 resulted in larger pumping stresses in the southern portion of the model, relative to the stress in the northern portion of the model. As a result, the estimated head values at the northern boundary of the SWC model declined over the predictive time period. There were no unanticipated results from this run, and the trends were a plausible indication of future conditions at the location chosen for the SWC northern model boundary.

Comment No. 23. Water level contour maps have been provided throughout the report. However, the applicant must provide water level altitude figures and water level depth figures for the entire model area (and not just the SWC area). Include in an accompanying discussion any discrepancies noted (such as dry cells within the model area and changes in flow direction).

Response No. 23. Please see Response No. 3 for references to the requested figures. Flow directions and dry cells in the SWC Revised model mimic the patterns observed when the TAMA Base Case model was run for a 100-year timeline, except for local changes in the vicinity of the revised transmissivity cells and the adjacent boundary condition. Groundwater flow at the northern boundary reverses direction over the course of the 100-year simulation, as outlined in Response No. 26 below. Figures 3 and 4 depict the dry cells in Layers 1 and 2, respectively. Layer 3 remained viable. Moving the western no flow boundary conditions to address the potential for an over-estimate of aquifer storage (due to Layer 3 simulation as a transmissivity layer) resulted in a conservative reduction in storage immediately adjacent to the site. Although there are data to suggest that the depth to bedrock west of the site is deeper than the depth-to-bedrock contours shown on Figure 4-1 of the original hydrology report, adequate data points to accurately simulate a fully three dimensional Layer 3 are not yet available. The SWC Revised AWS model is therefore considered to be a worst-case scenario for the 100-year runs in terms of groundwater availability.

Comment No. 24. The applicant must provide a table for the year 2107 with information on drawdown for each SWC well used in the AWS simulation. The table must also provide measured water levels, final water levels from the base simulation, and final water levels from the AWS simulation. A hydrograph showing projected water levels, measured water levels, and simulated water levels from 1941 through 2107 can also be created for each SWC well used in the AWS simulation.

Response No. 24. Table 8 below presents the requested information for the SWC wells used in the AWS simulation. Hydrographs from 1941 to 2107 for the SWC index wells are provided in Attachment B and include all measured water levels for the specified wells. See Response No. 10 for a narrative summary of the observed versus simulated water levels. The hydrographs in Attachment B also allow the comparison of measured versus simulated water levels for existing wells.

Table 8. Simulated 1999 and 2107 Water Levels Depths and Altitudes for SWC Active and Future Planned Water Supply Wells

Well	Active or Future Wells	ADWR Registration No.	Cadastral Location	Simulated 1999 Water Level Altitude (feet amsl)	Projected 2107 Depth to Water (feet bls)	Projected 2107 Water Level Altitude (feet amsl)
Well No. 14	Active	55-611142	D-17-13 1ACC	2472	756	1950
Well No. 18	Active	55-611144	D-17-13 1CDD	2475	772	1949
Well Site No. 17R	Future	NA	D-16-13 36CCA	2458	872	1953
Well Site No. 19R	Future	NA	D-17-13 1BDB	2468	862	1948
Well Site No. 21	Future	NA	D-17-13 1CDB	2472	778	1947
Well Site No. 23	Installed/ Inactive	55-216840	D-17-13 11BAA	2472	777	1948
Well Site No. 24B	Future	NA	D-17-13 11CAA	2477	796	1945
Well Site No. 25	Future	NA	D-17-13 14ABA	2480	879	1945
Well Site No. 26	Future	NA	D-17-13 14DDC	2484	886	1951
Well Site No. 27	Future	NA	D-17-13 23ACC	2487	870	1953
Well Site No. 28	Future	NA	D-17-13 23DDA	2486	852	1958
Well Site No. 30	Future	NA	D-17-13 14DBA	2483	902	1947

Notes:
NA = Not applicable
amsl = above mean sea level
bls = below land surface

Comment No. 25. Although evapotranspiration (ET) is mentioned in the report on page 5-7, there is no discussion of ET within that section. Based on the output for stress period 108 ET was included within the model. The applicant must provide an ET discussion within the report.

Response No. 25. The location and magnitudes of ET cells for the SWC model series, are presented on Figure 11. The volume of water removed from the model via ET was 3,046 acre-feet in 2107, consistent with the original TAMA model (see water budget comparison in Table 9).

Comment No. 26. The applicant must provide a zone budget for the modeled area. Please discuss the flux across the northern and southern boundaries and how this flux may impact the model results. The flow in and out of the model for the southern and northern boundary was compared and by the end of the simulation almost 4,000 AFY of water is entering the model area from the northern boundary. The amount of water entering the model area from the southern boundary appears to be too large (should range between 20,000 and 24,000 AFY). If these values are to be used in the model, there must be a discussion on the effect flow out of the model through the south boundary and flow into the model through the north boundary have on the model results.
ADWR Explanation: The ADWR would like the applicant to discuss what is occurring over the simulation time period at the boundaries (i.e., how the fluxes over time are changing). Providing a narrative and a table of the volumetric changes over time to the ADWR would explain if unreasonable volumes of water are moving across the model boundaries. This request references the 100-year simulation period. This request is referenced within the guidelines of the 2007 Substantive Policy Statement on Hydrologic Guidelines for AWS (page 18).

Response No. 26. Table 9 below presents the simulated water budgets for the model area. Figures C-1 and C-2 in Attachment C are graphs of flux values for the northern and southern boundaries of the SWC Revised AWS model.

Table 9. Simulated Water Budgets for SWC Model Simulations

Simulation	Storage IN	Constant Head IN[1]	Recharge IN	Storage OUT	Constant Head OUT[2]	Wells OUT	ET OUT
Base Simulation(1999)	58,910	28,368	47,022	6,240	8,583	116,595	3,150
Revised Base Simulation (1999)	57,546	28,339	47,022	5,255	8,825	115,745	3,135
Revised AWS Simulation (2107)	59,272	35,664	37,991	668	54	129,193	3,047

Notes:

[1]Includes fluxes from both northern and southern boundaries

[2]Only reflects flux across northern boundary

The incorporation of the revised transmissivity distribution in the Revised Base simulation did not significantly alter the simulated water budget at the beginning of the year 2000. The magnitude of underflow entering the model domain via the constant head cells along the southern boundary of the model (approximately 26,000 AFY) compares favorably with the value of approximately 27,000 AFY from running ADWR's transient TAMA model. By the year 2107, 28,600 AFY of underflow enters the model from the south, accounting for a increase of approximately 2,600 AFY of additional inflow. This additional underflow comprises less than 2 percent of the overall model water budget of approximately 133,000 AFY. This small contribution to the overall groundwater system when compared to the approximately 50,000 AFY of current, committed, and pending groundwater (pumping) demands that are simulated by buildout between the SWC service and the southern model boundary, suggests that the magnitude of additional inflow across the southern boundary is not

sufficient to bias the model results in the vicinity of SWC, whose southernmost extent is located over 14 miles to the north.

By the year 2107, the simulated magnitude of underflow at the constant head cells along the northern extent of the model domain shifts from approximately 6,900 AFY of net outflow to approximately 7,000 AFY of net inflow. This increase in boundary fluxes is primarily due to the over 50,500 AFY of groundwater pumping simulated at buildout north of the SWC service area. Of this amount, approximately 18,000 AFY of projected pumping occurs within 4 miles of the northern model boundary. The SWC service area is located over 12 miles south of these constant head cells and would not be significantly biased by variations in flux as this increase is primarily going towards drawdown located several miles to the north. Furthermore, the reduction of Tucson Water pumping in the central TAMA in lieu of CAP recharge and recovery activities in Avra Valley has and is projected by ADWR's predictive TAMA modeling to allow the recovery of water levels in the vicinity of the SWC model northern boundary (ADWR, 2006). Although the SWC model does apply steadily declining, transient prescribed heads to the northern constant head cells, it is likely that underflow from the central portions of the TAMA will increase over a 100-year simulation that includes the full allotment of regulatory demands in the southern TAMA. Lastly, an inspection of water level elevation contours in 2107 presented on Figure 9 shows that water levels still steadily decline towards the northern boundary. Should water levels be lowered along the northern constant head cells, the impact on water levels would only increase the gradient near the boundary and not significantly lower heads at the SWC service area.

Comment No. 27. The applicant must expand the calibration discussion. The submitted report states "the base simulation and early stress periods of the AWS model were qualitatively calibrated by comparing the groundwater contours and cell specific water levels with those from ADWR's transient TAMA model". The applicant must provide a table for the base simulation and early stress periods of the AWS model which compares cell specific water levels with those from the TAMA model. The applicant must also provide model scale figures (not site specific figures) which compare the groundwater contours in the base simulation and early stress periods of the AWS model with those in the TAMA model. Major discrepancies need to be discussed, as well as the effect of that discrepancy (if any) on the model results.

Response No. 27. See Response No. 10 as well as the following discussion. Qualitative comparisons were made during model development, as noted in the above Comment, to ensure that the calibration performed for the ADWR TAMA model would be applicable to the SWC model series that was derived from it. Figures 6 and 10 present comparisons of 1999 water levels from ADWR's TAMA model and the SWC Base and SWC Revised Base models, respectively. Figure 6 shows the excellent agreement achieved between the TAMA model and the SWC Base model, prior to any modifications of T values. Slight differences in contours between these two models is attributed to the smaller cell size of the SWC Base model. No discrepancies are observed at the northern boundary of the SWC model version. Figure 10 compares the TAMA model water level contours to the SWC Revised Base model, which has updated T values. The impact of the updated transmissivity brought the water levels up slightly in the vicinity of the site. This was anticipated, as the aquifer test results reflected higher T values than were used in the ADWR TAMA model. Because the northern boundary was prescribed, and derived from the ADWR TAMA model, no changes are attributed to this revision and the agreement depicted in Figure 6 strongly supports this assertion. Updated T values in the vicinity of the site and the original ADWR TAMA values are provided in shapefiles in Attachment Z (K_Base_allLayers.shp, K_RevAWS_allLayers.shp). From the shapefiles, the range of values for each of the model can be spatially compared. Original T values ranged from 230 to 1,860 feet squared per day (ft^2/day); revised values ranged from 684 to 24,854 ft^2/day. The highest T values were simulated in the vicinity of Anamax Well No. 1 and Well No. 23, and a buffer was placed

around these values during the kriging process to constrain the influence of these higher estimates to a small, realistic areal extent, while still respecting the data points.

To further address this comment, a quantitative comparison of the primary calibration statistic, Mean Absolute Error (MAE), was made. The 2000 water levels from 133 "target" wells in the GWSI database were imported into the SWC Base model (which replicated the southern half of the original TAMA model) and compared to the model-calculated water levels at the end of 1999. The MAE of the residuals was calculated to be 45.2 feet, which is approximately 5.3 percent of the total head change of 850 feet in the model domain. The MAE calculated for the SWC Revised Base model (incorporating updated T values) was 48.6 feet which is 5.7 percent of the total head change. Attachment D presents scatter plots of the model-calculated versus observed water levels for the SWC Base and SWC Revised Base models as well as listings of the target wells with their respective observed, calculated, and residual values. Generally, the plots both indicate that the model-calculated water levels are too low compared to observed water levels. However, in the second plot from the SWC Revised Base model, the residuals for heads between 2,400 and 2,500 feet are more balanced (i.e., both positive and negative residuals) due to the refinement of the T values in the vicinity of the site.

When the focus is narrowed to SWC wells in the immediate vicinity of the updated T values, the calibration statistics improve significantly. Based on recent, 2005 water level measurements in the six current SWC wells, a MAE of 27.9 feet was calculated based on measured versus predicted 2005 water levels representing 3.3 percent of the total head change across the model. Table 10 lists the wells used in the site-specific analysis of residuals. The overall model is thus relatively insensitive to the updated T values presented on Figure 8 but locally, in the vicinity of the SWC service area, performance was improved by this revision. The original calibration performed for the ADWR TAMA model is therefore considered to be appropriate for the SWC model series.

Table 10. Comparison of 2005 Observed vs. Simulated Water Levels for SWC Wells

SWC Well ID	Observed Water Level	Simulated Water Level	Residual
Well No. 1	2470.3	2472.5	-2.2
Well No. 12	2446.1	2483.6	-37.5
Well No. 14	2463.0	2477.9	-14.9
Well No. 17	2436.0	2479.8	-43.8
Well No. 18	2453.0	2475.0	-22.0
Well No. 20	2444.6	2491.6	-47.0
Mean Absolute Error (MAE)			27.9
MAE as a Percent of Total Head Change			3.3 %

Comment No. 28. The report did not mention if a sensitivity analysis was completed as part of the model process. The applicant must do a sensitivity analysis by changing area parameters (for example recharge along the boundaries, hydraulic conductivity, changes in agricultural recharge, specific yield) and provide a discussion about the process and results in the report.
ADWR Explanation: As a result of changing the grid size, model area, and the objective of the original ADWR Tucson model, ADWR requests that the applicant provide a sensitivity analysis for the submitted numeric groundwater model per the guidelines of the 2007 Substantive Policy Statement on Hydrologic Guidelines for AWS (page 18). The ADWR understands Brown and Caldwell's argument that the original Tucson model was used so sensitivity analysis should not have

to be provided. However, based on the aforementioned changes, the ADWR believes a sensitivity analysis would assist in explaining the models simulation of different system components.

Response No. 28. The hydraulic parameters, boundary conditions, prescribed fluxes and model domain for the SWC Base model are identical to the southern portion of ADWR's TAMA model. Additionally, the results of the SWC Base model simulation accurately match those from the TAMA model. As cited in Response No. 27, calibration statistics for the SWC Base (southern half of TAMA, no changes in inputs) and SWC Revised Base (revised transmissivity) model both show a Mean Absolute Error (MAE) between 5.3 and 5.7 percent of the total model head change. Response No. 26 also demonstrates that the simulated water budgets between the two models are not significantly different. Given the agreement in calibration statistics between the SWC Base and Revised models and the matching water budget, the modeling results are considered to be largely insensitive to the updated transmissivity distribution in Layer 3.

Given the excellent agreement of the SWC Base Model with the results of ADWR's TAMA model, the sensitivity analysis performed and documented by ADWR for the TAMA model (ADWR, 2006) holds for the SWC model with respect to all model components other than transmissivity, which was addressed above. ADWR states that for the transient simulation, "In general, the model is most sensitive to changes in Layer 1 specific yield and least sensitive to changes in agricultural recharge." (ADWR, 2006. Page 84) Since specific yield was not adjusted from the ADWR TAMA values, and the model is largely insensitive to the localized transmissivity value changes, it can be stated that the SWC model adequately reproduces groundwater conditions within the southern TAMA to the same degree of quantifiable certainty as the ADWR TAMA simulations.

Although the northern boundary conditions in the SWC model are not present in ADWR's TAMA model, these transient, prescribed head values are based upon the simulated head values from the TAMA transient model for the years 1941 through 1999 and the Base Case Future Model simulation described in Response No. 22 for the years 2000 through 2107. Because these head values are prescribed at levels taken directly from ADWR's TAMA model, adjustments to them would cause the SWC model to deviate from TAMA model predictions and adversely effect the overall calibration. Should the head values be adjusted upward or downward, simulated water levels would move in the same direction and cause water levels to move away from the bulk of observed calibration target water levels. A discussion of the potential impacts of fluxes across the northern boundary condition over the predictive time period is provided in Response No. 26.

Given the stability of water levels, calibration targets, and water budgets from multiple runs of the SWC model with various transmissivity arrays (including the model output from the original SWC AWS submittal) in conjunction with a review of ADWR's TAMA model sensitivity analysis discussion, the SWC model provides an appropriate level of certainty for the estimation of water levels within the southern TAMA.

Comment No. 29. The applicant must phase mine pumpage and tailings pile recharge out of the model. ADWR Explanation: The ADWR requests that the applicant justify using the pumpage and tailings recharge over the entire 100-year simulation. For example, if the pumpage and recharge has been approved and committed it is required to be left in through ADWR rules.

Response No. 29. Due to the consumptive use of water by the mining operations to the west of the SWC service area, pumping for mining applications is in excess of the recharge derived from it. The inclusion of adjacent mining pumping for the full 100-year predictive period was deemed to be a conservative measure to fully reflect the current demands of mining operations upon the availability of groundwater supplies at the SWC service area. For the purposes of an AWS submittal, it was also deemed appropriate that the historic and current pumping (and associated recharge) be included in the model as a regulatory demand for the full 100-year predictive time period. Should the mine

pumping and recharge be phased out of the model, the groundwater reserves in the vicinity of SWC would receive a net increase in the overall water budget, causing water levels at 2107 to be at a higher elevation than what is currently simulated. Given the fact that the revised AWS simulation currently passes the regulatory AWS criteria for groundwater availability, and incorporates all current, committed, and pending demands, the phasing out of mine pumping would not change the overall results or conclusions of this hydrology study.

Comment No. 30. The report did not make clear if FICO agricultural recharge was decreased as areas urbanized. The applicant must reduce FICO agricultural recharge in addition to the reduction in agricultural pumping.

Response No. 30. FICO agricultural recharge was not directly decreased to account for urbanization, but was indirectly simulated, as follows. Projected pumping for FICO was updated with new AWS demands starting in 2008. Projected pumpage by FICO for future usage was set at 5,000 AFY starting in year 2013 (conservative estimate corresponding to assumed residential build-out time frame) and was further increased by an additional 4,062 AFY starting in year 2023 in order to offset the impact of future agricultural recharge coming from previously retired irrigated lands. This methodology follows the same approach employed by Farmers Water Company in their approved AWS submittal (Clear Creek and Associates, 2006). Because it is unknown exactly which lands FICO plans on retaining for future agricultural activities, the model recharge array was not modified, and the calculated excess "return flow" recharge rate of 4,062 AFY to the local aquifer system was removed from the model by additional pumping at FICO wells. The magnitude of excess agricultural recharge was taken directly from Farmers Water Company's AWS and assumes an irrigation return of 20 percent of agricultural pumpage (Clear Creek and Associates, 2006). The year 2023 was selected for the initiation of this excess pumping to account for the time lag (approximately 10 years) between the reduction in FICO irrigation pumping and when it is estimated to reach the regional aquifer system as recharge. Total simulated pumping by Farmers Water Company and FICO (both committed demand pumping and pumping to offset recharge at retired agricultural lands) totaled 23,500 AFY at build-out.

Comment No. 31. The applicant must address the bedrock on the west side of the model. In order to accomplish this, the applicant should put a bottom on layer three and recalculate a hydraulic conductivity value based on the layer three transmissivity and a saturated thickness. In the simulation provided the water levels fell below bedrock west of Sahuarita Water Companies Certificate of Convenience and Necessity service area.

Response No. 31. This issue has been previously addressed in meetings and correspondence with ADWR personnel. Please refer to Response No. 11.

3. CONCLUSIONS

The supplemental hydrogeologic analyses presented herein demonstrate the physical availability of 10,983 AFY of local groundwater resources for 100 years for the existing and planned expansion of SWC's water service area. The planned expansion is to serve potable groundwater resources to two proposed development projects including the Mission Peaks and Sahuarita Mission development projects, and an existing school site. The school site includes the Sahuarita Unified School District Campus (K through 12). Mission Peaks development may also include development on an adjacent State Land parcel. Additional potable groundwater resources will also be served (bulk sales) to 500 existing off site units at the adjacent Magee

Ranch by a stand-pipe system. Additional development is also planned within the existing service area within the Rancho Sahuarita Master Planned Community.

To demonstrate the physical availability of an Assured Water Supply within the Tucson AMA utilizing groundwater resources, it is required that current, committed and projected groundwater withdrawals over 100 years will not result in depth to water that exceeds 1,000 feet from ground surface or depth to bedrock, whichever is less. Furthermore, groundwater must also be of acceptable quality for potable use. Lastly, the proposed water uses must be consistent with the Rules and Regulations of ADWR pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

To assess the hydrologic impacts of future groundwater development by SWC, a three-dimensional, numerical groundwater flow model ("SWC model") was constructed for the southern portion of the Tucson AMA. In order to ensure consistency with current modeling efforts by ADWR, the primary source of information and guidance in the development of the model was ADWR's Modeling Report No. 13 by Dale Mason and Liciniu Bota, *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Simulation and Application*, 2006 (ADWR, 2006) as well as the digital model files for the Tucson AMA model ("TAMA model"). The groundwater model was modified to incorporate new hydrogeologic data gathered from exploratory boring analyses and aquifer testing programs performed by Brown and Caldwell for the SWC in 2006 and 2007, resulting in the Revised SWC model.

The hydrologic analyses presented include a number of conservative elements in demonstrating the physical availability of sufficient groundwater resources, as follows:

- New wastewater treatment plant will be constructed for the new developments. No effluent reuse or artificial recharge of effluent generated by the new developments was included in the hydrologic simulations. Potentially up to 60 percent of equivalent volume of pumpage may be available for future reuse or recharge.
- Mine and agricultural water usage in the hydrologic study area will likely not be at current levels for 100 years. Hydrologic simulations assume current levels of pumpage will remain constant. Mine life will likely be exhausted, and agriculture usage will likely be retired and transferred to municipal uses. A significant net reduction in overall water usage will likely occur; however these groundwater stresses were maintained in the SWC AWS simulation.
- Artificial recharge of Central Arizona Project (CAP) water at the Pima Mine Road Recharge Project will likely continue into the distant future and potentially augmented in the future. Currently annual recharge totals about 20,000 AFY. Hydrologic simulations only applied 5 percent of the total as required by ADWR. North Borrow pit may also be in operation within the simulated period.
- The aquifer in Layer 3 of the SWC AWS model to the west of the SWC service area was converted to no flow cells for the full predictive simulation time period. This effectively removed a significant portion of the local aquifer system that would be available as groundwater storage to satisfy local groundwater demands during the early portion of the predictive simulation.
- Constant head values assigned to the northern model boundary were based upon declining water levels simulated in the ADWR TAMA Base Case Future model, which also included full SWC future pumping demands. This is in contrast with the ADWR TAMA predictive model (through 2025), which does not show declining water levels at the location of the SWC model's northern boundary (ADWR, 2006).

The groundwater model, incorporating current, committed and projected groundwater demands within an approximate 500-square mile hydrologic study area was used to simulate water-level conditions in 2107, a 100 year period. Computer simulations were performed with only 5 percent of the approximately 20,000 acre feet of current annual artificial recharge of CAP water at the Pima Mine Road Recharge Project and with no recharge for the North Borrow Pit, both located just north of SWC. The hydrologic simulations analyses

demonstrated that maximum depth to water in the vicinity of SWC's water supply wells will range from 756 to 902 feet bls in 100 years. These projected depths meet the requirement for AWS analyses for the Tucson AMA, which specify that depth to water in 100 years does not exceed 1,000 feet from the ground surface or depth to bedrock, whichever is less.

Groundwater quality analyses performed on groundwater samples collected from active wells and exploratory borings reveal favorable groundwater quality for potable use based on current regulatory limits. The proposed water uses will be consistent with the Rules and Regulations of ADWR, pertaining to demonstration of an AWS within an AMA (A.R.S. 45-576).

4. REFERENCES

ADWR, 2008. *Assured and Adequate Water Supply Database.*

ADWR, 2006. *Regional Groundwater Flow Model of the Tucson Active Management Area, Tucson, Arizona: Arizona: Simulation and Applicative*, Model Report No. 13, 2006.

Brown and Caldwell, 2007a. *Well Nos. 12 and 19 Aquifer Test Analyses and Well Production Evaluations*, July 16, 2007.

Brown and Caldwell, 2007b. *Well Site No. 24 Pilot Hole Analyses Report*, September 6, 2007.

Brown and Caldwell, 2007c. *Well Site Nos. 21, 22, 23, 25 and 26 Exploratory Boring Analyses Report*, September 6, 2007.

Brown and Caldwell, 2008a. *Well Site Nos. 20R and 24B Exploratory Boring Analyses Report*, April 18, 2008.

Brown and Caldwell, 2008b. *Sahuarita Water Company Well No. 23 Completion Report*, June 21, 2008.

Clear Creek Associates, 2006. *Farmers Investment Company, Hydrology Study*, October 27, 2006.

List of Attachments

Figures - 1 through 19

Attachment A - Application and Application Revision Form

Attachment B - Hydrographs

Attachment C – Boundary Fluxes

Attachment D – Calibration Statistics

Attachment Z – Supporting Digital Files

FIGURES

Figure 1 - 2107 Simulated Depth to Water Contours–SWC Revised AWS Model
Figure 2 – 2107 Simulated Water Level Drawdown Contours–SWC Revised AWS Model
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Figure 11 – Evapotranspiration–SWC Revised AWS Model
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Figure 16 – Layer 3 Transmissivity–SWC Revised AWS Model
Figure 17 – Layer 1 Specific Yield–SWC Revised AWS Model
Figure 18 – Layer 2 Specific Yield–SWC Revised AWS Model
Figure 19 – Layer 3 Specific Yield–SWC Revised AWS Model

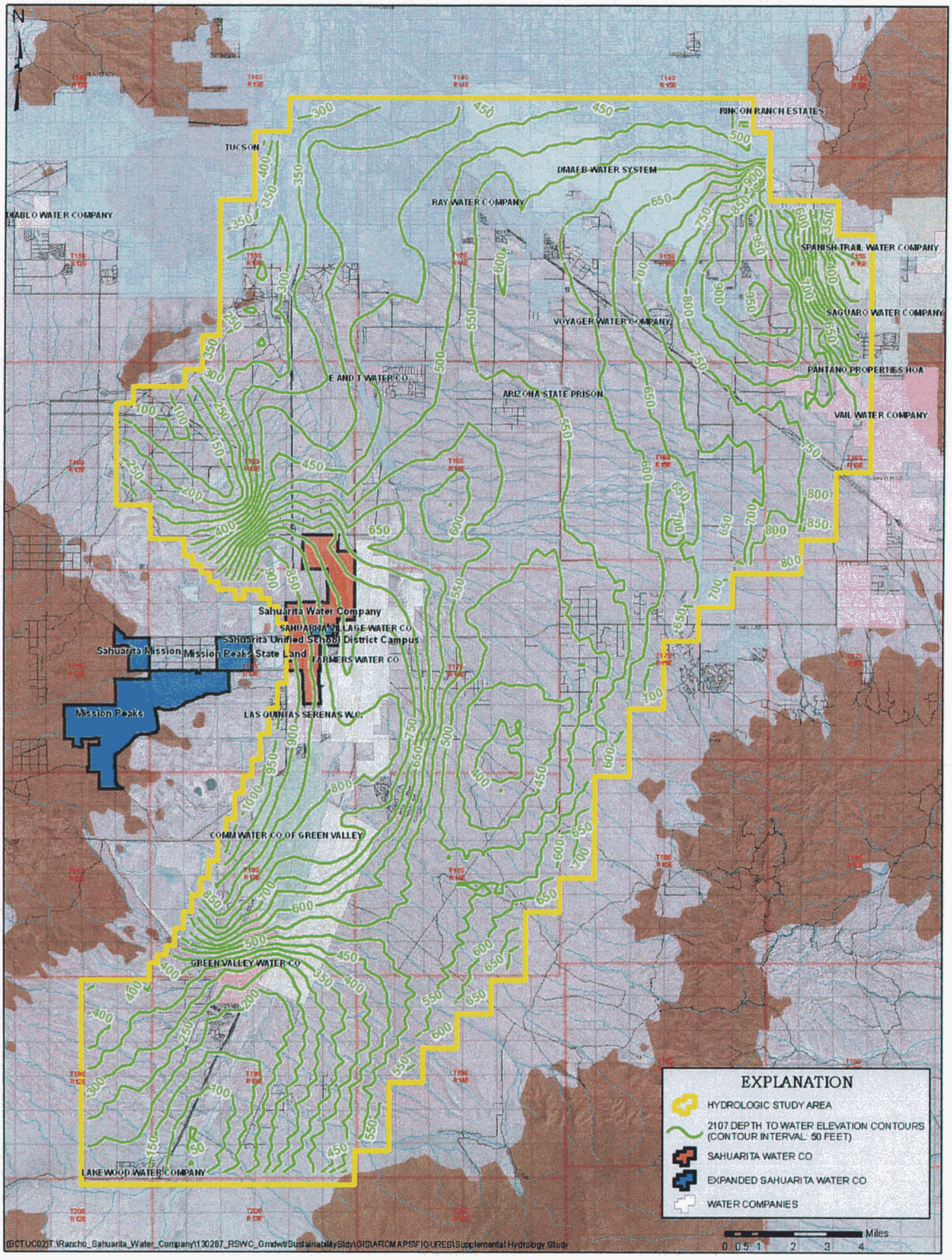


Figure 1 - 2107 Simulated Depth to Water Contours–SWC Revised AWS Model

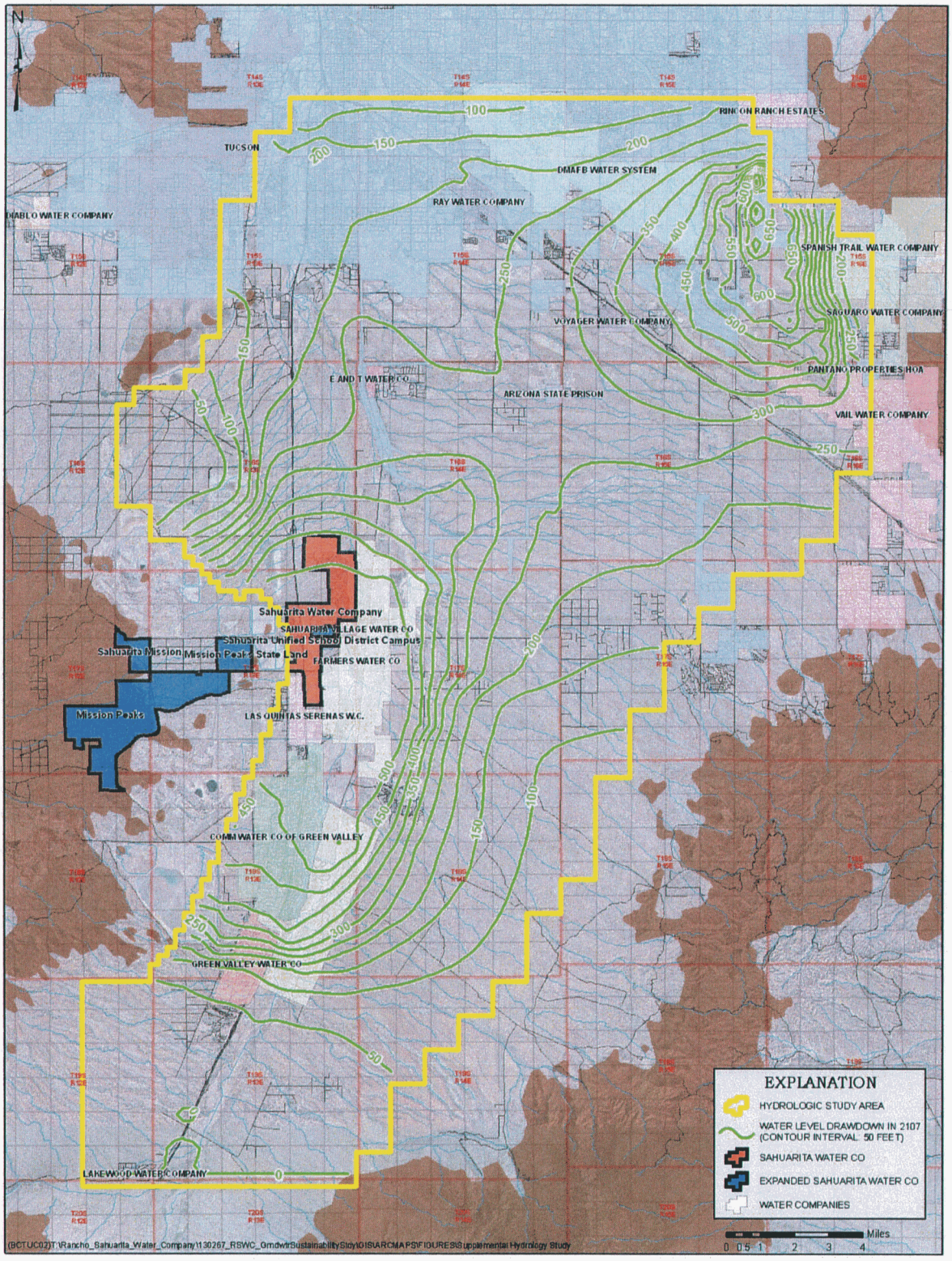


Figure 2 – 2107 Simulated Water Level Drawdown Contours–SWC Revised AWS Model

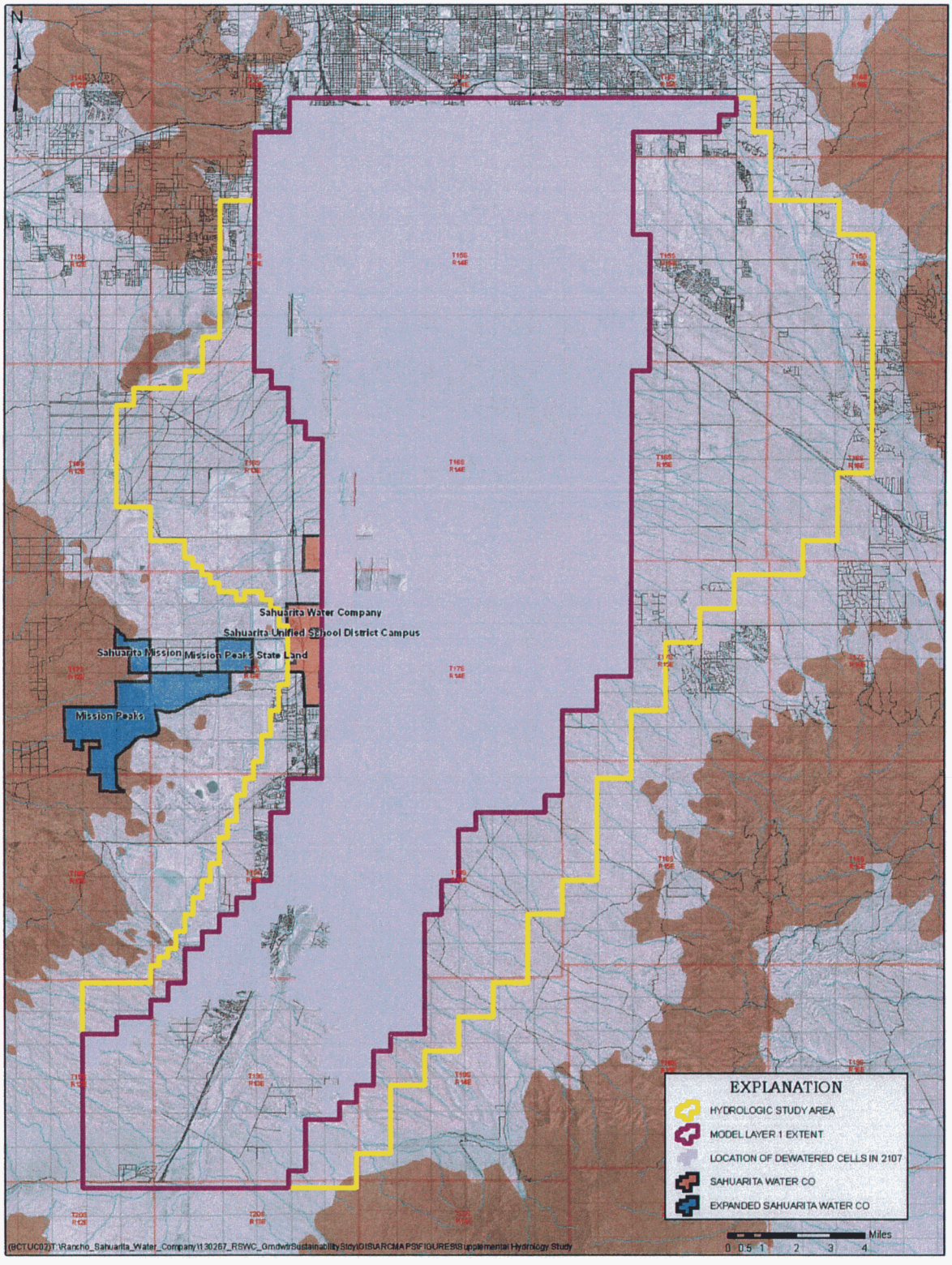


Figure 3 – Layer 1 Simulated Dewatered Model Cells in 2107–SWC Revised AWS Model

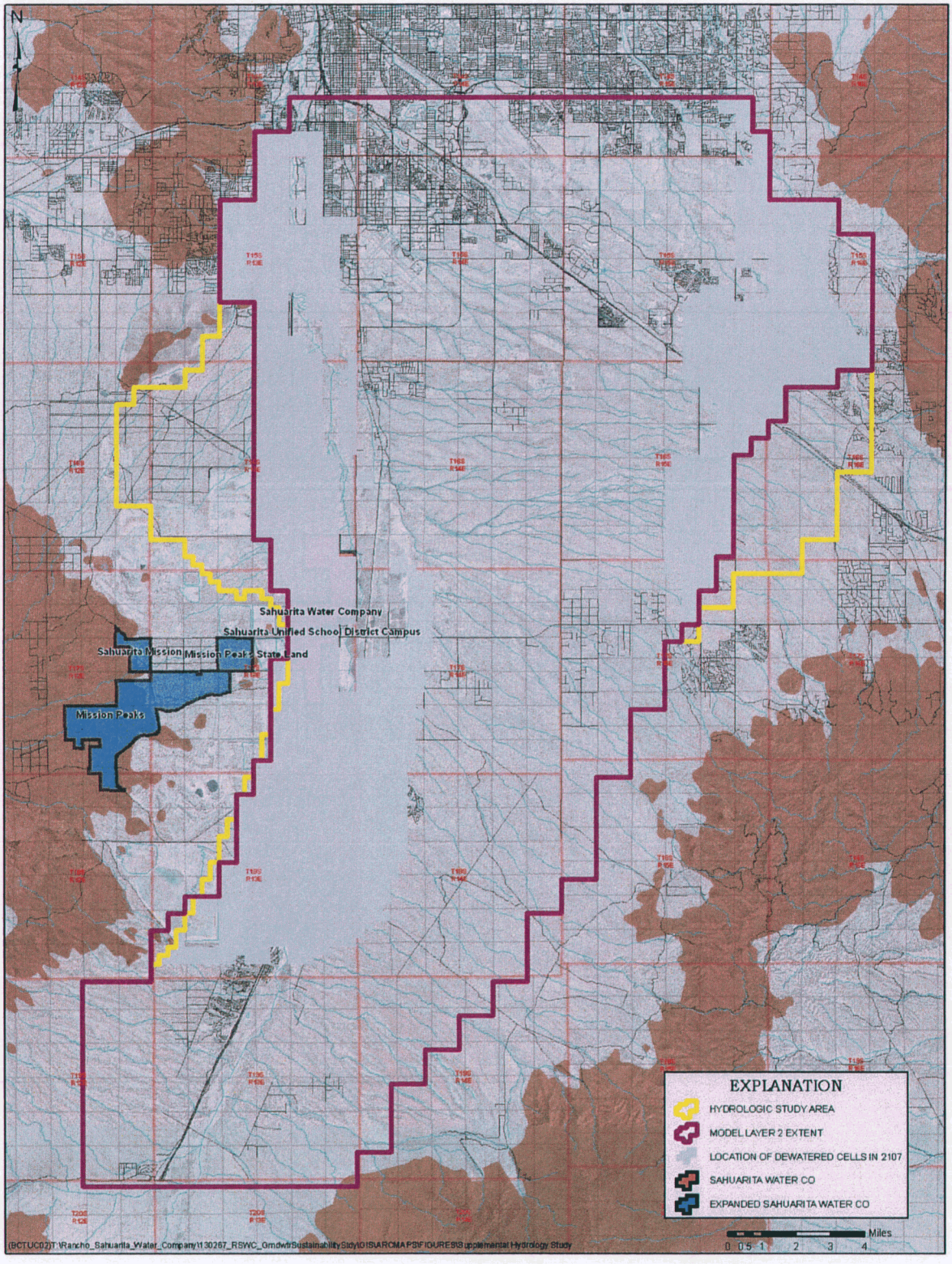


Figure 4 – Layer 2 Simulated Dewatered Model Cells in 2107–SWC Revised AWS Model

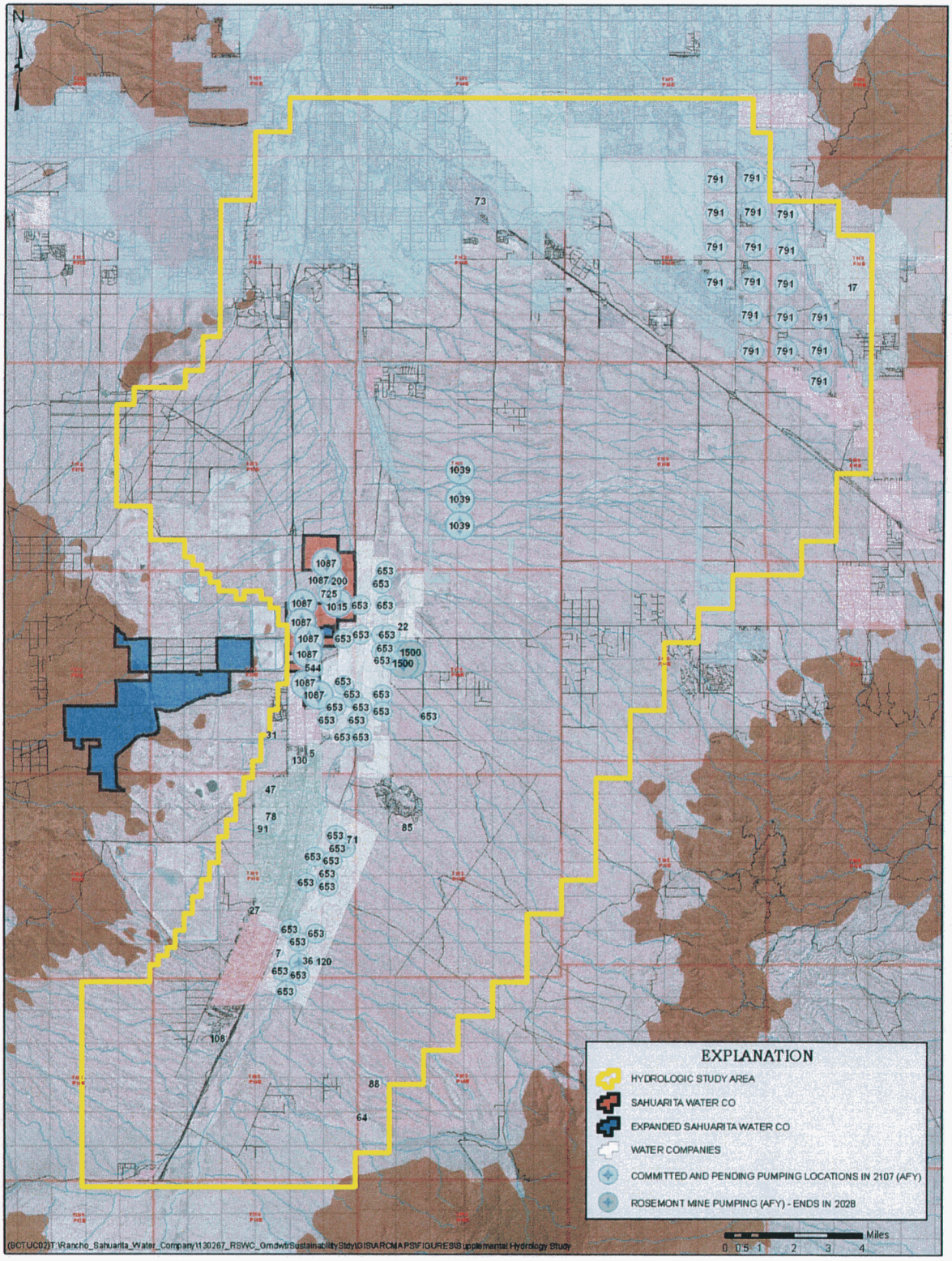


Figure 5 – Committed and Pending Water Demand Pumping Locations–SWC Revised AWS Model

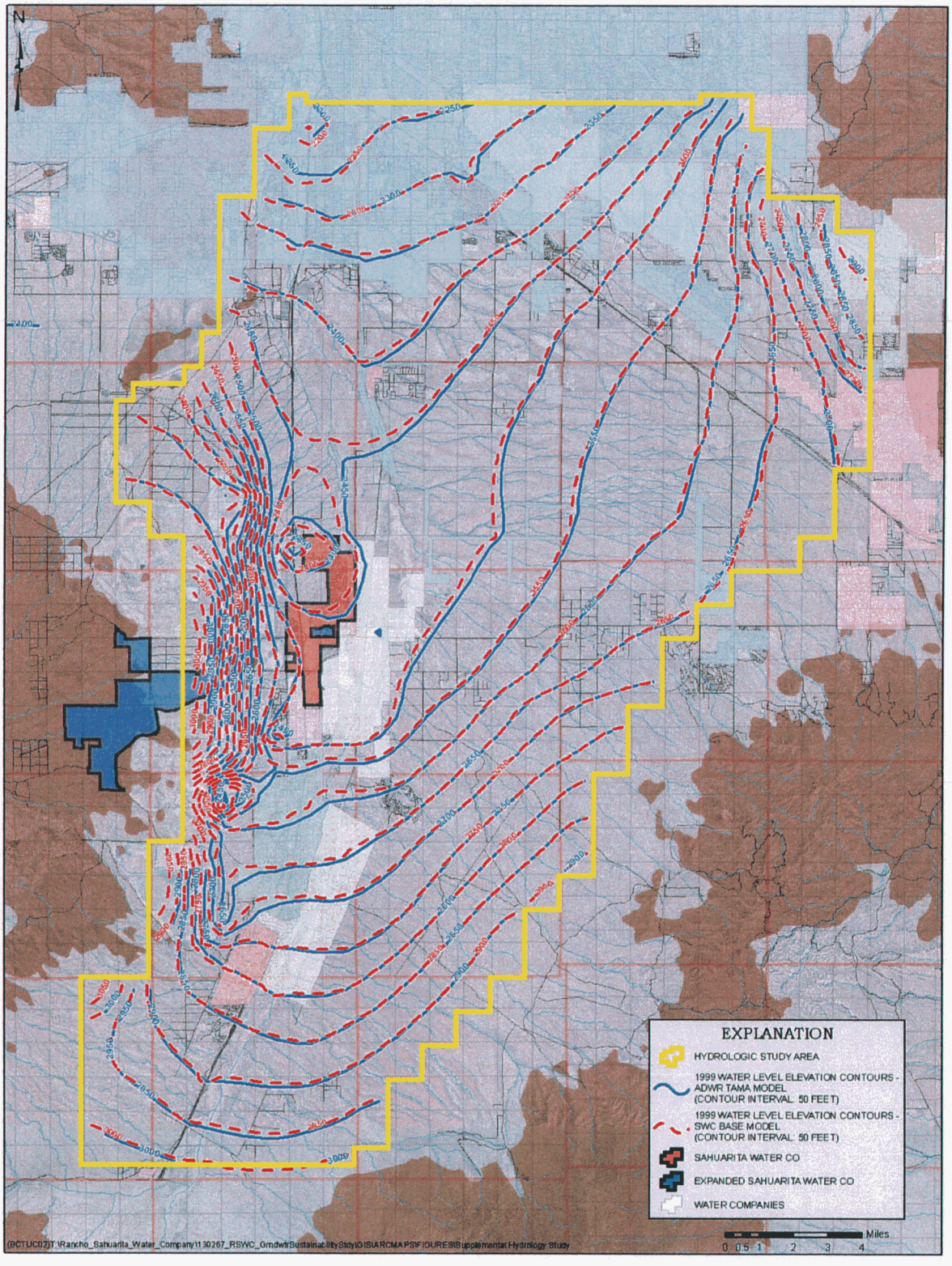


Figure 6 – 1999 Simulated Comparison of Water Level Altitudes for TAMA and SWC Base Groundwater Models

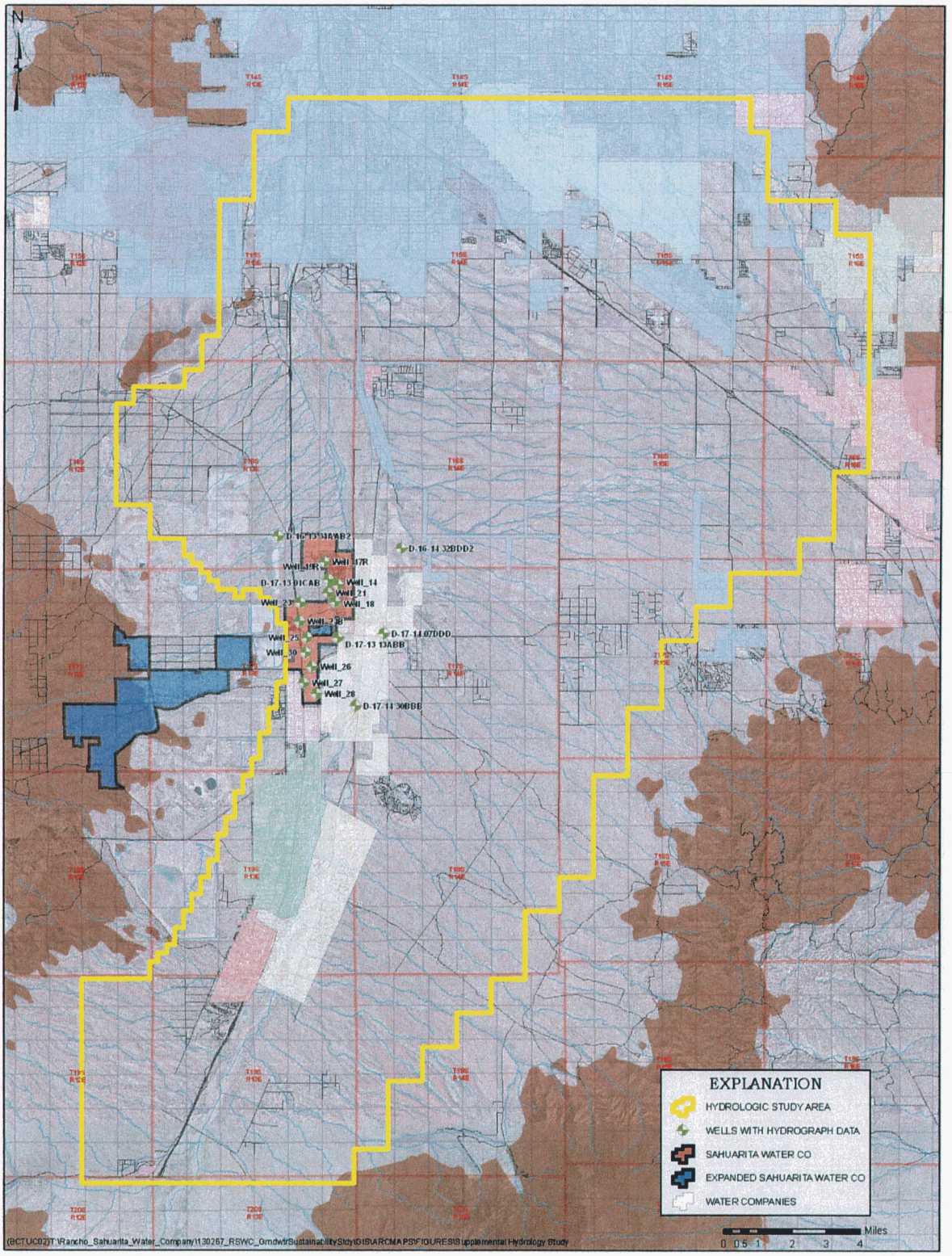


Figure 7 – Observed and Simulated Hydrograph Well Locations–SWC Revised AWS Model

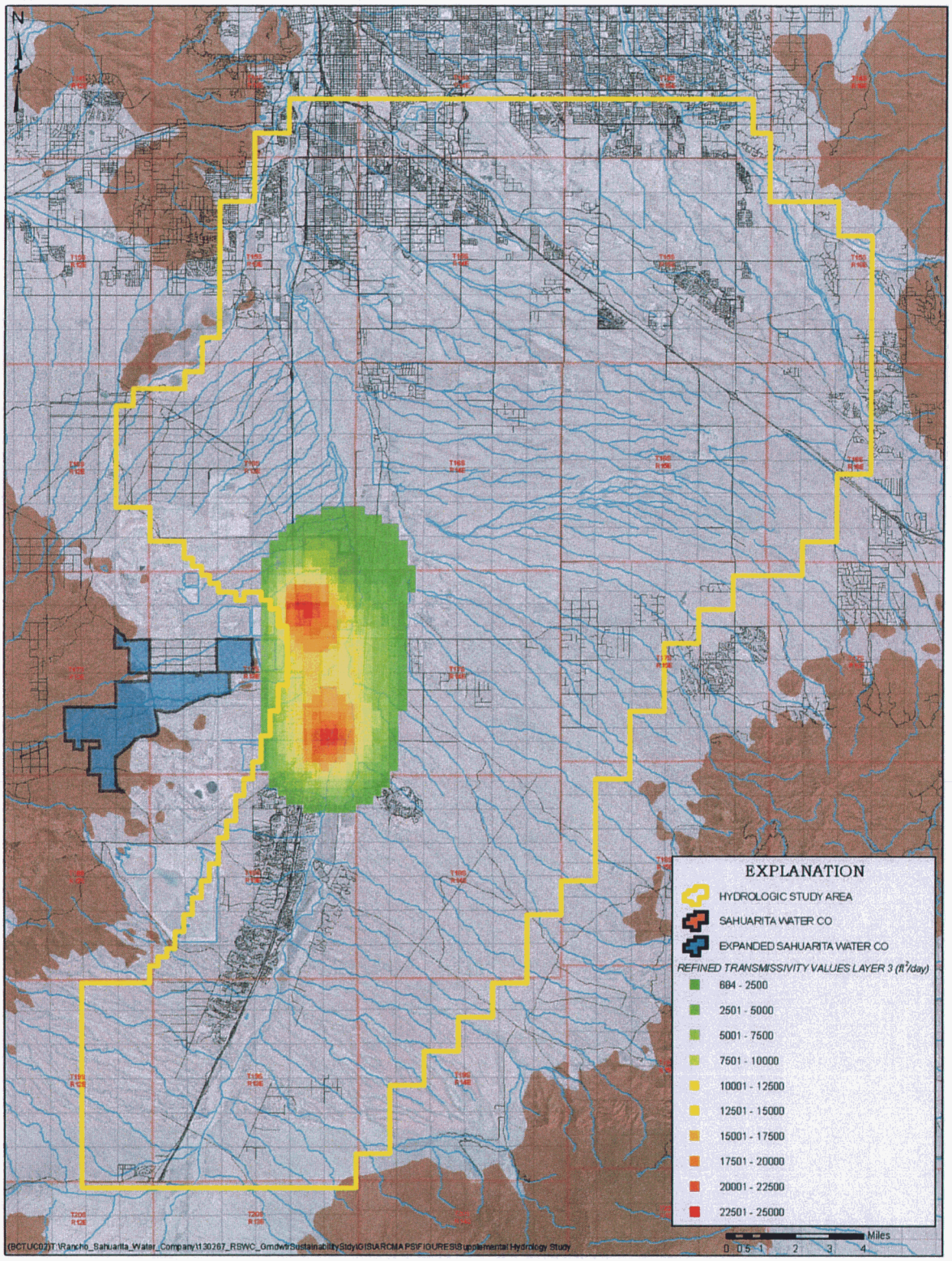


Figure 8 – Layer 3 Refined Transmissivity Values–SWC Revised AWS Model

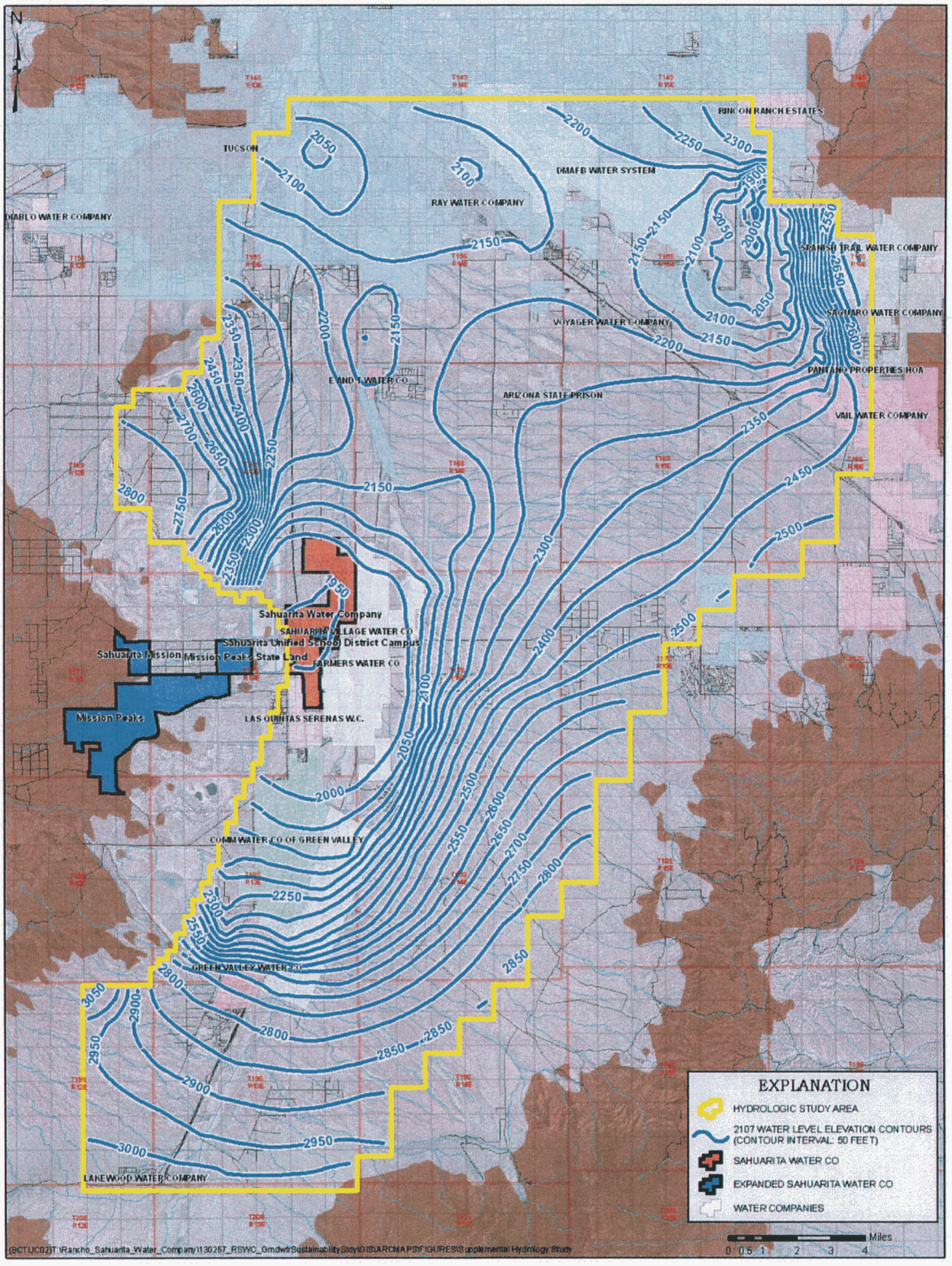


Figure 9 – 2107 Simulated Water Level Altitudes–SWC Revised AWS Model

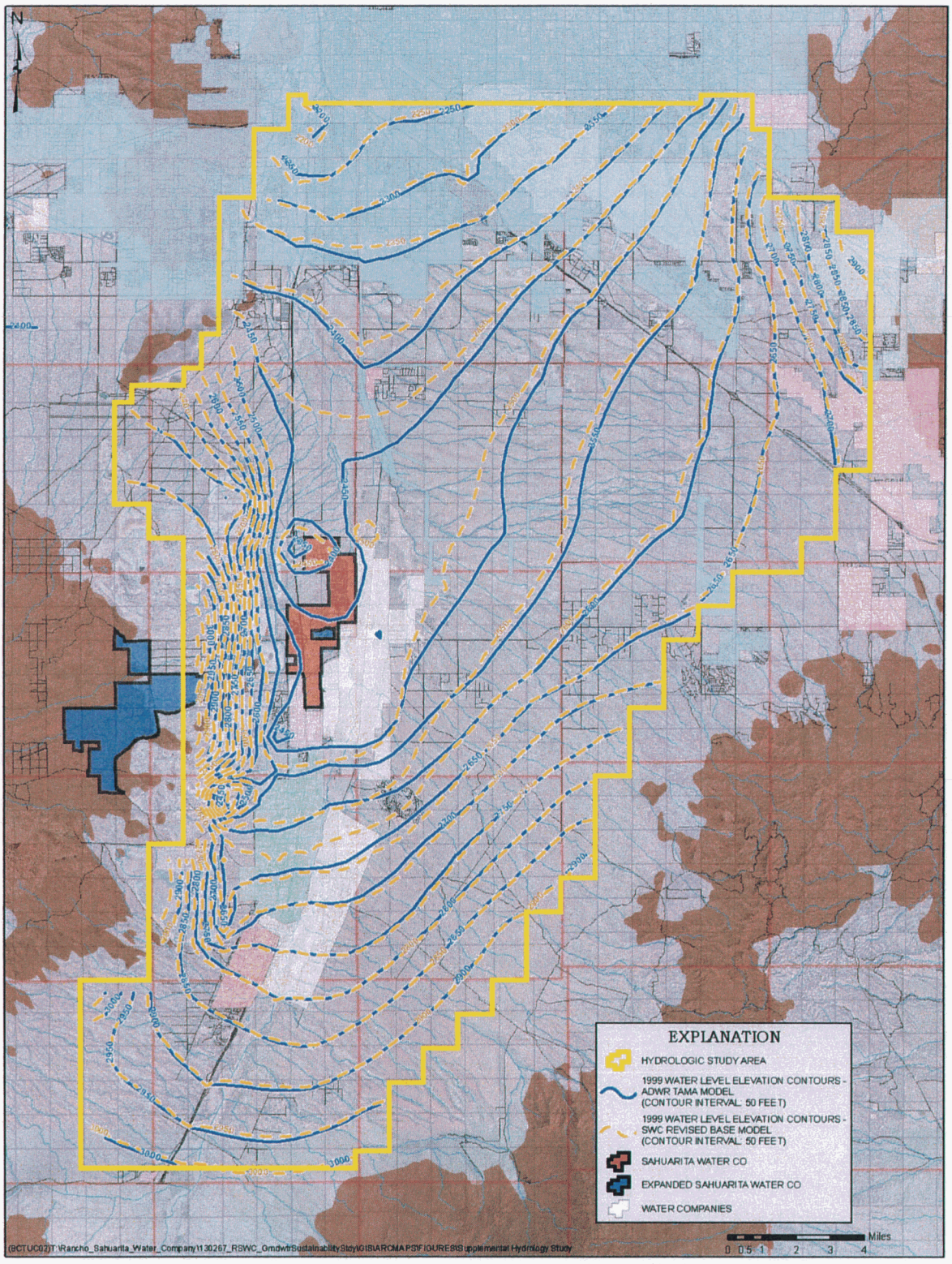


Figure 10 – 1999 Comparison of Water Level Altitudes for TAMA and SWC Revised Base Groundwater Models

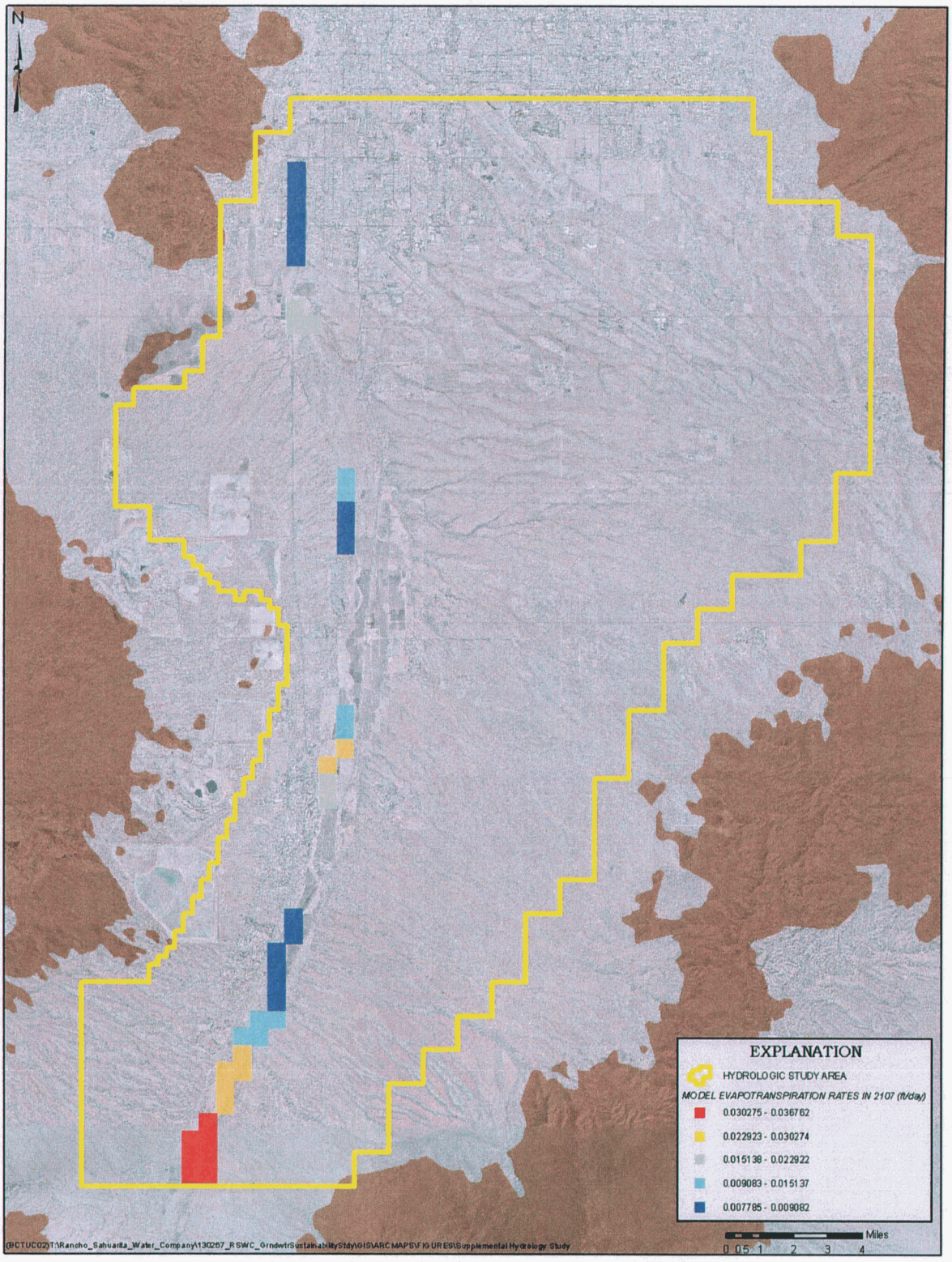


Figure 11 – Evapotranspiration–SWC Revised AWS Model

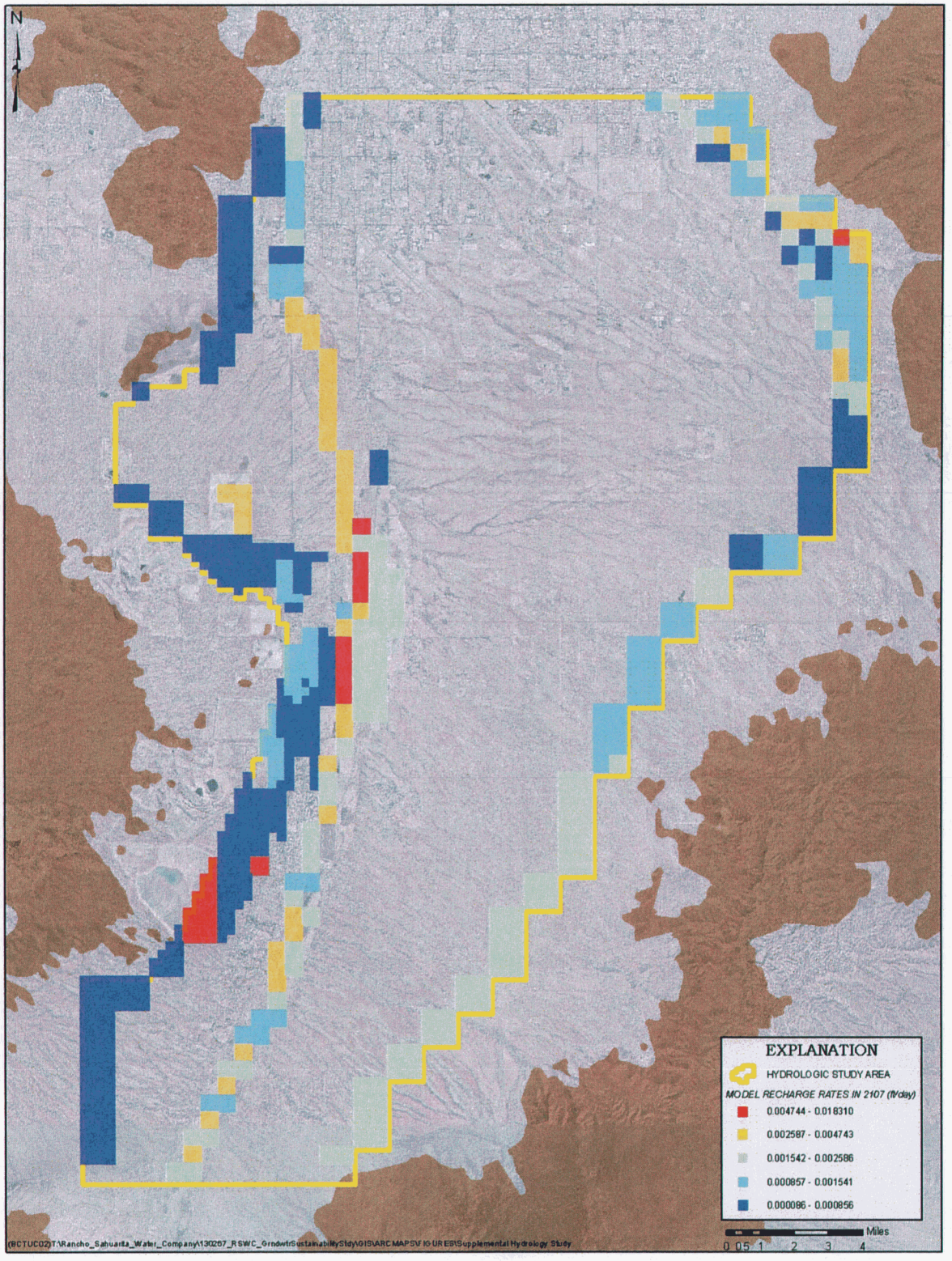


Figure 12 – Recharge–SWC Revised AWS Model

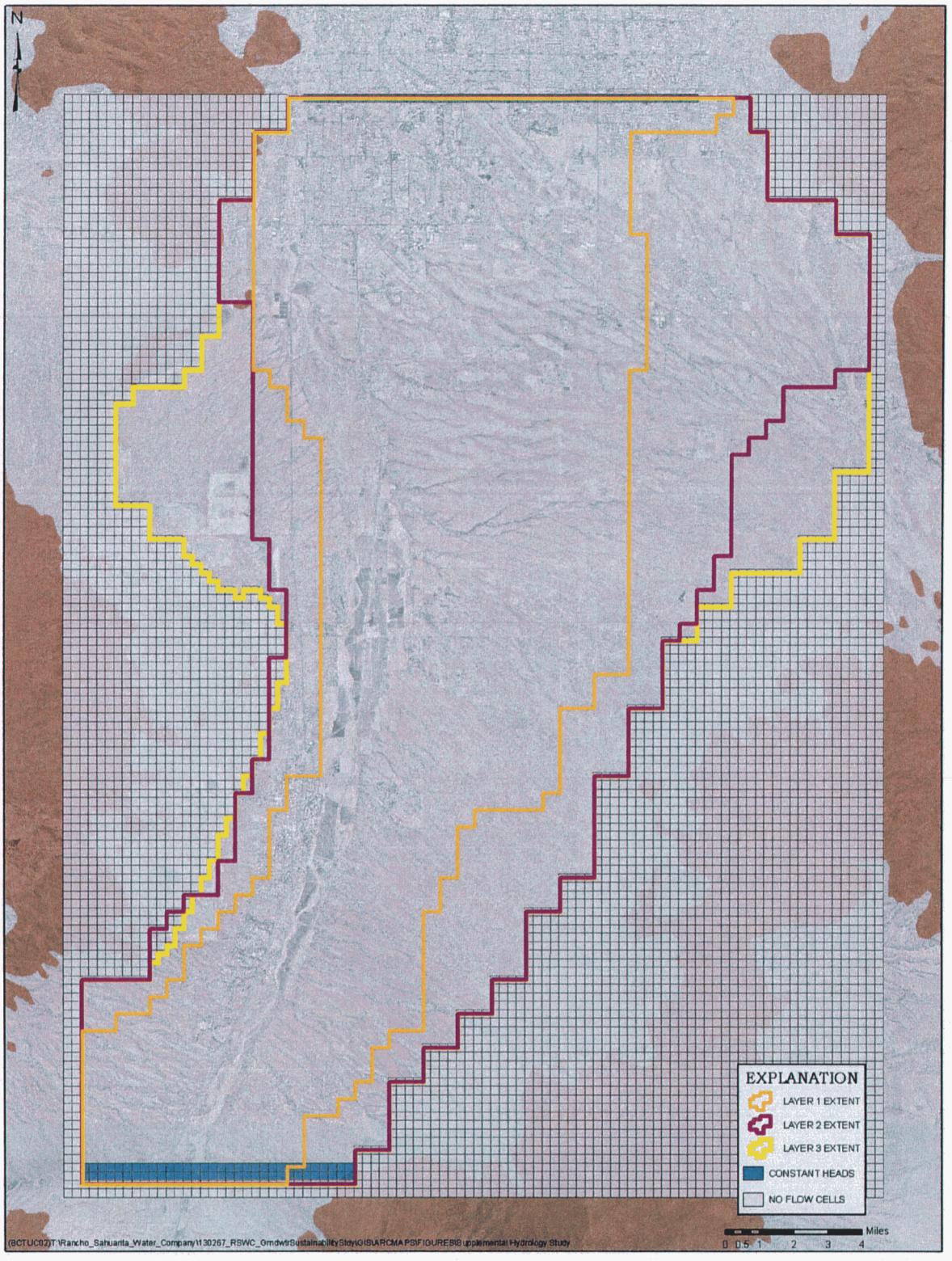


Figure 13 – Boundary Conditions–SWC Revised AWS Model

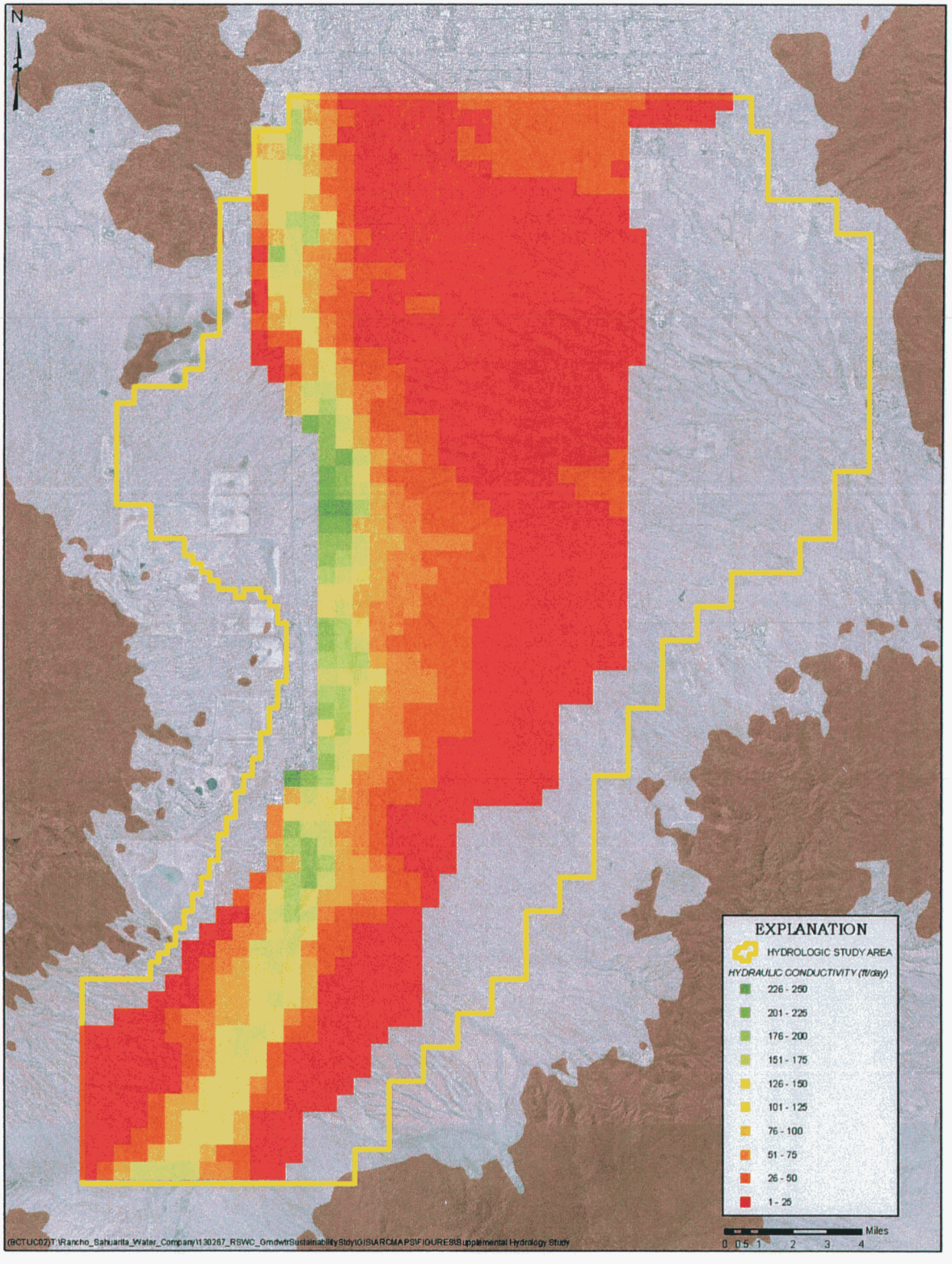


Figure 14 – Layer 1 Hydraulic Conductivity–SWC Revised AWS Model

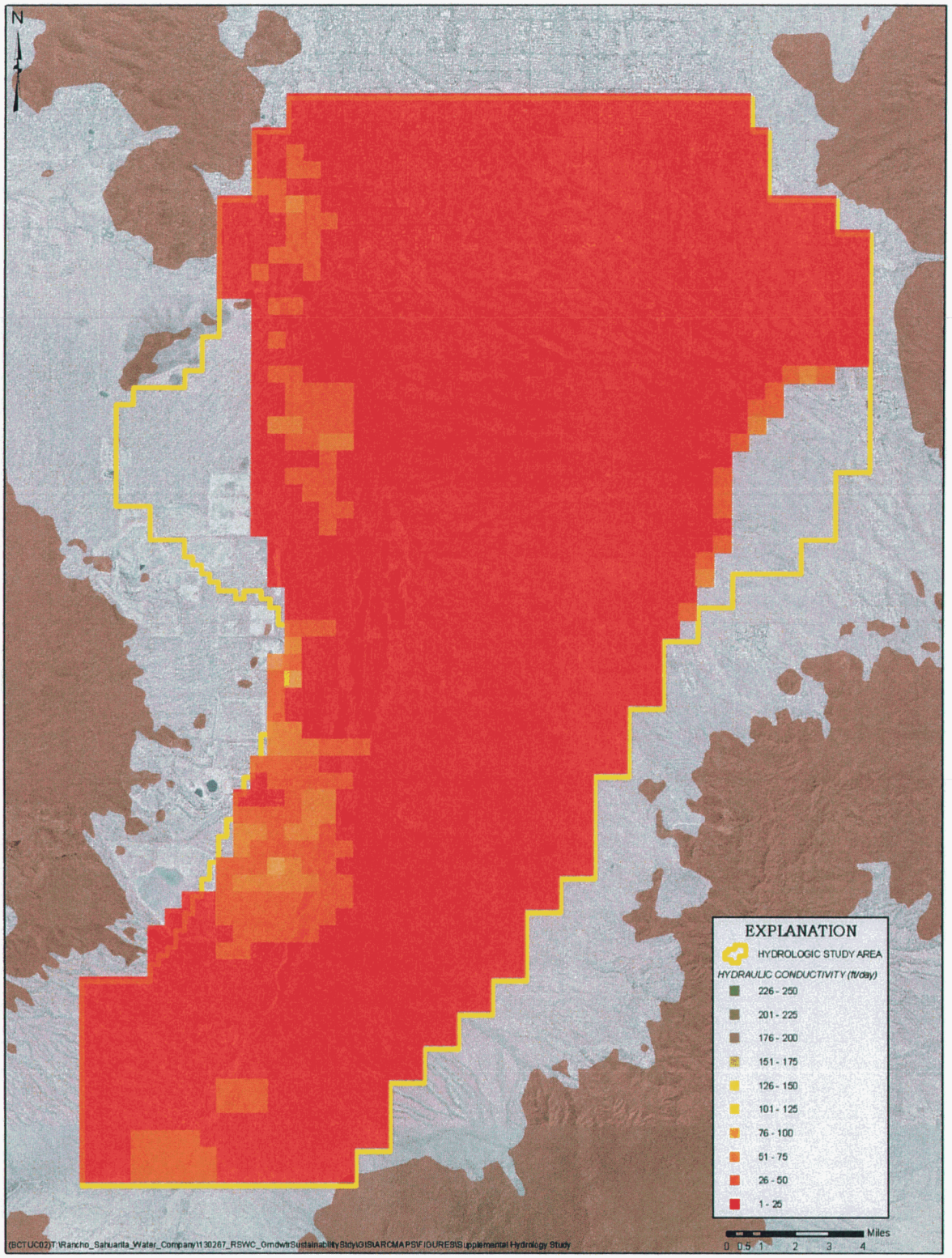


Figure 15 – Layer 2 Hydraulic Conductivity–SWC Revised AWS Model

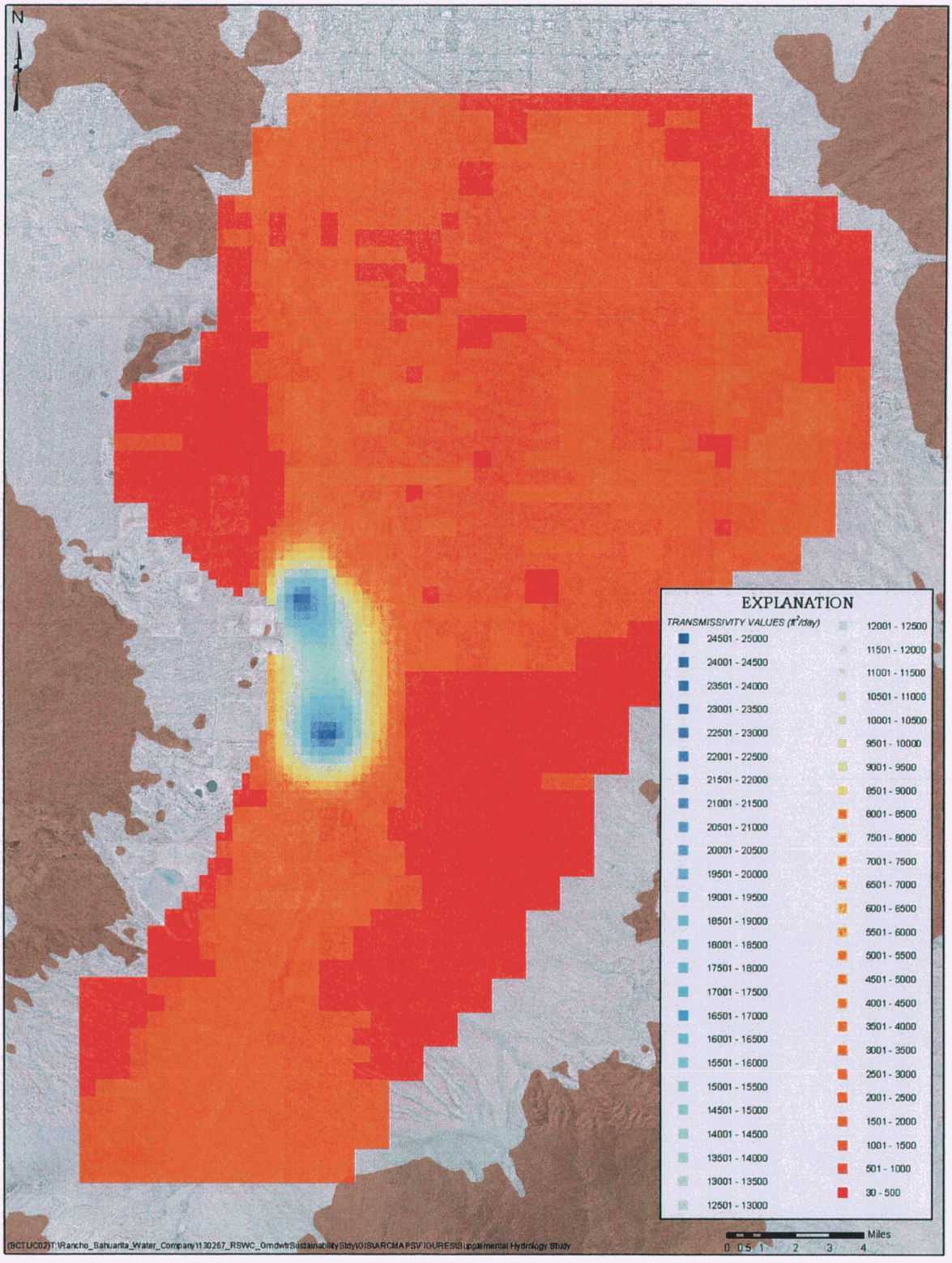


Figure 16 – Layer 3 Transmissivity–SWC Revised AWS Model

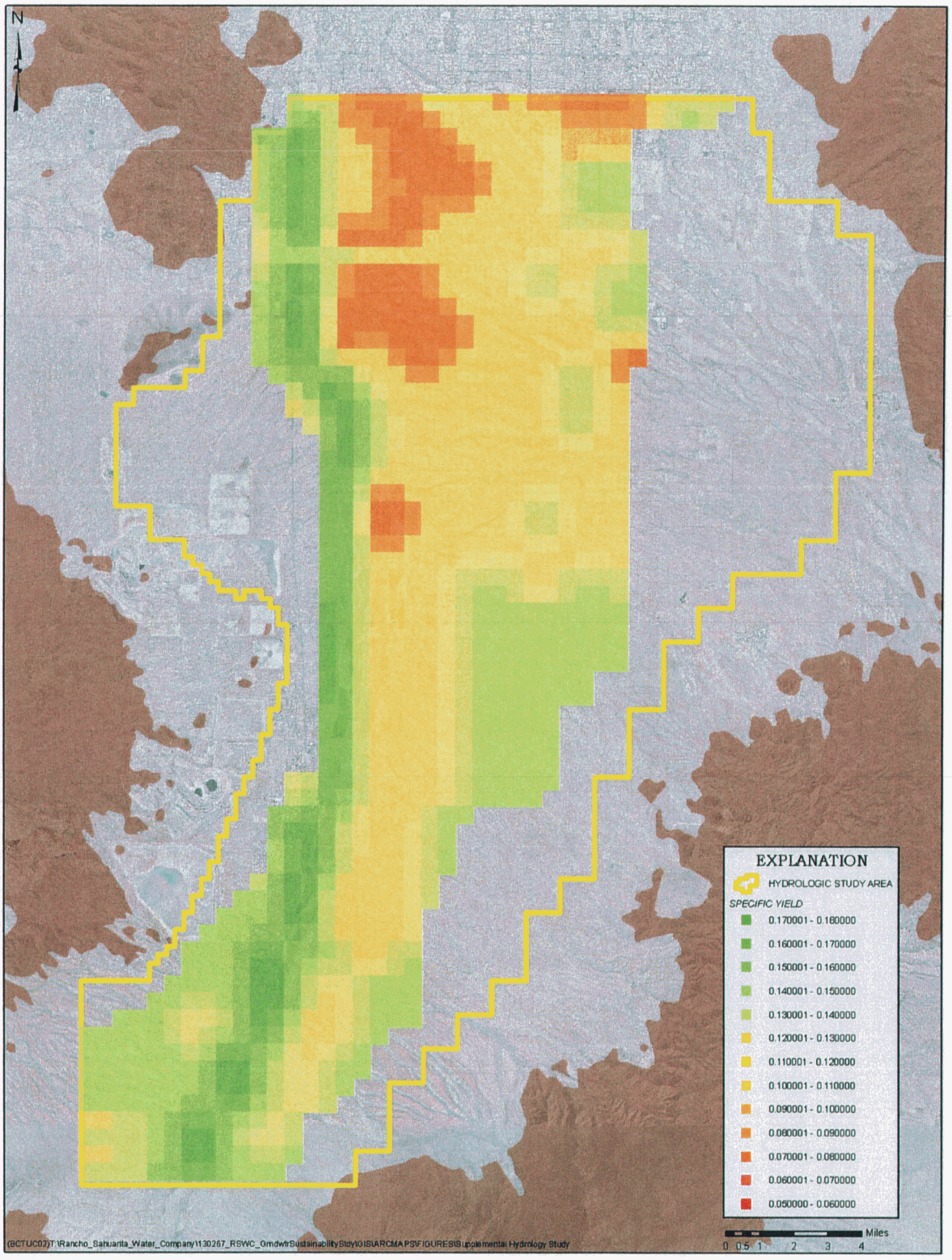


Figure 17 – Layer 1 Specific Yield–SWC Revised AWS Model

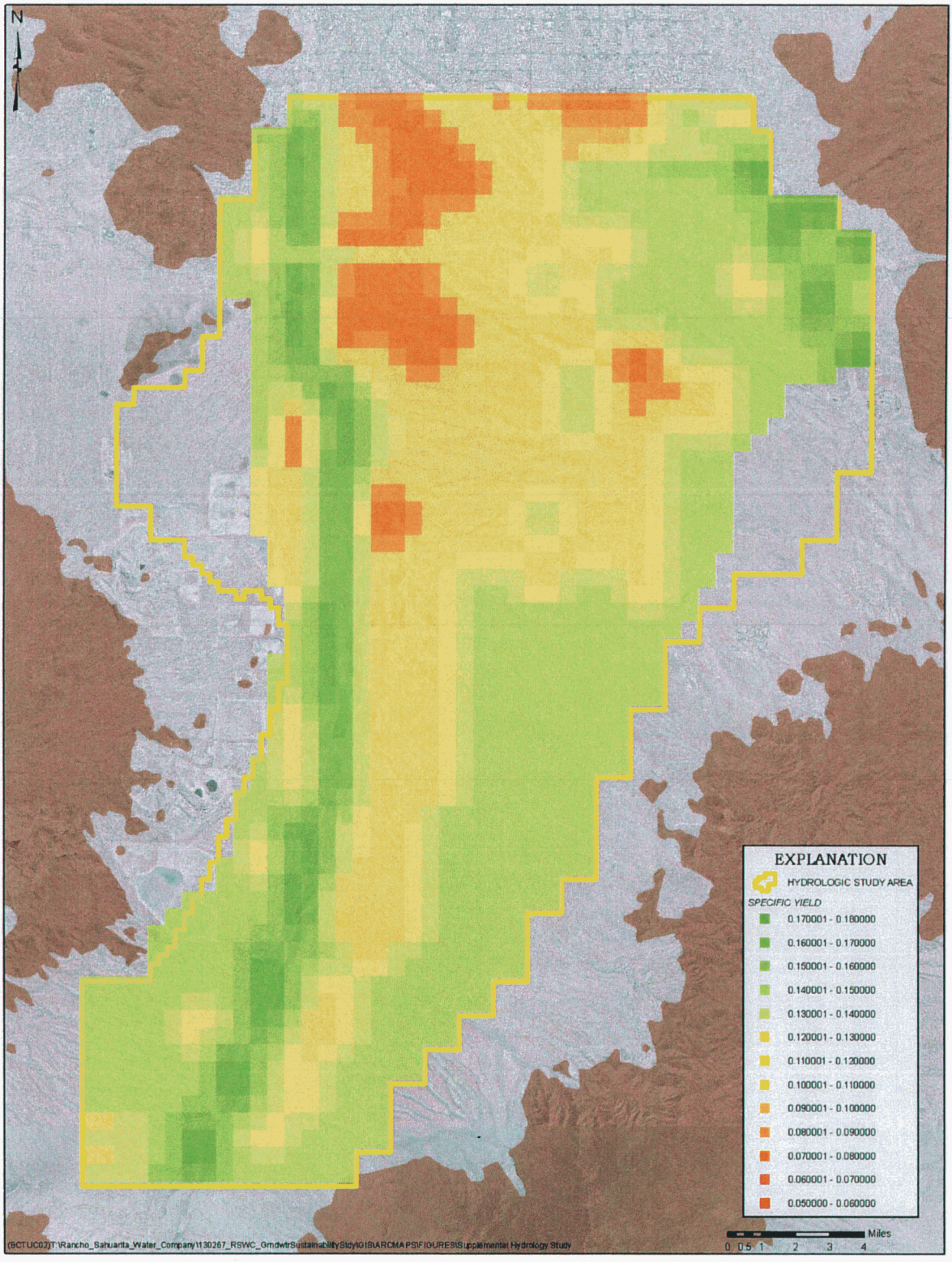


Figure 18 – Layer 2 Specific Yield–SWC Revised AWS Model

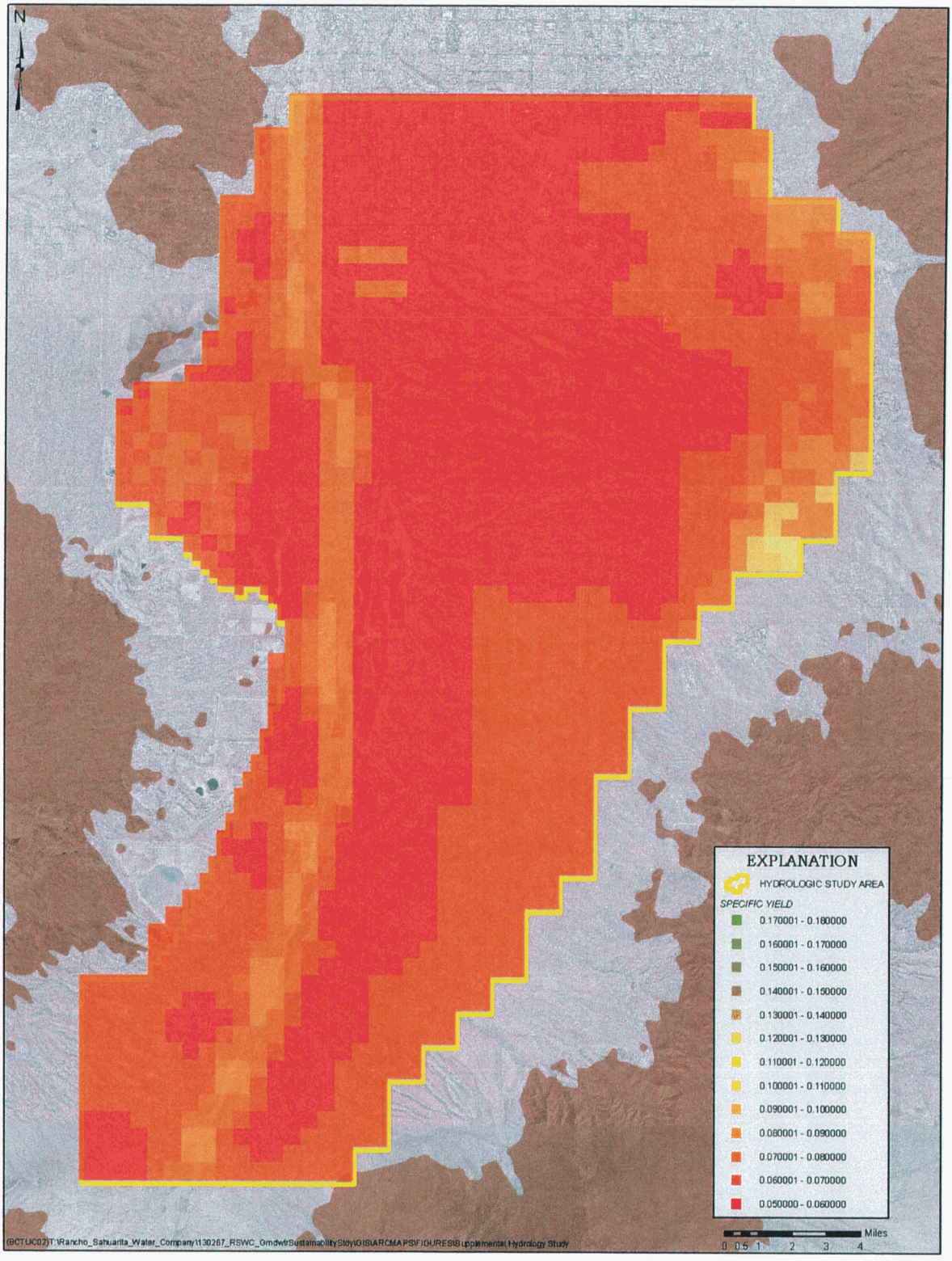


Figure 19 – Layer 3 Specific Yield–SWC Revised AWS Model

ATTACHMENT A

Application and Application Revision Form

ARIZONA DEPARTMENT OF WATER RESOURCES OFFICE OF ASSURED AND ADEQUATE WATER SUPPLY 3550 NORTH CENTRAL AVENUE, 2nd FLOOR PHOENIX, ARIZONA 85012 (602) 771-8599 Fax: (602) 771-8689	DATE RECEIVED:

APPLICATION REVISIONS FORM

This form is to be used when only a portion of a pending application is revised. This form does not authorize the Office of Assured and Adequate Water Supply to make changes to the application materials previously submitted. Please attach the documents that have changed and check the box(es) below as appropriate. For assistance, contact the Office of Assured and Adequate Water Supply at (602) 771-8599.

Application Number: 86-401203.0001

Application Name*: Sahuarita Water Company LLC

* Subdivision, master plan development, or water provider, depending on application type.

The following item(s) have been changed/revised since the application was filed:	
☐ Owner/Optionee (attach proof of ownership)	☒ Pages of the application (attach revised pages): Page 1
☐ Notice of Intent to Serve (attach signed form)	☐ Plat (attach revised plat)
☒ Other, please specify (attach necessary documents): Additional Hydrology Study Data	

I DO HEREBY certify that **the information attached and the information in the application, as amended, is true and correct to the best of my knowledge and belief. NOTE:** You may use the Department's Letter of Authorization for Signature form to give another person the authority to sign this application on your behalf, or you may submit a letter signed by you and dated within 90 days of the date this application is submitted, authorizing your representative to submit applications for permits regarding the land to be included in this Certificate.

Robert Sharpe, President Sahuarita Water Company, LLC

Please print the name and title of the owner or the owner's authorized agent (if signator is someone other than the owner)

Signature of Owner or Owner's Authorized Agent — Date: 4-11-08

Please print the name and title of the buyer or the buyer's authorized agent (if signator is someone other than the buyer)

Signature of Buyer or Buyer's Authorized Agent — Date

ARIZONA DEPARTMENT OF WATER RESOURCES OFFICE OF ASSURED AND ADEQUATE WATER SUPPLY 3550 NORTH CENTRAL AVENUE, 2nd FLOOR PHOENIX, ARIZONA 85012 (602) 771-8585 Fax: (602) 771-8689	DATE RECEIVED:
APPLICATION NO:	

DESIGNATION OR MODIFICATION OF DESIGNATION OF ASSURED WATER SUPPLY APPLICATION

PART A - GENERAL INFORMATION

1. This is an application for: ☐ New Designation ☒ Modification of an existing designation

2. Name of municipal provider: Sahuarita Water Company, LLC AMA: Tucson

   ADWR No. 56-000373.0000

3. Name and address of person representing the municipal provider:
   Name: Mark Seamans
   Title: General Manager E-Mail: mseamans@ranchosahuarita.com
   Address: PO Box 1520, Sahuarita, AZ 85629 Phone: 520-399-1105 Fax: 520-399-1095

4. Contact person for questions regarding this application:
   Name: Kristen Whatley
   Company: WestLand Resources, Inc. E-Mail: kwhatley@westlandresources.com
   Address: 4100 E. Paradise Falls Drive, Tucson, AZ 85712 Phone: 520-206-9585 Fax: 520-206-9518

5. If not already on file with the Department, provide a map of the service area that includes the current and proposed distribution system and any treatment or storage facilities and reference as an attachment.

Up to date service area map on file with the Department	☐	
Hard copy of service area map attached	☒	Attachment: Attachment A
Electronic copy of service area map attached	☐	Attachment:

I DO HEREBY certify that the information contained in **this application and all information accompanying it is true** and **correct to the best of my knowledge and belief. NOTE:** If the applicant is a city or town, include a resolution of the governing body of the city or town authorizing the person to sign the application.

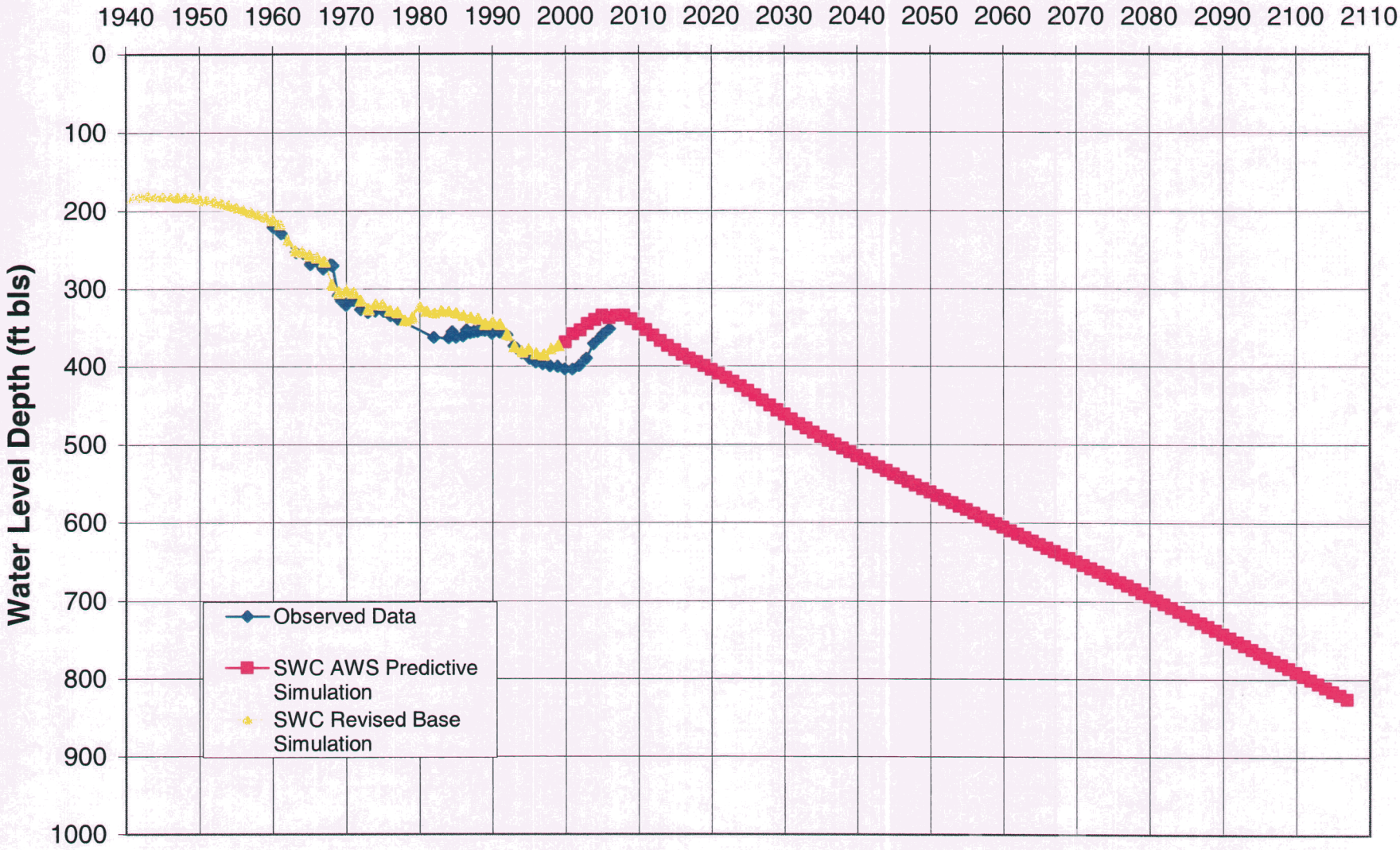
Robert Sharpe, President, Sahuarita Water Company, LLC
Printed Name Title

Signature 4-11-08
Date

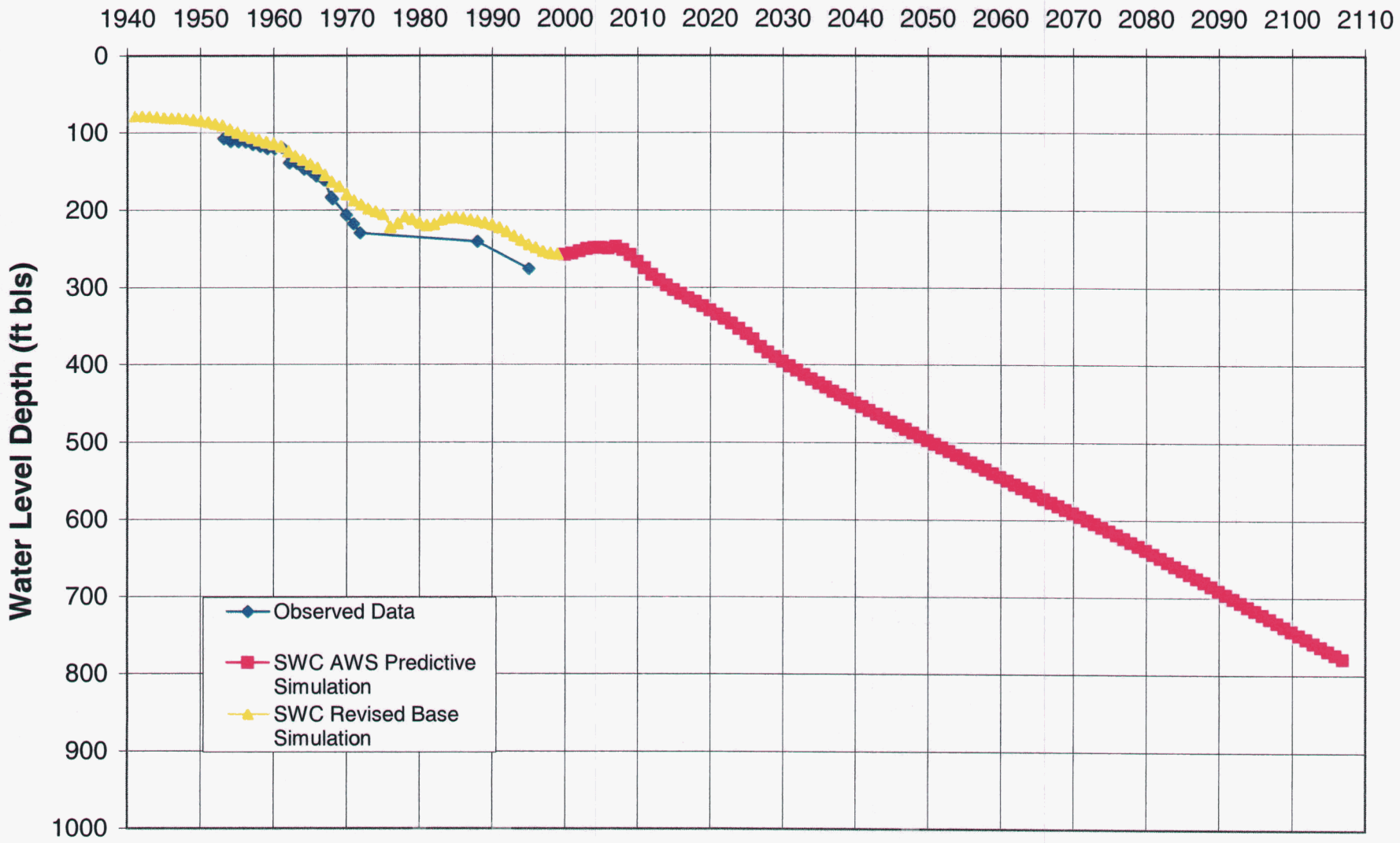
ATTACHMENT B

Hydrographs

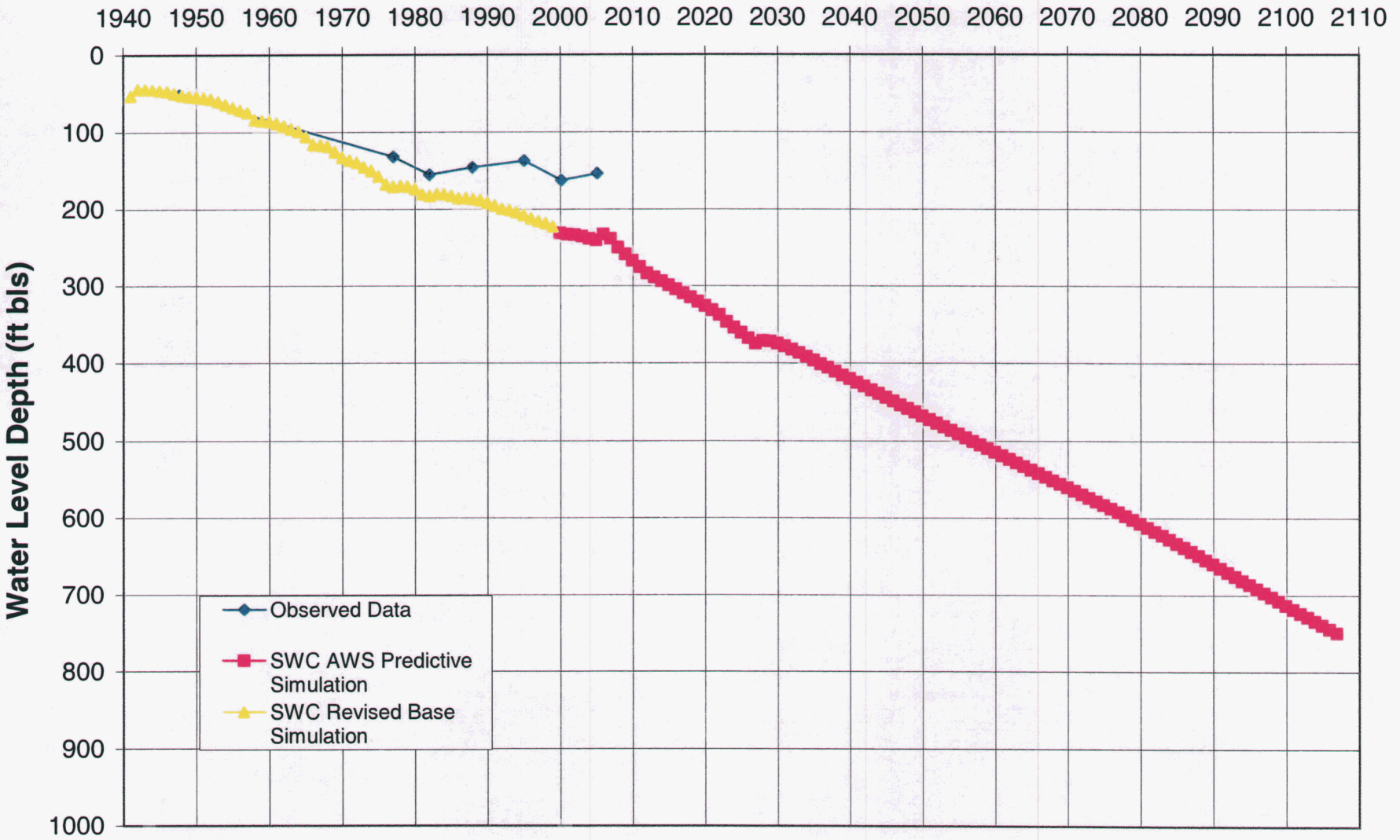
Well D-16-13 34AAB2, Reg No. 55-607785

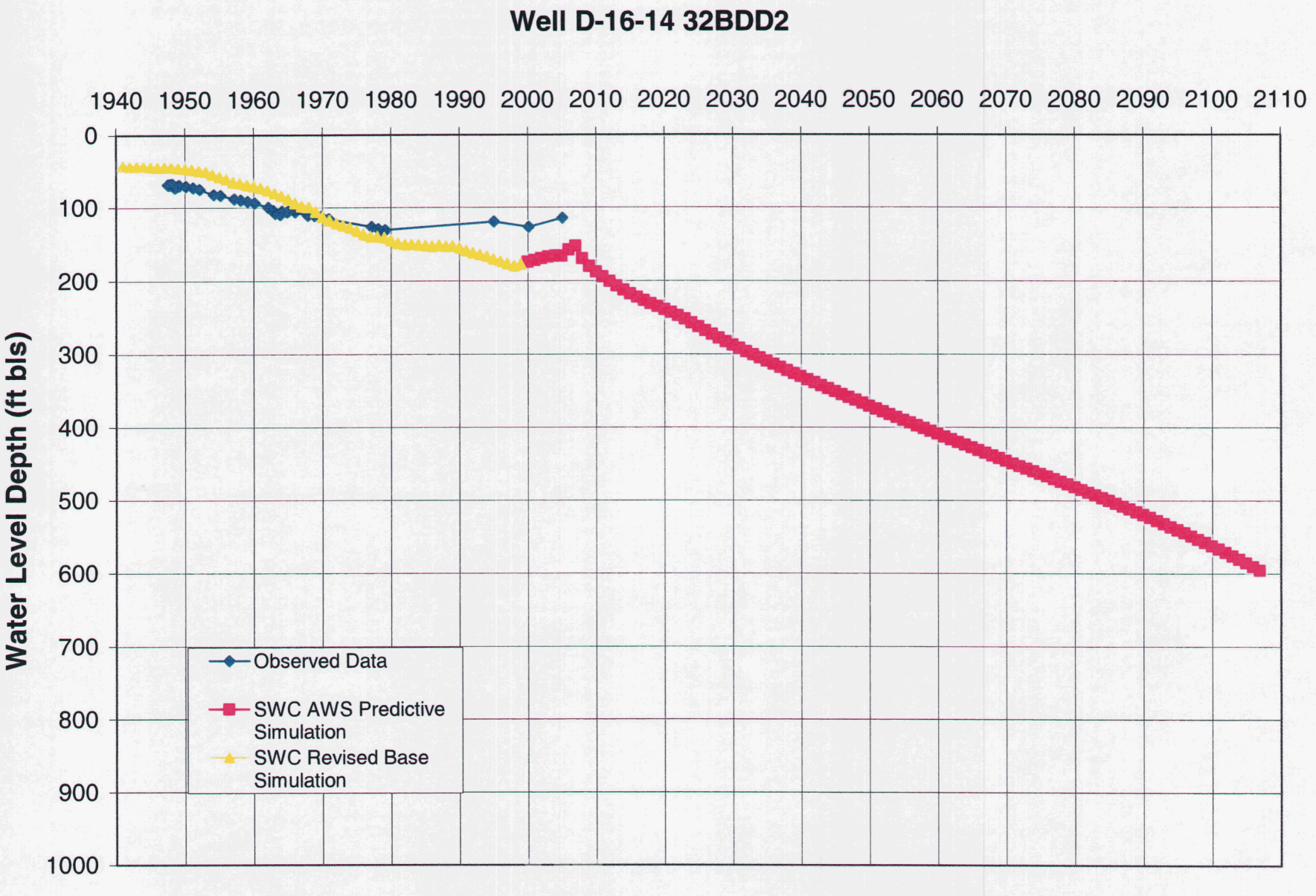


Well D-17-13 01CAB, Reg No. 55-617256

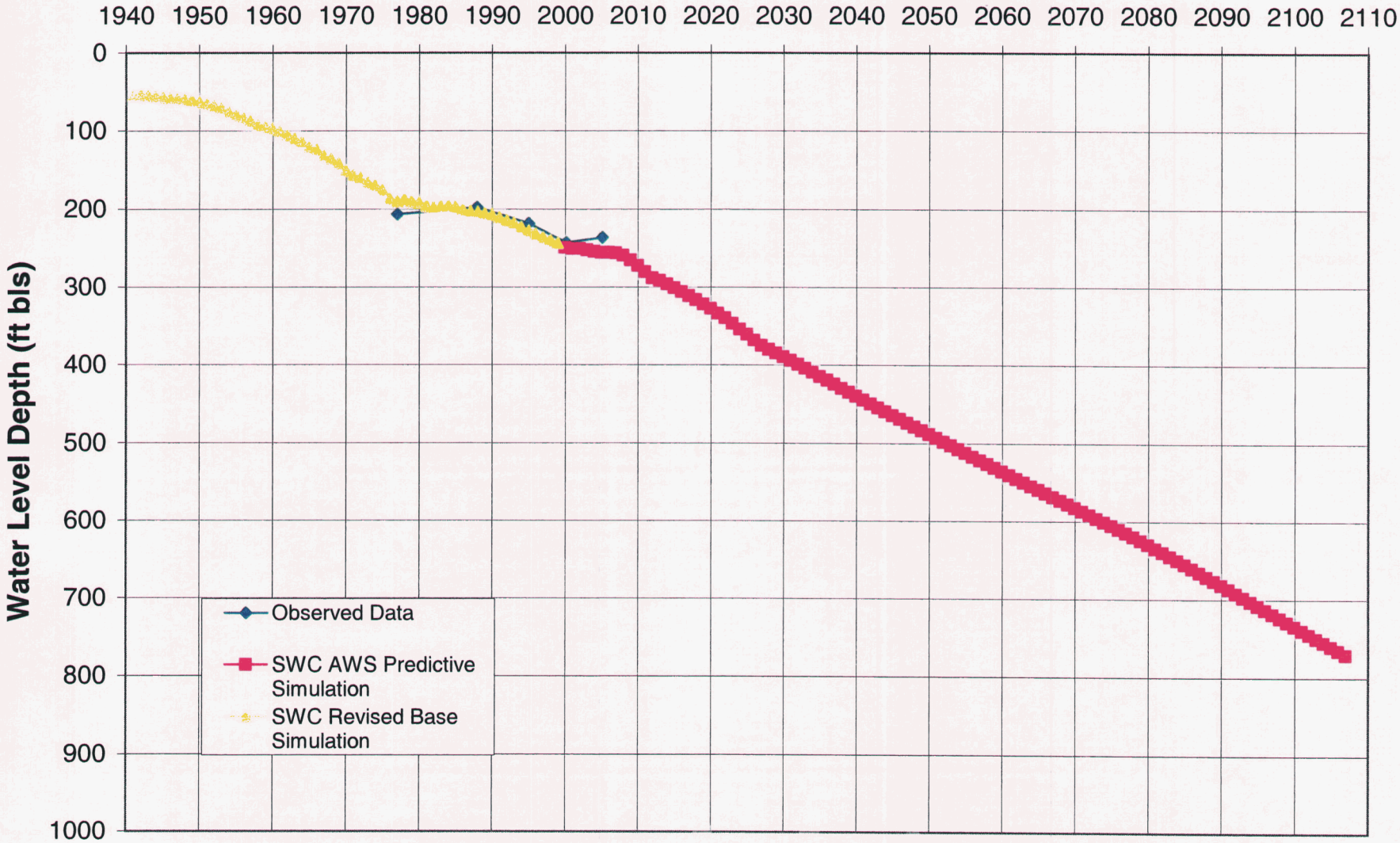


Well D-17-14 07DDD, Reg No. 55-623981

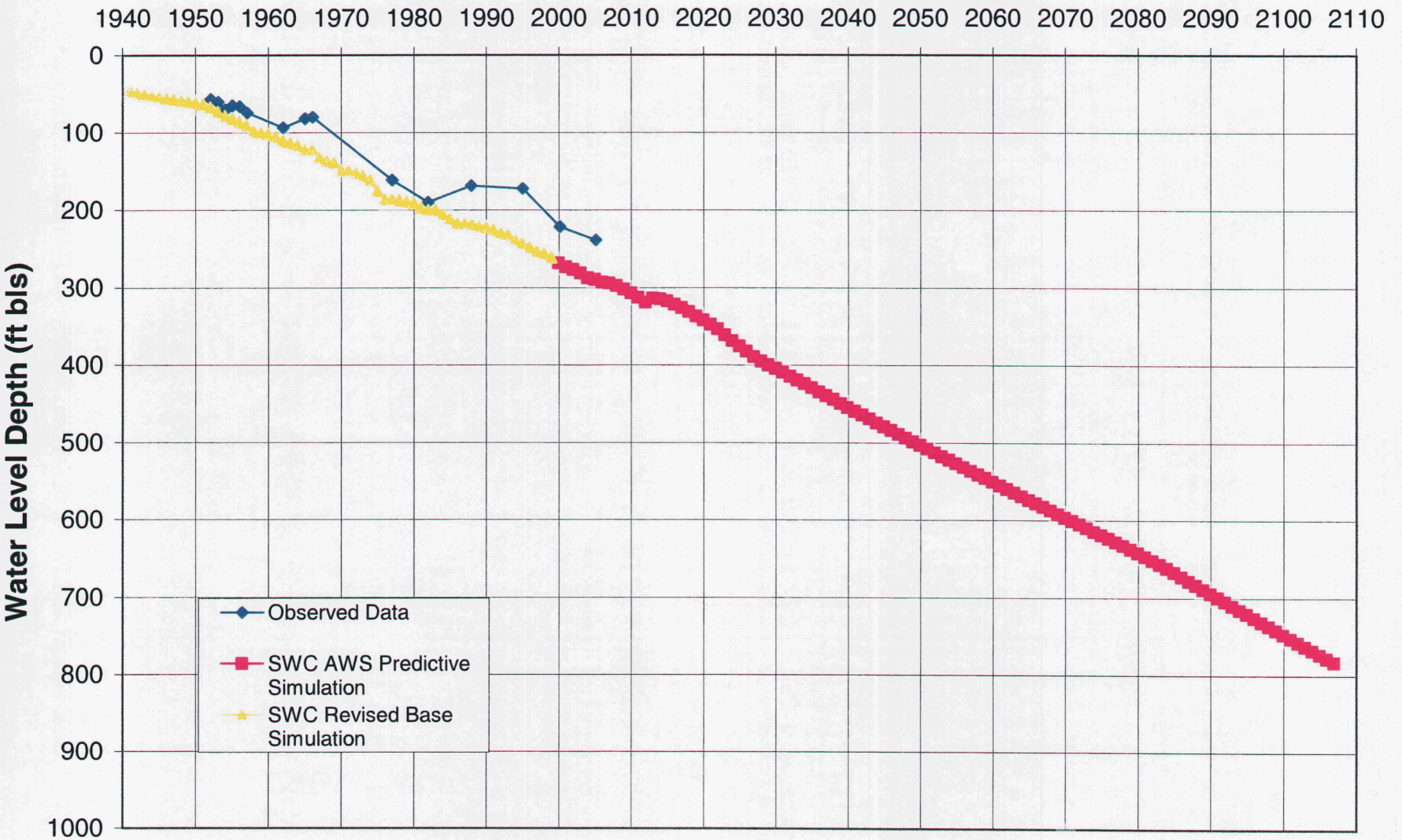



Well D-16-14 32BDD2
1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100 2110
0 100 200 300 400 500 600 700 800 900 1000
Water Level Depth (ft bls)
Observed Data
SWC AWS Predictive Simulation
SWC Revised Base Simulation

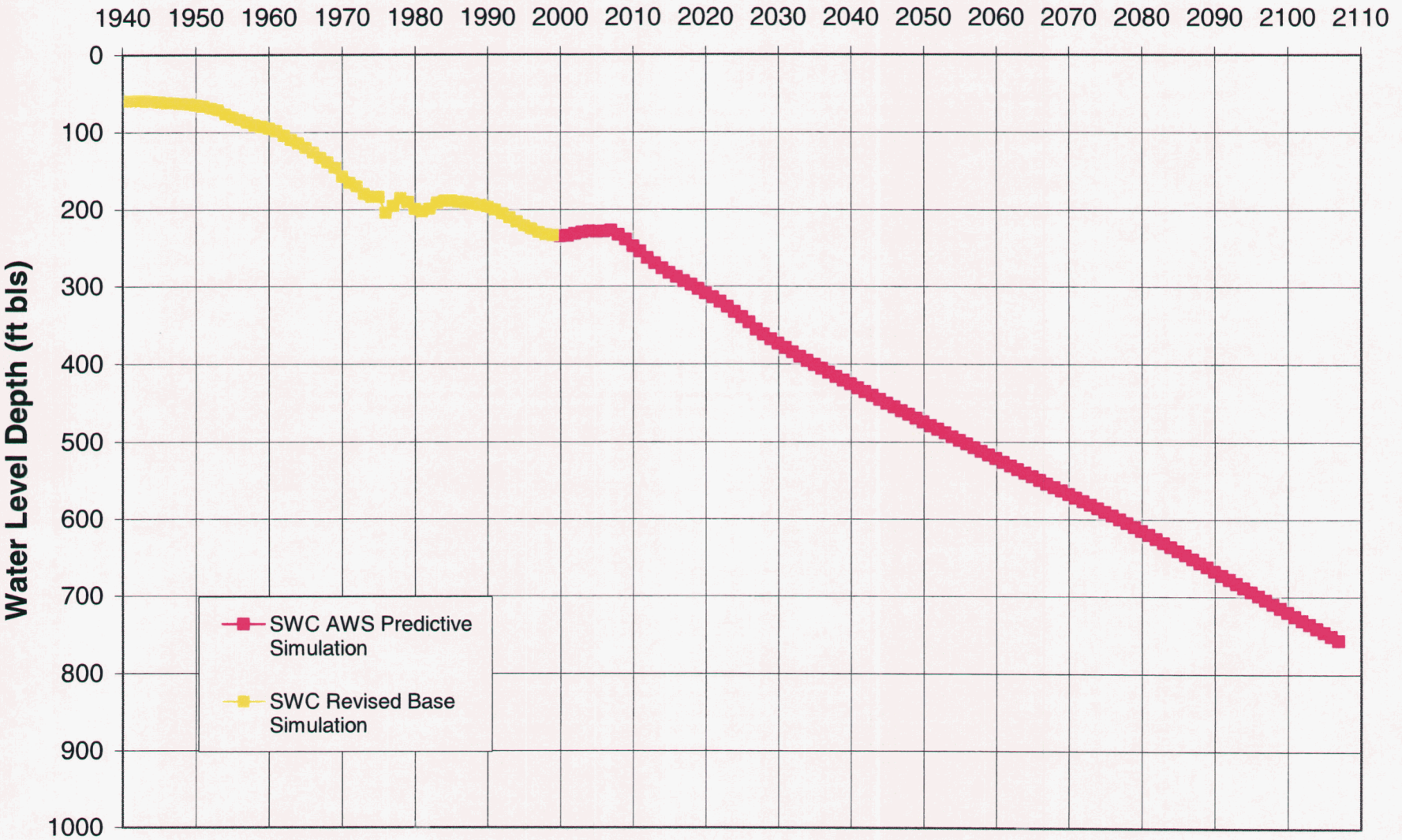
Well D-17-13 13ABB, Reg No. 55-624000



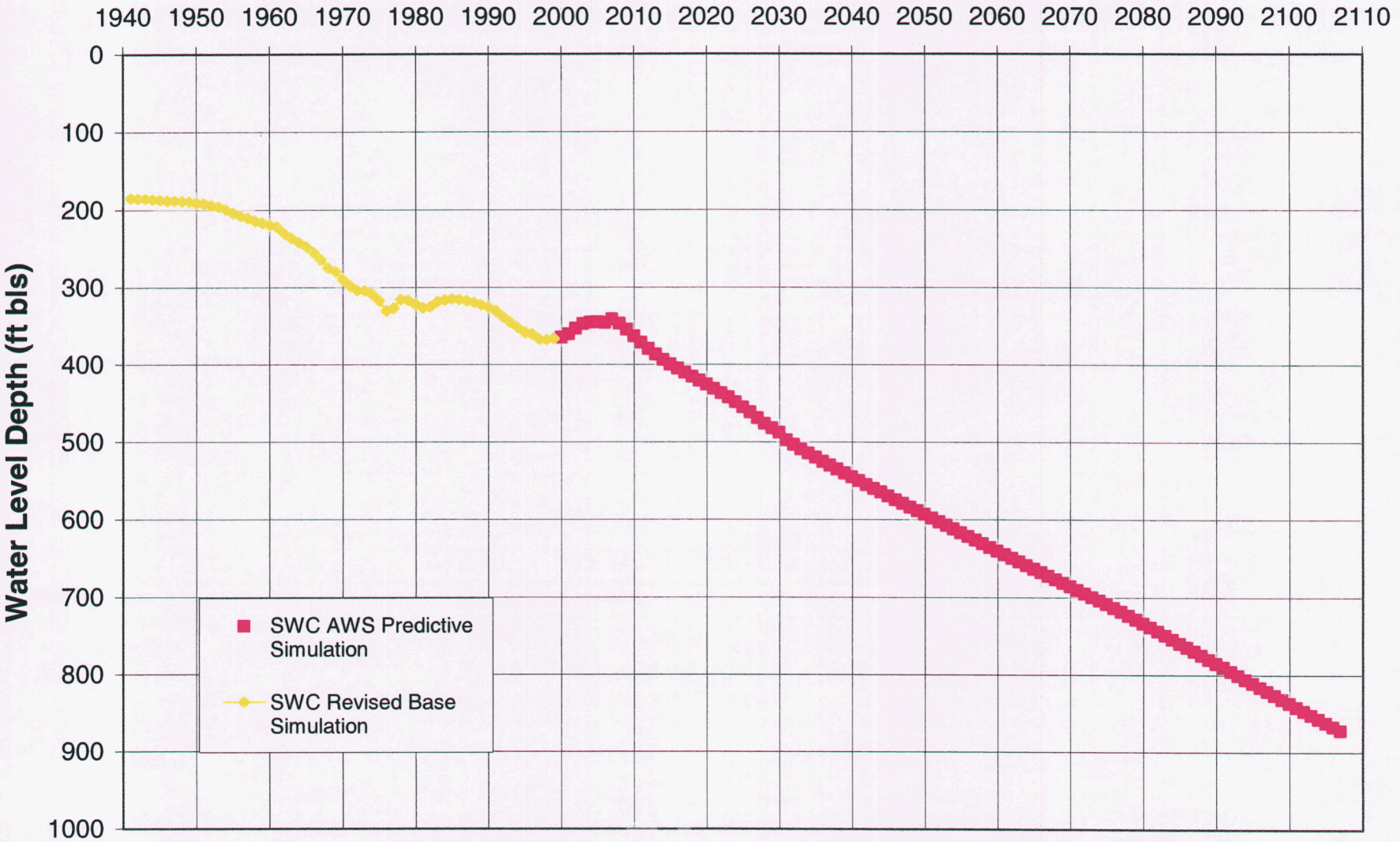
Well D-17-14 30BBB, Reg No. 55-623988



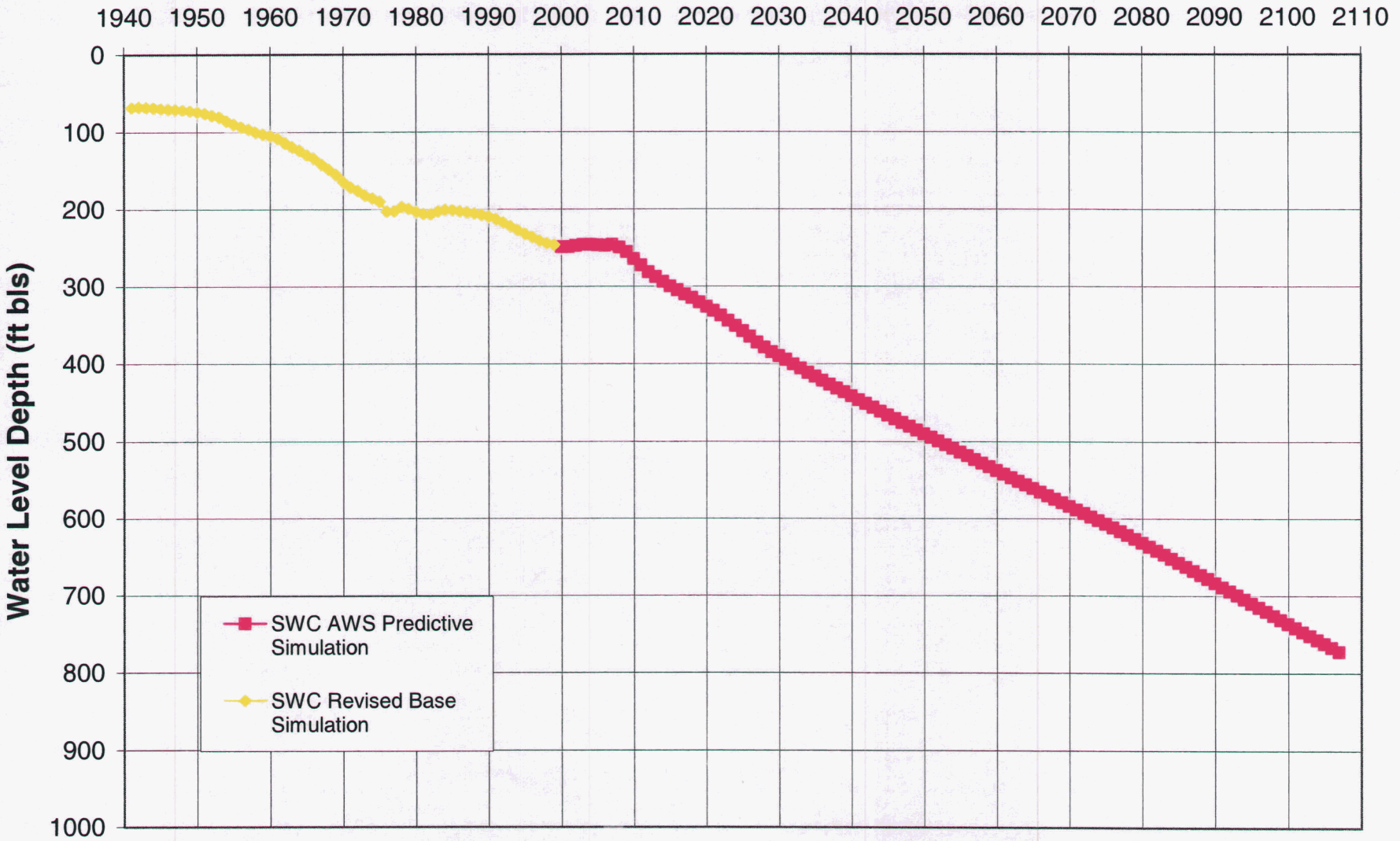
SWC Well No. 14

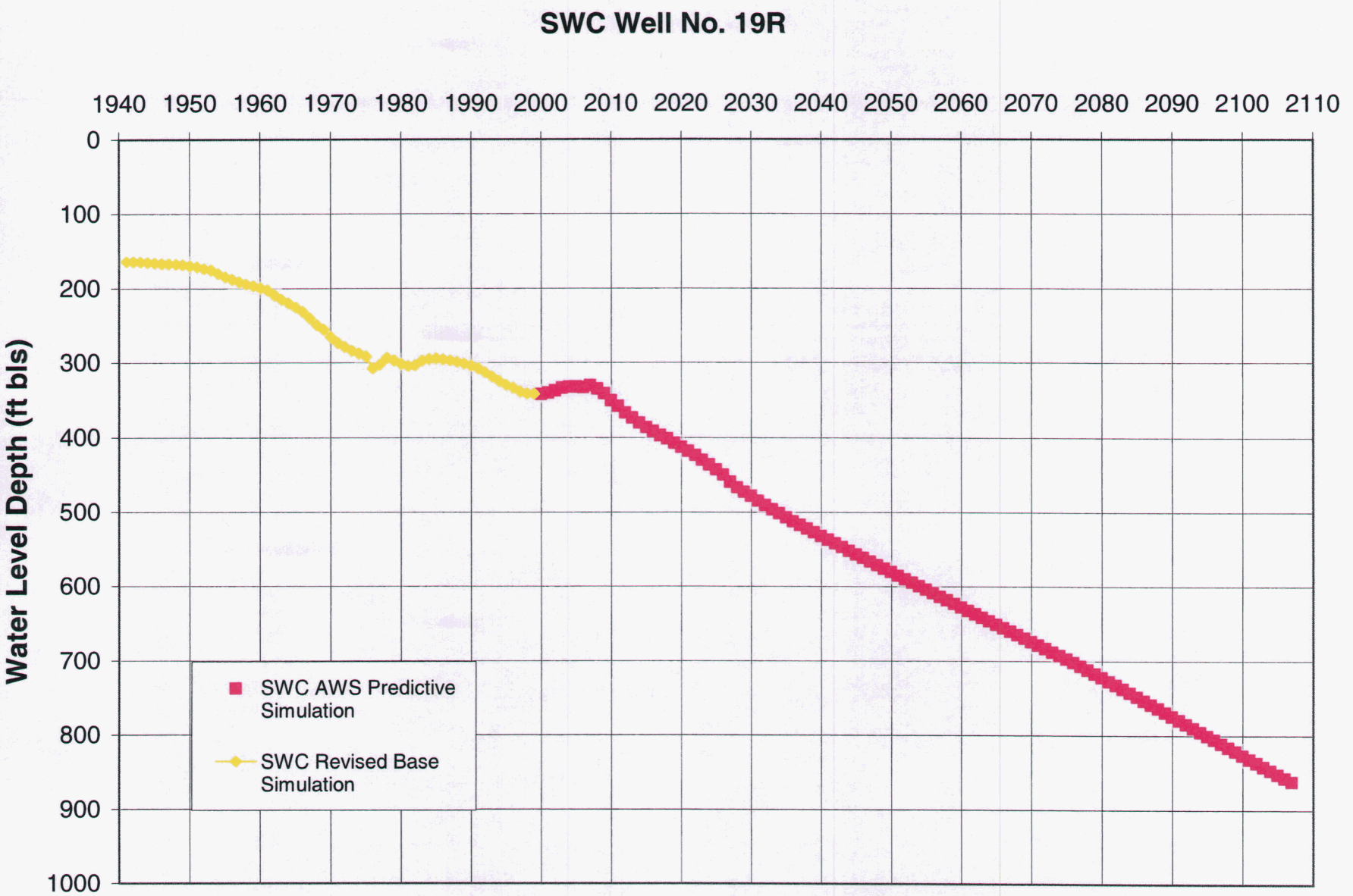


SWC Well No. 17R



SWC Well No. 18

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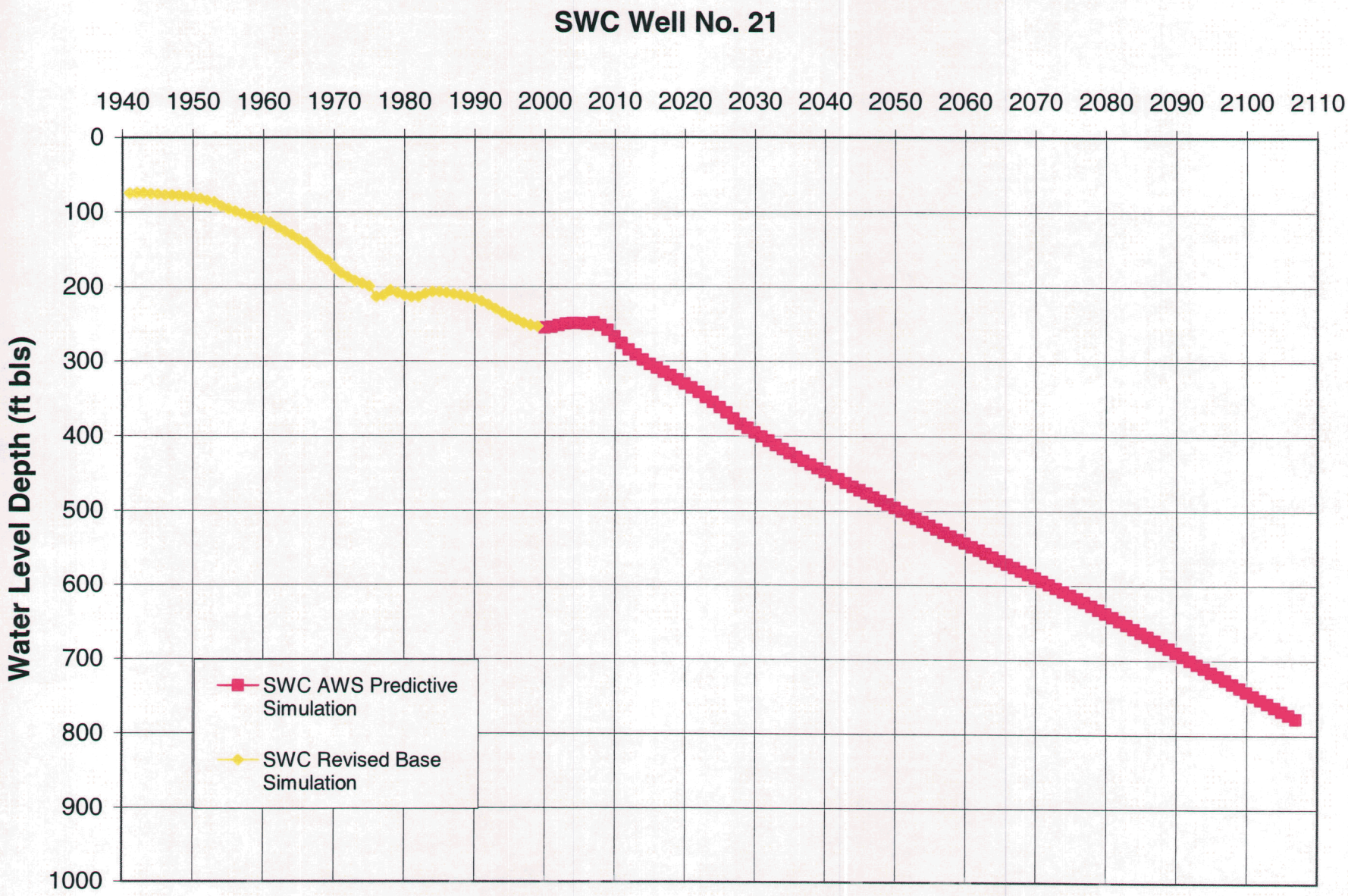
Water Level Depth (ft bls)
SWC AWS Predictive Simulation
SWC Revised Base Simulation


SWC Well No. 21
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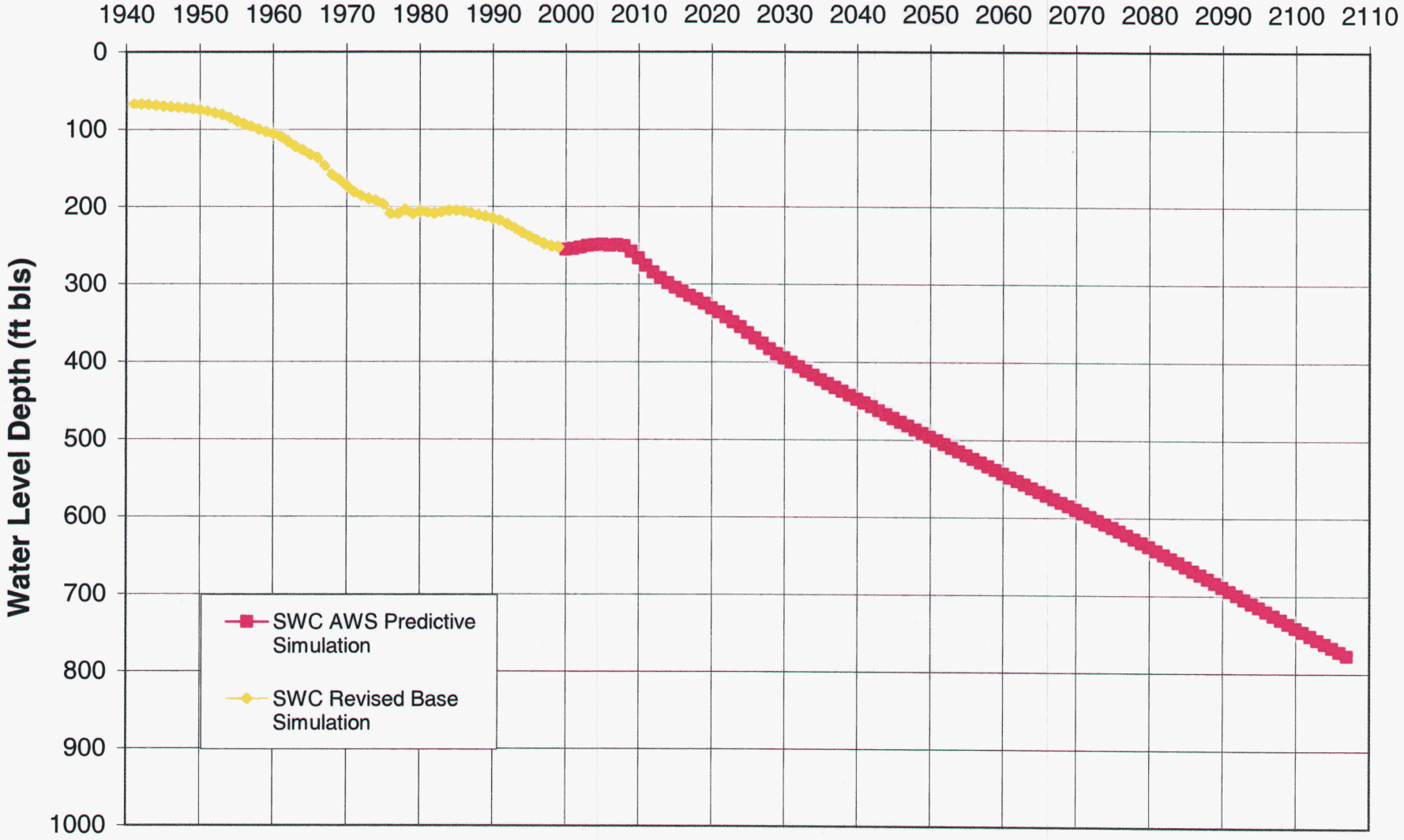
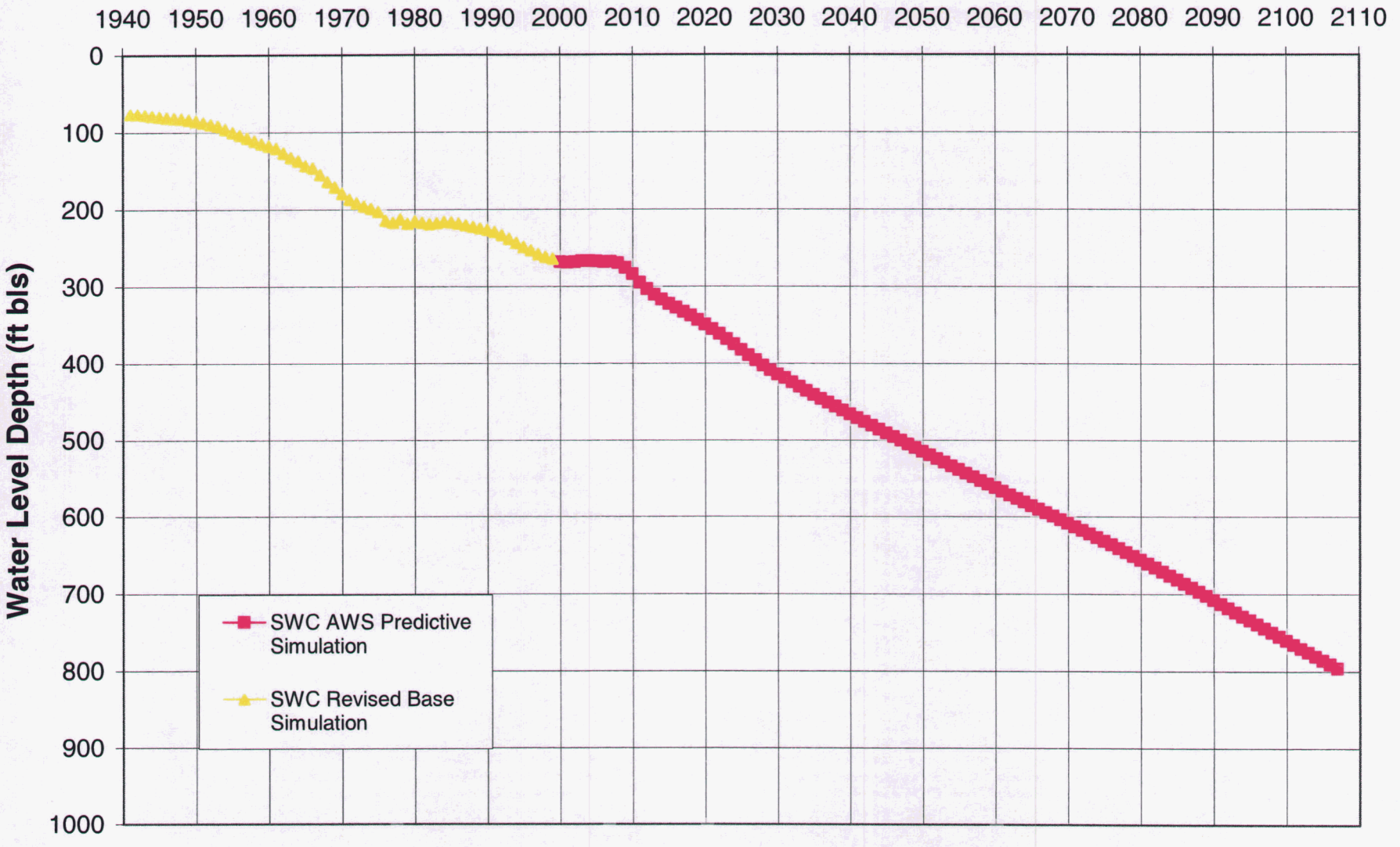
0 100 200 300 400 500 600 700 800 900 1000
Water Level Depth (ft bls)
SWC AWS Predictive Simulation
SWC Revised Base Simulation

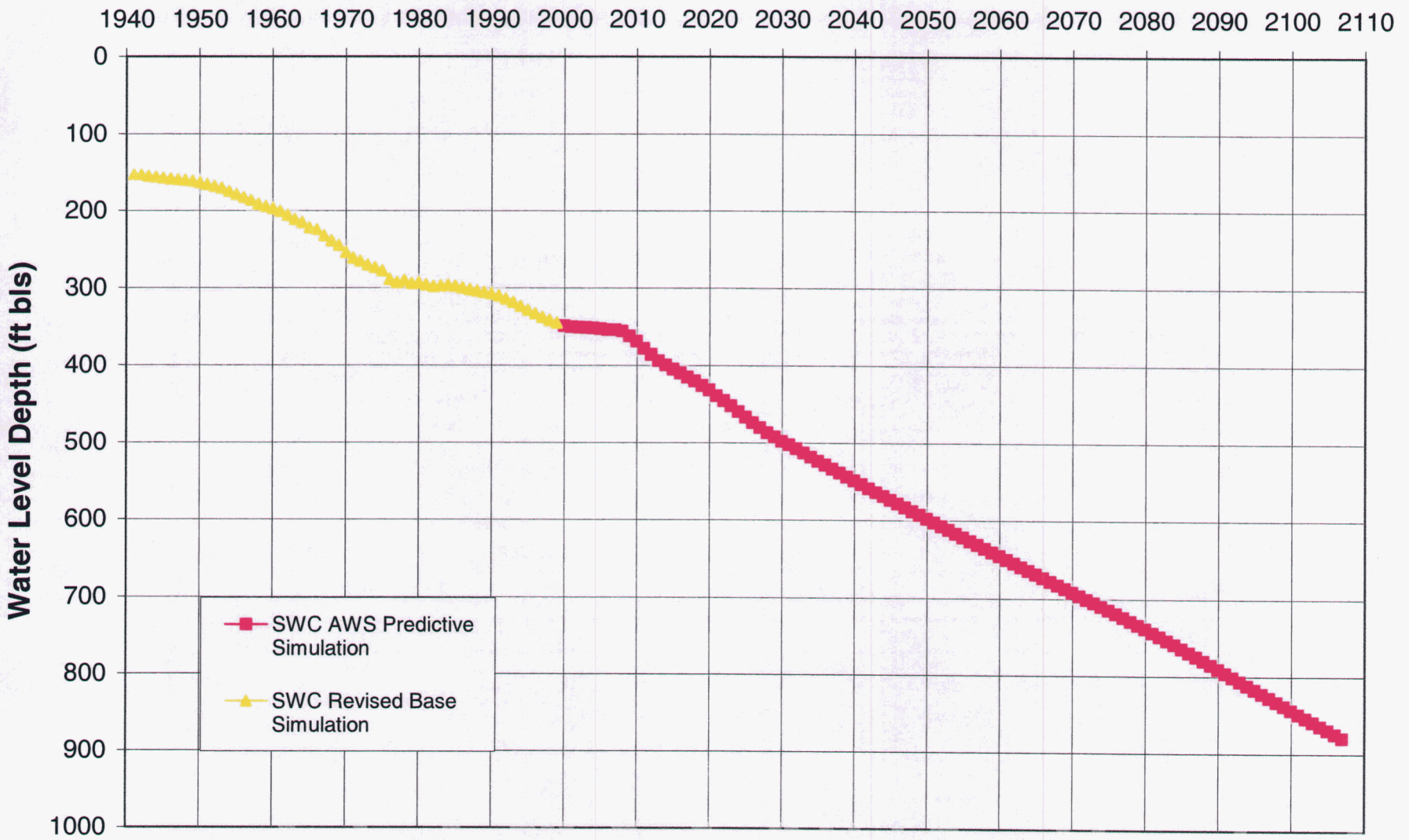
SWC Well No. 23



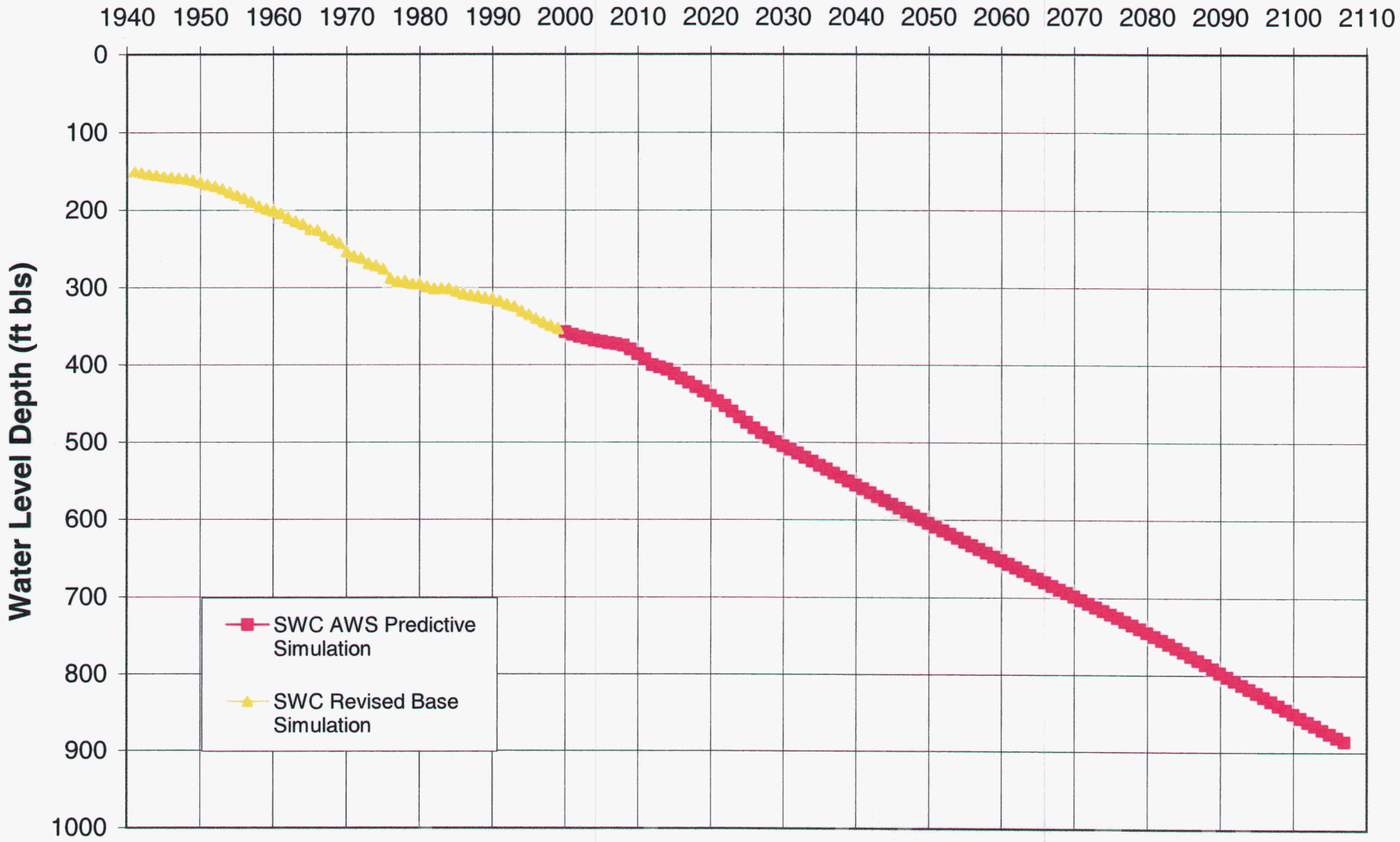
SWC Well No. 24B



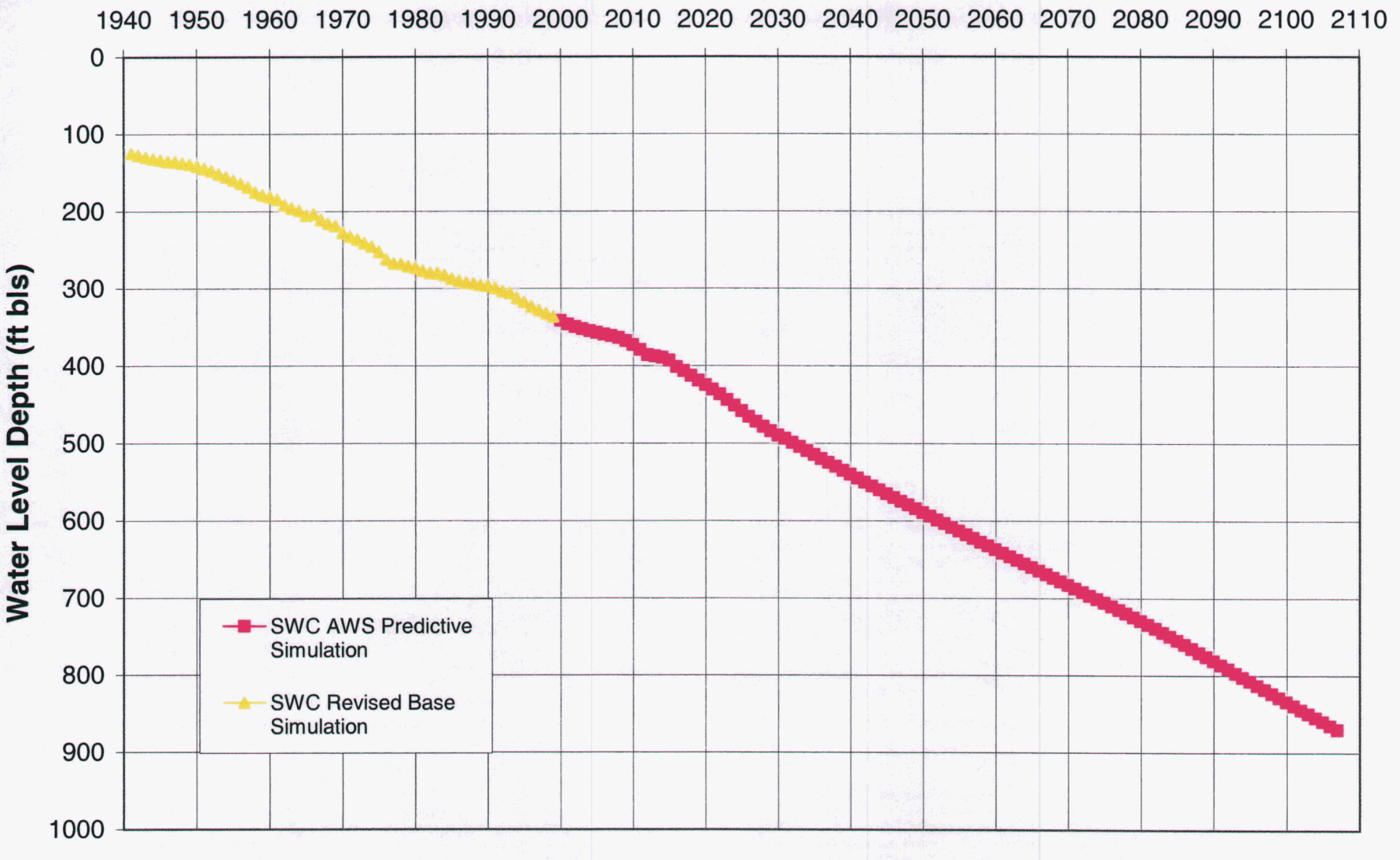
SWC Well No. 25

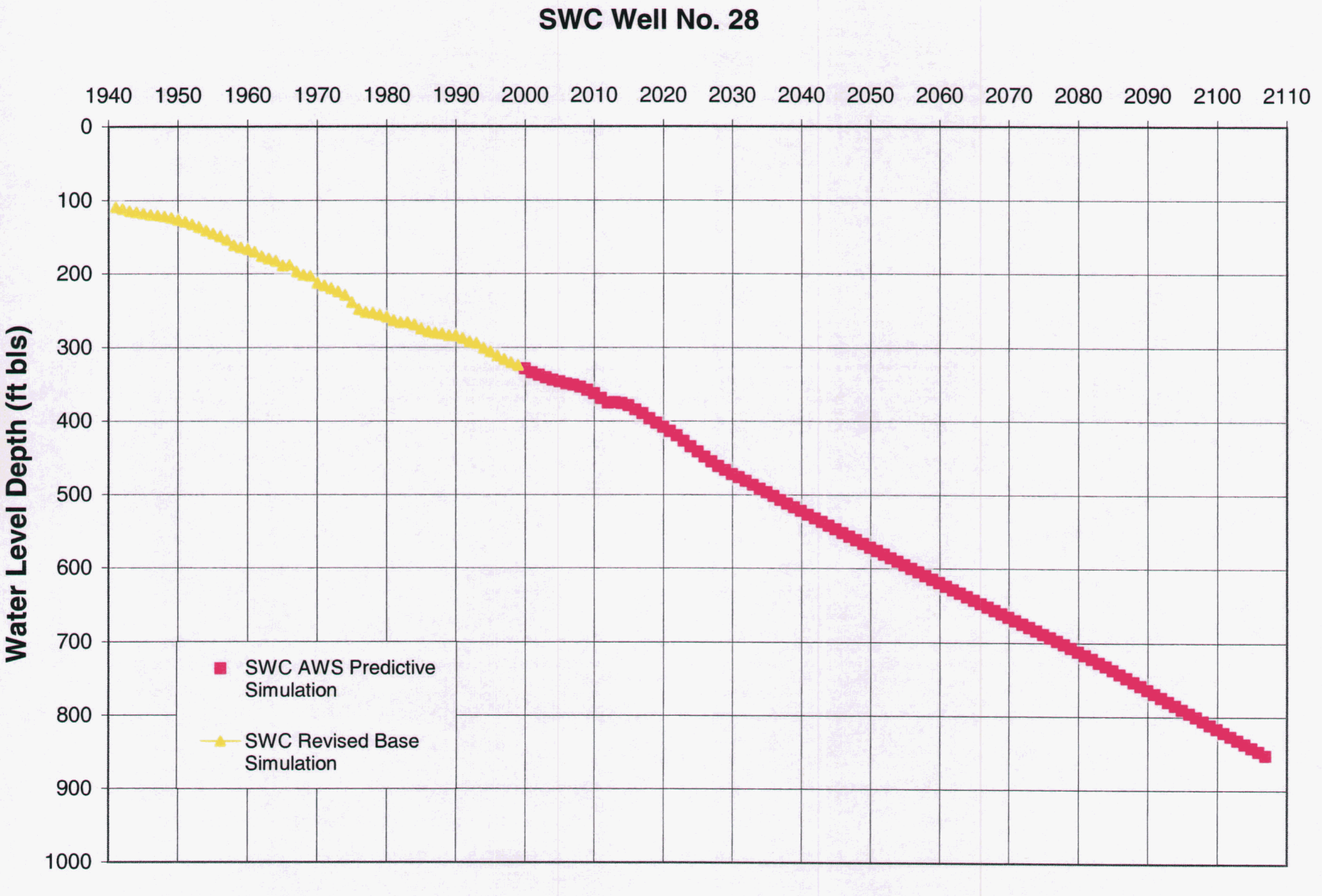


SWC Well No. 26

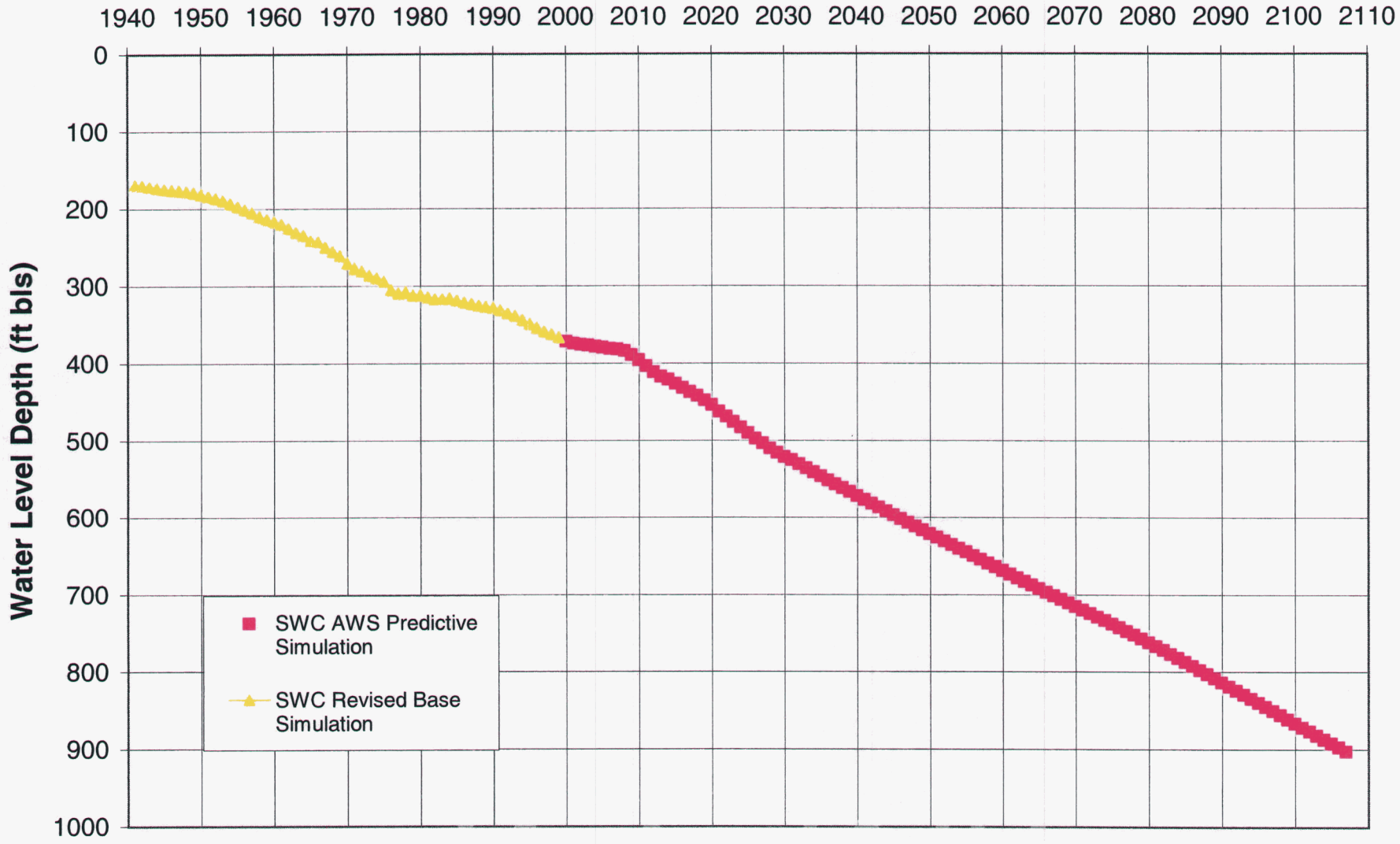


SWC Well No. 27




SWC Well No. 28
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
2110
0
100
200
300
400
500
600
700
800
900
1000
Water Level Depth (ft bls)
SWC AWS Predictive Simulation
SWC Revised Base Simulation

SWC Well No. 30



ATTACHMENT C

Boundary Fluxes

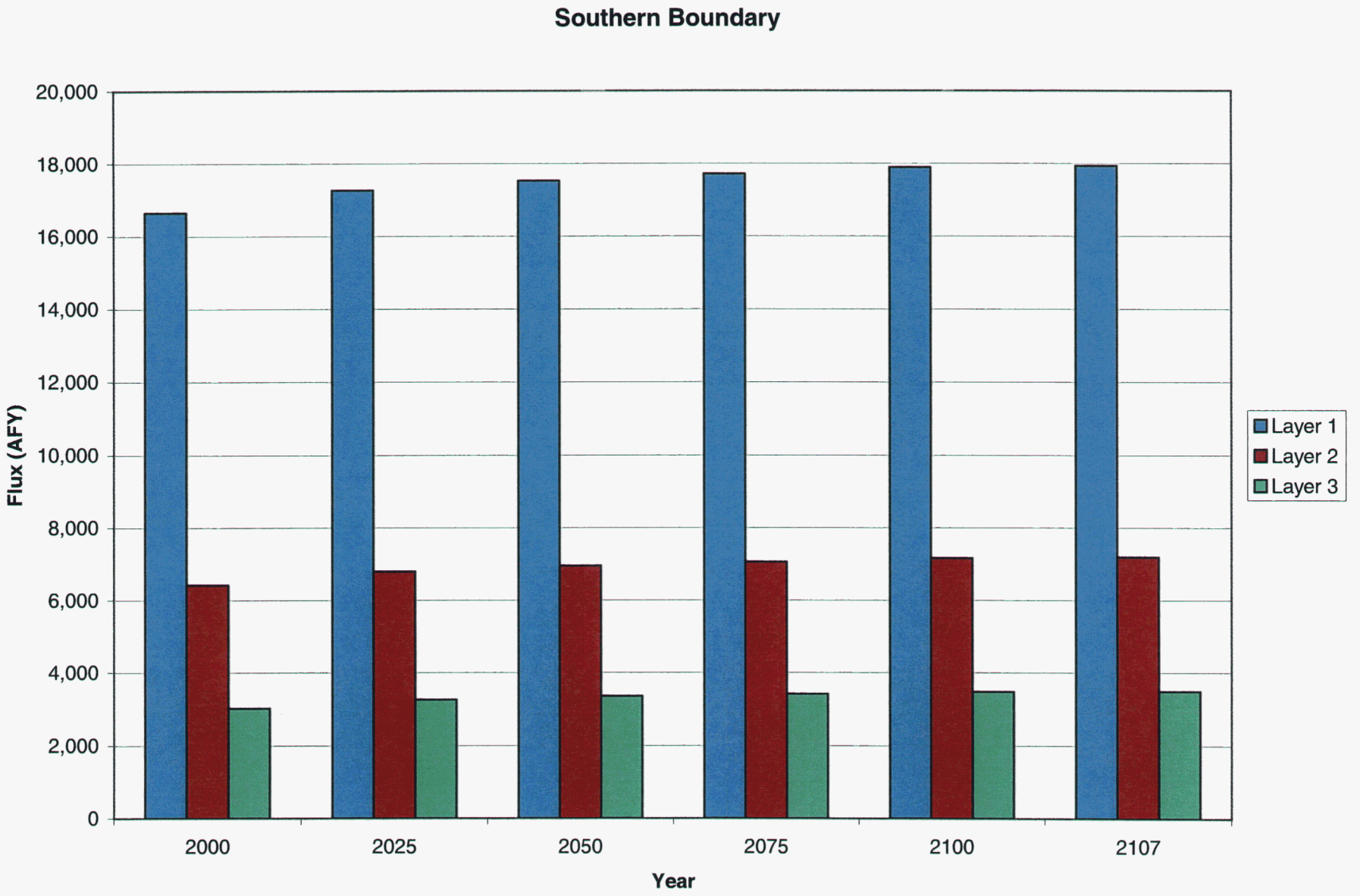


Figure C-1 - Southern Boundary Net Flux

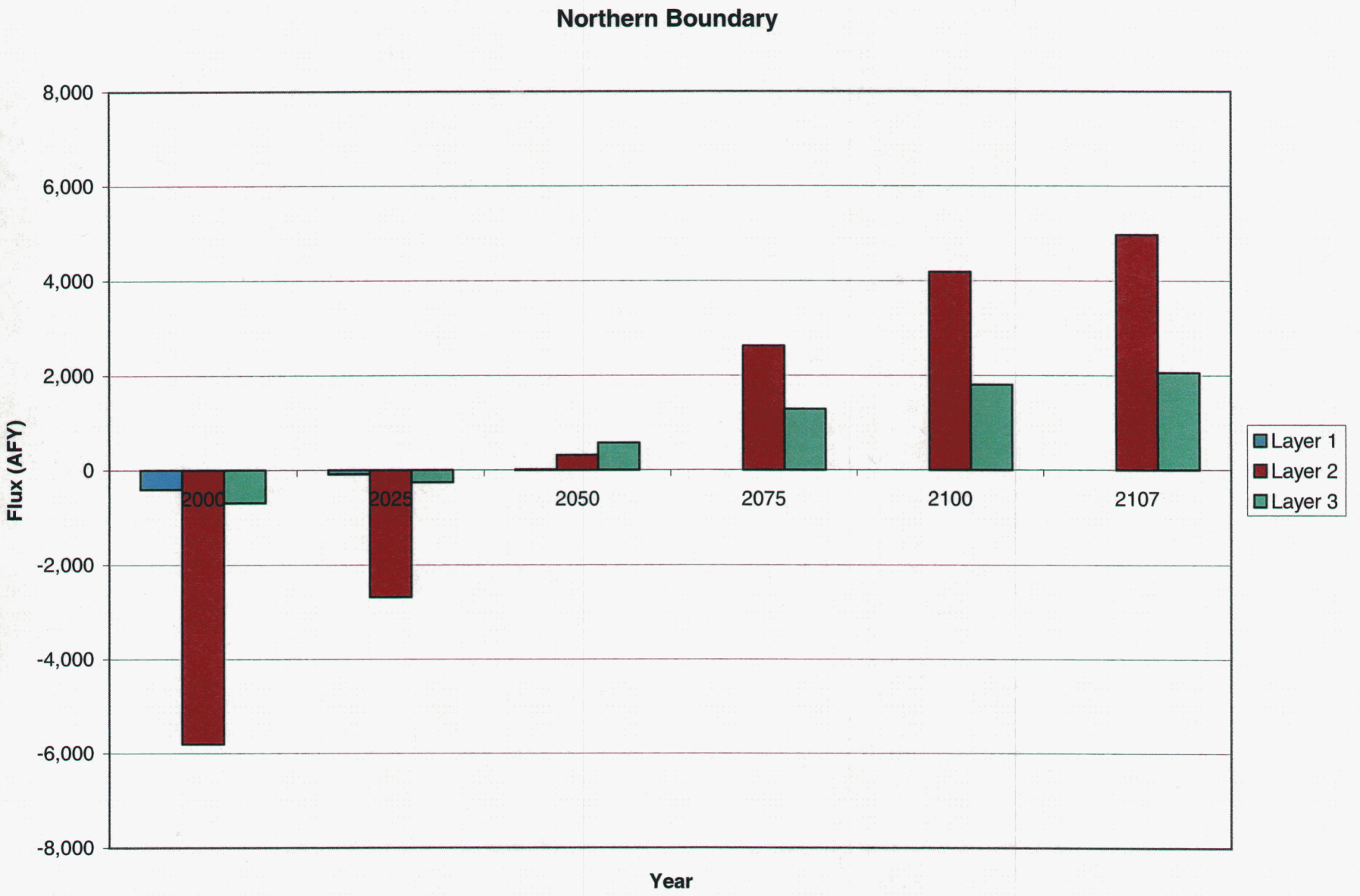
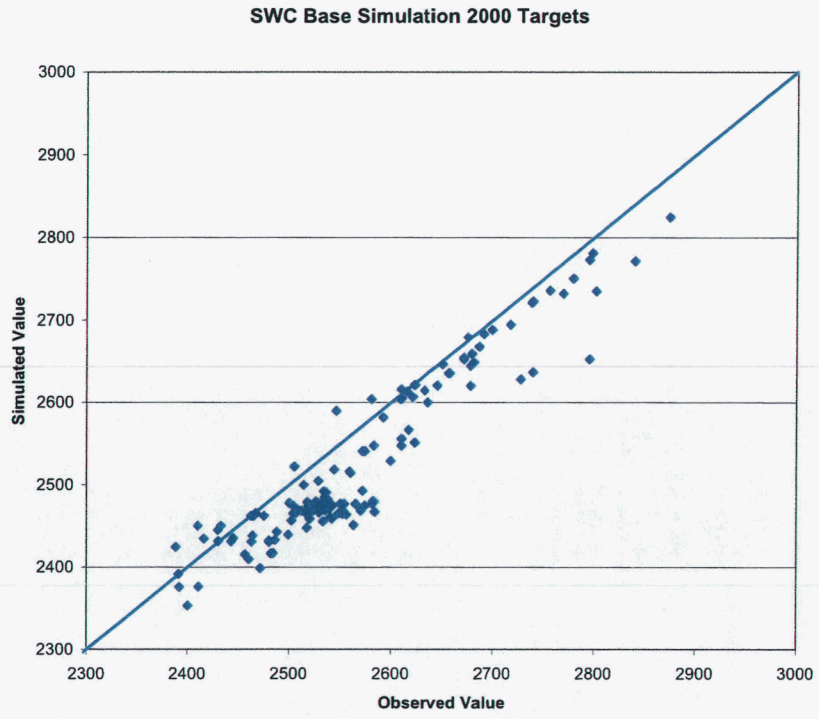
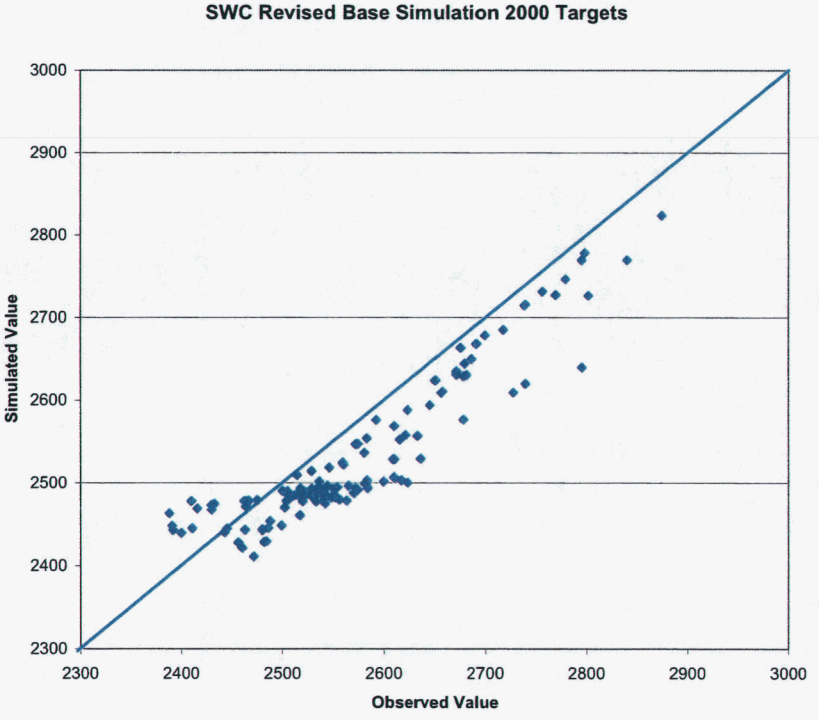


Figure C-2 - Northern Boundary Net Flux

ATTACHMENT D

Calibration Statistics


SWC Base Simulation 2000 Targets
Simulated Value
Observed Value
3000
2900
2800
2700
2600
2500
2400
2300
2300
2400
2500
2600
2700
2800
2900
3000


SWC Revised Base Simulation 2000 Targets
Simulated Value
Observed Value
3000
2900
2800
2700
2600
2500
2400
2300
2300
2400
2500
2600
2700
2800
2900
3000

Name	Time	X	Y	Layer	Observed	Computed	Weight	Group	Residual
608521	21535	1651795.59	11577917.95	3	2546	2590.18426	1	1	-44.18426
611146	21535	1652559.54	11610140.83	3	2410	2450.517872	1	1	-40.517872
624199	21535	1650578.44	11612968.23	3	2388.2	2424.528237	1	1	-36.328237
501760	21535	1646108.31	11573775.03	3	2580.4	2604.267289	1	1	-23.867289
611141	21535	1650493.14	11610140.14	3	2416	2434.633998	1	1	-18.633998
635296	21535	1641712.11	11593976.57	3	2505	2522.637827	1	1	-17.637827
611144	21535	1649633.5	11605089.25	3	2433	2450.557174	1	1	-17.557174
611142	21535	1650493.9	11607614.64	3	2429.95	2445.178333	1	1	-15.228333
801179	21535	1644385.05	11570845.31	3	2610	2615.771164	1	1	-5.771164
608596	21535	1662572.46	11570852.37	3	2675	2679.361607	1	1	-4.361607
611145	21535	1648771.44	11608725.46	3	2430	2431.747117	1	1	-1.747117
607788	21535	1647048.35	11615189.94	3	2391	2391.7805	1	1	-0.7805
605342	21535	1647567.96	11601048.31	3	2462.3	2462.501565	1	1	-0.201565
605344	21535	1646362.33	11600644.07	3	2466.9	2465.726773	1	1	1.173227
623105	21535	1640359.74	11568037.07	3	2623	2621.40187	1	1	1.59813
608591	21535	1650073.04	11573876.66	3	2615.4	2613.405835	1	1	1.994165
605345	21535	1647653.84	11601048.33	3	2465	2462.362157	1	1	2.637843
803638	21535	1636583.57	11564956.56	3	2650.3	2646.576868	1	1	3.723132
608588	21535	1648952.14	11575795.64	3	2609	2604.372007	1	1	4.627993
608585	21535	1647314.68	11575290.17	3	2610.2	2604.841317	1	1	5.358683
608598	21535	1663261.83	11571055.01	3	2690.6	2682.883166	1	1	7.716834
D-16-13S02BDC	21535	1643516.67	11639533.38	3	2445	2435.491713	1	1	9.508287
D-17-14 21ACD	21535	1666956.79	11585805.1	3	2592.1	2581.784905	1	1	10.315095
624024	21535	1644817.29	11561461.72	3	2699	2688.23712	1	1	10.76288
D-16-13S02BBA2	21535	1643258.53	11641654.52	3	2443	2431.426233	1	1	11.573767
624000	21535	1650108.78	11599513.29	3	2475	2462.557001	1	1	12.442999
619901	21535	1673733.45	11615710.58	3	2514	2500.019832	1	1	13.980168
608522	21535	1656019.37	11575596.35	3	2621	2606.907654	1	1	14.092346
607789	21535	1645154.56	11615189.62	3	2392	2376.025394	1	1	15.974606
608597	21535	1659986.44	11571254.77	3	2671	2654.609771	1	1	16.390229
638581	21535	1654087.59	11557423.48	3	2739.1	2722.565729	1	1	16.534271
601769	21535	1654104.57	11557655.86	3	2738.1	2721.246939	1	1	16.853061
624025	21535	1640523.35	11548188.76	3	2798	2780.891941	1	1	17.108059
605200	21535	1649469.97	11573472.49	3	2633	2614.838559	1	1	18.161441
803637	21535	1636531.47	11562562.39	3	2686	2667.774943	1	1	18.225057
624020	21535	1651592.44	11566513.47	3	2671	2652.378006	1	1	18.621994
624013	21535	1648549.59	11564795.5	3	2679	2659.265392	1	1	19.734608
624023	21535	1645861.7	11554189.17	3	2756	2735.808318	1	1	20.191682
624019	21535	1651091.68	11569008.58	3	2656	2635.735891	1	1	20.264109
627485	21535	1643781.96	11566299.78	3	2657.3	2635.806978	1	1	21.493022
619894	21535	1666928.83	11621159.19	3	2500	2478.082902	1	1	21.917098
624018	21535	1643024.8	11548976.49	3	2794.7	2772.560611	1	1	22.139389
627483	21535	1640782.19	11560410.89	3	2717	2694.683193	1	1	22.316807
619902	21535	1670940.88	11610051.43	3	2528.3	2504.936416	1	1	23.363584
543600	21535	1640083.84	11565895.62	3	2645	2620.832011	1	1	24.167989
608581	21535	1645590.05	11582461.91	3	2543.9	2518.815711	1	1	25.084289
617255	21535	1651095.61	11610342.15	3	2463.9	2438.649703	1	1	25.250297
624016	21535	1643472.9	11552047.42	3	2779	2750.334414	1	1	28.665586
619888	21535	1665722.1	11623481.59	3	2504	2474.730341	1	1	29.269659
619905	21535	1684143.07	11620470.31	3	2572	2541.019165	1	1	30.980835
86528	21535	1653676.95	11636586.31	3	2462.9	2431.080293	1	1	31.819707
624014	21535	1650989.13	11566493.28	3	2681	2648.691274	1	1	32.308726
619899	21535	1683460.3	11616024.95	3	2574	2541.232029	1	1	32.767971
624010	21535	1646385.6	11565603.05	3	2678	2644.464819	1	1	33.535181
607785	21535	1641108.55	11614784.92	3	2410.8	2376.437172	1	1	34.362828
619904	21535	1681565.24	11610022.42	3	2583	2547.757421	1	1	35.242579
608595	21535	1651623.66	11576200.42	3	2635.8	2600.279824	1	1	35.520176
624026	21535	1642317.44	11554936.05	3	2769	2731.921695	1	1	37.078305
619876	21535	1662793.21	11627419.25	3	2504	2465.477525	1	1	38.522475
619896	21535	1663403.16	11616611.02	3	2517.85	2479.273298	1	1	38.576702
619875	21535	1662795.03	11624691.9	3	2507.64	2468.255006	1	1	39.384994
623987	21535	1660293.41	11605720.07	3	2518	2478.575647	1	1	39.424353

Name	Time	X	Y	Layer	Observed	Computed	Weight	Group	Residual
619895	21535	1663313.56	11621661.63	3	2509	2469.165072	1	1	39.834928
619878	21535	1660471.52	11624589.34	3	2506	2465.721054	1	1	40.278946
619886	21535	1653563.75	11639343.81	3	2456.45	2415.75083	1	1	40.69917
608518	21535	1648433.01	11583876.29	3	2534	2492.322499	1	1	41.677501
619893	21535	1679236.87	11620767.19	3	2559	2516.6855	1	1	42.3145
607811	21535	1658322.03	11621153.48	3	2512	2468.892527	1	1	43.107473
607813	21535	1660905.8	11618124.71	3	2519	2474.70187	1	1	44.29813
D-16-14S05DDB	21535	1662012.16	11637620.87	3	2487.6	2442.937633	1	1	44.662367
619898	21535	1666680.24	11608633.61	3	2536	2490.898997	1	1	45.101003
619877	21535	1657887.6	11628931.28	3	2502	2456.667053	1	1	45.332947
619900	21535	1679845.16	11615717.22	3	2560	2514.516164	1	1	45.483836
624005	21535	1657594.85	11595688.23	3	2526	2479.791831	1	1	46.208169
607787	21535	1642313.73	11615189.34	3	2400	2353.506195	1	1	46.493805
607812	21535	1662626.77	11619136.01	3	2522	2474.866326	1	1	47.133674
801430	21535	1659344.9	11638528.37	3	2480	2432.565154	1	1	47.434846
632691	21535	1653685.28	11636667.04	3	2480.2	2430.76091	1	1	49.43909
623998	21535	1656400.69	11607515.84	3	2516	2466.469335	1	1	49.530665
608531	21535	1642315.29	11587511.79	3	2535	2485.263368	1	1	49.736632
803636	21535	1626569.1	11552009.76	3	2874	2824.236693	1	1	49.763307
608583	21535	1647744.54	11580340.84	3	2616.8	2566.788671	1	1	50.011329
623988	21535	1652972.13	11588433.36	3	2524	2473.626182	1	1	50.373818
619883	21535	1655893.86	11641748.89	3	2460.19	2409.751396	1	1	50.438604
608530	21535	1644469.59	11585189.05	3	2535	2484.542228	1	1	50.457772
617261	21535	1661252.33	11614488.47	3	2528.7	2477.712583	1	1	50.987417
619879	21535	1654442.73	11636101.88	3	2486	2433.277961	1	1	52.722039
616157	21535	1652656.1	11580746.27	3	2610	2556.14714	1	1	53.85286
623999	21535	1656433.83	11610172.63	3	2523	2468.492835	1	1	54.507165
623982	21535	1656522.2	11587465.41	3	2538	2481.822707	1	1	56.177293
619897	21535	1663580.8	11608429.14	3	2533	2476.158192	1	1	56.841808
608599	21535	1654469.06	11573171.29	3	2678	2620.399095	1	1	57.600905
607814	21535	1659442.47	11618326.03	3	2532	2473.909803	1	1	58.090197
619889	21535	1665535.73	11642270.04	3	2499	2439.705577	1	1	59.294423
617258	21535	1651184.3	11602463.49	3	2520	2458.631634	1	1	61.368366
D-17-14 31BDB	21535	1654723.96	11581555.45	3	2610	2547.983851	1	1	62.016149
623985	21535	1650499.31	11591664.93	3	2529	2466.361864	1	1	62.638136
617264	21535	1660049	11611255.31	3	2539	2476.283746	1	1	62.716254
607815	21535	1657464.93	11613981.23	3	2538	2474.390864	1	1	63.609136
618409	21535	1654871.47	11639435.26	3	2481.8	2416.68615	1	1	65.11385
624004	21535	1647476.14	11586563.01	3	2535	2469.166381	1	1	65.833619
618411	21535	1654871.51	11639334.17	3	2483.9	2417.382916	1	1	66.517084
623981	21535	1658083.7	11599496.54	3	2542	2475.374391	1	1	66.625609
D-18-13 28CCD	21535	1632390.68	11552290.42	3	2801.6	2734.867846	1	1	66.732154
623995	21535	1656106.74	11591151.8	3	2542	2474.314807	1	1	67.685193
624002	21535	1651929.06	11590382.47	3	2539	2470.946411	1	1	68.053589
D-18-13 32BAA	21535	1628949.55	11552008.87	3	2839.7	2771.233668	1	1	68.466332
607782	21535	1654014.44	11631455.01	3	2517	2447.923907	1	1	69.076093
617271	21535	1654120.55	11582464.3	3	2599.6	2529.307567	1	1	70.292433
616158	21535	1647916.8	11581351.06	3	2623	2551.779569	1	1	71.220431
619890	21535	1653356.31	11642434.74	3	2471.6	2398.775754	1	1	72.824246
D-16-14 32BDD2	21535	1660392.31	11612972.64	3	2550	2476.841888	1	1	73.158112
607817	21535	1657636	11616405.73	3	2554	2476.904049	1	1	77.095951
624001	21535	1655655.09	11599596.44	3	2533	2455.857194	1	1	77.142806
623994	21535	1653301.4	11583857.81	3	2572	2493.075529	1	1	78.924471
607805	21535	1652726.36	11624282.68	3	2540	2460.800112	1	1	79.199888
623997	21535	1656462.77	11603445.25	3	2548	2465.496053	1	1	82.503947
607806	21535	1653500.3	11625797.92	3	2542	2459.204267	1	1	82.795733
623991	21535	1656543.4	11596929.91	3	2553	2468.340974	1	1	84.659026
607803	21535	1653760.04	11622363.75	3	2552	2464.889211	1	1	87.110789
607795	21535	1655914.92	11614990.68	3	2565	2476.97871	1	1	88.02129
607804	21535	1655910.95	11623576.71	3	2556	2463.847507	1	1	92.152493
D-18-13 16BCD	21535	1632341.92	11565189.67	3	2727.1	2628.042567	1	1	99.057433
607818	21535	1657720.84	11618325.1	3	2574	2474.904209	1	1	99.095791

Name	Time	X	Y	Layer	Observed	Computed	Weight	Group	Residual
607801	21535	1655395.7	11620849.13	3	2570.5	2469.773562	1	1	100.726438
607802	21535	1653725.94	11620848.42	3	2570	2468.927419	1	1	101.072581
607800	21535	1655396.83	11618323.98	3	2582	2480.220955	1	1	101.779045
803629	21535	1631988.93	11567230.13	3	2739	2636.646644	1	1	102.353356
607799	21535	1652608.13	11617999.56	3	2581	2477.371997	1	1	103.628003
607797	21535	1653676.67	11615393.73	3	2583.2	2479.556339	1	1	103.643661
617254	21535	1652645.39	11610140.86	3	2563	2451.140882	1	1	111.859118
607798	21535	1652815.93	11614989.39	3	2584	2467.295634	1	1	116.704366
803633	21535	1632202.12	11556987.54	3	2795	2652.344997	1	1	142.655003
Residual Mean							41.81921		
Res. Std. Dev.							34.332756		
Sum of Squares							389368.7257		
Abs. Res. Mean							45.229991		
Min. Residual							-44.18426		
Max. Residual							142.655003		
Range in Target Values							485.8		
Std. Dev./Range							0.070673		

Name	Time	X	Y	Layer	Observed	Computed	Weight	Group	Residual
624199	21535	1650578.44	11612968.23	3	2388.2	2462.718323	1	1	-74.518323
611146	21535	1652559.54	11610140.83	3	2410	2477.576005	1	1	-67.576005
607788	21535	1647048.35	11615189.94	3	2391	2447.847236	1	1	-56.847236
611141	21535	1650493.14	11610140.14	3	2416	2468.481305	1	1	-52.481305
607789	21535	1645154.56	11615189.62	3	2392	2442.373363	1	1	-50.373363
611142	21535	1650493.9	11607614.64	3	2429.95	2472.698344	1	1	-42.748344
611144	21535	1649633.5	11605089.25	3	2433	2474.280106	1	1	-41.280106
607787	21535	1642313.73	11615189.34	3	2400	2438.998271	1	1	-38.998271
611145	21535	1648771.44	11608725.46	3	2430	2467.219429	1	1	-37.219429
607785	21535	1641108.55	11614784.92	3	2410.8	2444.839967	1	1	-34.039967
605342	21535	1647567.96	11601048.31	3	2462.3	2477.543288	1	1	-15.243288
605345	21535	1647653.84	11601048.33	3	2465	2477.550267	1	1	-12.550267
605344	21535	1646362.33	11600644.07	3	2466.9	2477.920178	1	1	-11.020178
617255	21535	1651095.61	11610342.15	3	2463.9	2470.797266	1	1	-6.897266
624000	21535	1650108.78	11599513.29	3	2475	2478.818925	1	1	-3.818925
D-16-13S02BDC	21535	1643516.67	11639533.38	3	2445	2444.450116	1	1	0.549884
D-16-13S02BBA2	21535	1643258.53	11641654.52	3	2443	2439.887061	1	1	3.112939
619901	21535	1673733.45	11615710.58	3	2514	2508.96797	1	1	5.03203
619894	21535	1666928.83	11621159.19	3	2500	2489.896604	1	1	10.103396
608596	21535	1662572.46	11570852.37	3	2675	2663.207431	1	1	11.792569
619902	21535	1670940.88	11610051.43	3	2528.3	2513.674902	1	1	14.625098
635296	21535	1641712.11	11593976.57	3	2505	2489.433014	1	1	15.566986
D-17-14 21ACD	21535	1666956.79	11585805.1	3	2592.1	2575.69849	1	1	16.40151
619888	21535	1665722.1	11623481.59	3	2504	2486.857049	1	1	17.142951
624025	21535	1640523.35	11548188.76	3	2798	2778.114342	1	1	19.885658
86528	21535	1653676.95	11636586.31	3	2462.9	2442.982302	1	1	19.917698
624024	21535	1644817.29	11561461.72	3	2699	2678.162499	1	1	20.837501
608598	21535	1663261.83	11571055.01	3	2690.6	2667.998946	1	1	22.601054
638581	21535	1654087.59	11557423.48	3	2739.1	2715.41827	1	1	23.68173
601769	21535	1654104.57	11557655.86	3	2738.1	2714.044793	1	1	24.055207
619896	21535	1663403.16	11616611.02	3	2517.85	2492.832977	1	1	25.017023
624023	21535	1645861.7	11554189.17	3	2756	2730.869023	1	1	25.130977
624018	21535	1643024.8	11548976.49	3	2794.7	2769.478543	1	1	25.221457
619905	21535	1684143.07	11620470.31	3	2572	2546.3509	1	1	25.6491
619876	21535	1662793.21	11627419.25	3	2504	2477.99126	1	1	26.00874
619875	21535	1662795.03	11624691.9	3	2507.64	2481.370252	1	1	26.269748
619895	21535	1663313.56	11621661.63	3	2509	2482.698941	1	1	26.301059
619878	21535	1660471.52	11624589.34	3	2506	2479.665149	1	1	26.334851
623987	21535	1660293.41	11605720.07	3	2518	2491.17167	1	1	26.82833
803638	21535	1636583.57	11564956.56	3	2650.3	2623.354574	1	1	26.945426
619899	21535	1683460.3	11616024.95	3	2574	2546.77208	1	1	27.22792
607811	21535	1658322.03	11621153.48	3	2512	2484.699378	1	1	27.300622
608521	21535	1651795.59	11577917.95	3	2546	2518.000247	1	1	27.999753
619886	21535	1653563.75	11639343.81	3	2456.45	2427.654743	1	1	28.795257
607813	21535	1660905.8	11618124.71	3	2519	2489.633701	1	1	29.366299
619904	21535	1681565.24	11610022.42	3	2583	2553.205231	1	1	29.794769
623998	21535	1656400.69	11607515.84	3	2516	2484.261878	1	1	31.738122
619877	21535	1657887.6	11628931.28	3	2502	2469.834539	1	1	32.165461
627483	21535	1640782.19	11560410.89	3	2717	2684.630343	1	1	32.369657
624016	21535	1643472.9	11552047.42	3	2779	2746.254815	1	1	32.745185
607812	21535	1662626.77	11619136.01	3	2522	2488.777589	1	1	33.222411
D-16-14S05DDB	21535	1662012.16	11637620.87	3	2487.6	2453.446124	1	1	34.153876
619898	21535	1666680.24	11608633.61	3	2536	2501.250585	1	1	34.749415
624013	21535	1648549.59	11564795.5	3	2679	2643.914786	1	1	35.085214
623105	21535	1640359.74	11568037.07	3	2623	2587.750408	1	1	35.249592
619893	21535	1679236.87	11620767.19	3	2559	2523.733412	1	1	35.266588
623999	21535	1656433.83	11610172.63	3	2523	2487.231601	1	1	35.768399
617261	21535	1661252.33	11614488.47	3	2528.7	2492.598981	1	1	36.101019
803637	21535	1636531.47	11562562.39	3	2686	2649.743191	1	1	36.256809
624020	21535	1651592.44	11566513.47	3	2671	2634.641055	1	1	36.358945
801430	21535	1659344.9	11638528.37	3	2480	2443.511256	1	1	36.488744
632691	21535	1653685.28	11636667.04	3	2480.2	2442.659495	1	1	37.540505

Name	Time	X	Y	Layer	Observed	Computed	Weight	Group	Residual
624005	21535	1657594.85	11595688.23	3	2526	2488.439365	1	1	37.560635
623988	21535	1652972.13	11588433.36	3	2524	2486.371664	1	1	37.628336
619900	21535	1679845.16	11615717.22	3	2560	2521.500805	1	1	38.499195
619883	21535	1655893.86	11641748.89	3	2460.19	2421.210282	1	1	38.979718
608597	21535	1659986.44	11571254.77	3	2671	2630.700699	1	1	40.299301
619879	21535	1654442.73	11636101.88	3	2486	2445.195095	1	1	40.804905
608518	21535	1648433.01	11583876.29	3	2534	2492.937178	1	1	41.062822
801179	21535	1644385.05	11570845.31	3	2610	2568.349626	1	1	41.650374
607814	21535	1659442.47	11618326.03	3	2532	2489.717877	1	1	42.282123
624026	21535	1642317.44	11554936.05	3	2769	2726.69629	1	1	42.30371
617258	21535	1651184.3	11602463.49	3	2520	2477.291107	1	1	42.708893
619897	21535	1663580.8	11608429.14	3	2533	2488.475529	1	1	44.524471
501760	21535	1646108.31	11573775.03	3	2580.4	2535.789267	1	1	44.610733
608530	21535	1644469.59	11585189.05	3	2535	2490.156017	1	1	44.843983
607815	21535	1657464.93	11613981.23	3	2538	2492.353004	1	1	45.646996
623985	21535	1650499.31	11591664.93	3	2529	2483.140124	1	1	45.859876
608531	21535	1642315.29	11587511.79	3	2535	2488.39893	1	1	46.60107
627485	21535	1643781.96	11566299.78	3	2657.3	2610.226759	1	1	47.073241
617264	21535	1660049	11611255.31	3	2539	2491.607974	1	1	47.392026
624019	21535	1651091.68	11569008.58	3	2656	2608.605748	1	1	47.394252
624004	21535	1647476.14	11586563.01	3	2535	2487.042738	1	1	47.957262
608581	21535	1645590.05	11582461.91	3	2543.9	2495.830889	1	1	48.069111
624010	21535	1646385.6	11565603.05	3	2678	2628.771127	1	1	49.228873
623982	21535	1656522.2	11587465.41	3	2538	2488.214831	1	1	49.785169
803636	21535	1626569.1	11552009.76	3	2874	2823.432175	1	1	50.567825
619889	21535	1665535.73	11642270.04	3	2499	2448.239383	1	1	50.760617
624014	21535	1650989.13	11566493.28	3	2681	2630.198619	1	1	50.801381
543600	21535	1640083.84	11565895.62	3	2645	2593.821264	1	1	51.178736
618409	21535	1654871.47	11639435.26	3	2481.8	2428.507252	1	1	53.292748
624002	21535	1651929.06	11590382.47	3	2539	2484.993278	1	1	54.006722
618411	21535	1654871.51	11639334.17	3	2483.9	2429.20312	1	1	54.69688
623981	21535	1658083.7	11599496.54	3	2542	2486.349709	1	1	55.650291
623995	21535	1656106.74	11591151.8	3	2542	2486.091857	1	1	55.908143
624001	21535	1655655.09	11599596.44	3	2533	2476.894874	1	1	56.105126
607782	21535	1654014.44	11631455.01	3	2517	2460.486874	1	1	56.513126
D-16-14 32BDD2	21535	1660392.31	11612972.64	3	2550	2492.276422	1	1	57.723578
607817	21535	1657636	11616405.73	3	2554	2493.996947	1	1	60.003053
619890	21535	1653356.31	11642434.74	3	2471.6	2410.705211	1	1	60.894789
607805	21535	1652726.36	11624282.68	3	2540	2477.670019	1	1	62.329981
608591	21535	1650073.04	11573876.66	3	2615.4	2552.010948	1	1	63.389052
608522	21535	1656019.37	11575596.35	3	2621	2557.277829	1	1	63.722171
623997	21535	1656462.77	11603445.25	3	2548	2481.853512	1	1	66.146488
607806	21535	1653500.3	11625797.92	3	2542	2474.636849	1	1	67.363151
607795	21535	1655914.92	11614990.68	3	2565	2496.050316	1	1	68.949684
607803	21535	1653760.04	11622363.75	3	2552	2482.170036	1	1	69.829964
623991	21535	1656543.4	11596929.91	3	2553	2482.837728	1	1	70.162272
D-18-13 32BAA	21535	1628949.55	11552008.87	3	2839.7	2769.326766	1	1	70.373234
D-18-13 28CCD	21535	1632390.68	11552290.42	3	2801.6	2726.241363	1	1	75.358637
607804	21535	1655910.95	11623576.71	3	2556	2479.616303	1	1	76.383697
605200	21535	1649469.97	11573472.49	3	2633	2556.265847	1	1	76.734153
623994	21535	1653301.4	11583857.81	3	2572	2493.207439	1	1	78.792561
607797	21535	1653676.67	11615393.73	3	2583.2	2502.621753	1	1	80.578247
608588	21535	1648952.14	11575795.64	3	2609	2528.1371	1	1	80.8629
607799	21535	1652608.13	11617999.56	3	2581	2498.96746	1	1	82.03254
608585	21535	1647314.68	11575290.17	3	2610.2	2528.153668	1	1	82.046332
607818	21535	1657720.84	11618325.1	3	2574	2491.591719	1	1	82.408281
607802	21535	1653725.94	11620848.42	3	2570	2487.278321	1	1	82.721679
607801	21535	1655395.7	11620849.13	3	2570.5	2487.110399	1	1	83.389601
607800	21535	1655396.83	11618323.98	3	2582	2498.5466	1	1	83.4534
617254	21535	1652645.39	11610140.86	3	2563	2477.955094	1	1	85.044906
607798	21535	1652815.93	11614989.39	3	2584	2493.247775	1	1	90.752225
617271	21535	1654120.55	11582464.3	3	2599.6	2500.989169	1	1	98.610831

Name	Time	X	Y	Layer	Observed	Computed	Weight	Group	Residual
608599	21535	1654469.06	11573171.29	3	2678	2576.111084	1	1	101.888916
D-17-14 31BDB	21535	1654723.96	11581555.45	3	2610	2506.251283	1	1	103.748717
616157	21535	1652656.1	11580746.27	3	2610	2505.716339	1	1	104.283661
608595	21535	1651623.66	11576200.42	3	2635.8	2528.808186	1	1	106.991814
608583	21535	1647744.54	11580340.84	3	2616.8	2502.791831	1	1	114.008169
D-18-13 16BCD	21535	1632341.92	11565189.67	3	2727.1	2608.877018	1	1	118.222982
803629	21535	1631988.93	11567230.13	3	2739	2619.420075	1	1	119.579925
616158	21535	1647916.8	11581351.06	3	2623	2499.69323	1	1	123.30677
803633	21535	1632202.12	11556987.54	3	2795	2639.02804	1	1	155.97196
Residual Mean							40.416949		
Res. Std. Dev.							38.868743		
Sum of Squares							418193.0937		
Abs. Res. Mean							48.621645		
Min. Residual							-74.518323		
Max. Residual							155.97196		
Range in Target Values							485.8		
Std. Dev./Range							0.08001		

ATTACHMENT Z

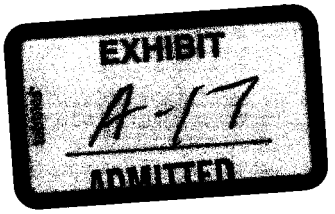
Supporting Digital Files

(only provided in Sahuarita Water Company and ADWR submitted copies)

EXHIBIT A-17

(ADWR July 28, 2008 Administrative Completeness Review Letter)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



ARIZONA DEPARTMENT OF WATER RESOURCES
Office of Assured and Adequate Water Supply
2nd Floor, 3550 N. Central Ave, Phoenix, AZ 85012
Telephone 602 771-8599
Fax 602 771-8689

Janet Napolitano
Governor

Herbert R. Guenther
Director

July 28, 2008

RECEIVED JUL 2 9 2008

Kristen Whatley
Westland Resources, Inc.
4001 E. Paradise Falls Drive
Tucson, AZ 85712

Re: Application for a Modification of a Designation of Assured Water Supply
Sahuarita Water Company LLC (DWR No. 86-401203.0001)
Administrative Completeness Review

Dear Kristen Whatley:

We received your application for a Modification of a Designation of Assured Water Supply on November 23, 2007. We sent an Administrative Completeness Review (ACR) letter on March 27, 2008, to which you responded on July 9, 2008. During our administrative review, we have again determined your application to be incomplete. Please provide the following items to the Department:

1. A final decision and order from the Arizona Corporation Commission extending the area of the Sahuarita Water Company Certificate of Convenience and Necessity (CC&N) to include the proposed subdivisions and approving any financing of the required infrastructure. Your response to our original ACR letter indicated that a final Decision and Order (D&O) from the Arizona Corporation Commission (ACC) for the extension of the Sahuarita Water Company Certificate of Convenience and Necessity (CC&N) was anticipated to be issued no later than the beginning of October 2008. Please submit the final, signed Decision and Order from the ACC once it has been issued. ADWR cannot issue a designation until the ACC D&O has been issued.

Please submit the requested information to the Office of Assured Water Supply within 60 days of this notice. Our review of your application has stopped and will resume when we receive the missing items. If you do not respond to this letter within the 60-day time frame, the director of the Department may take action to deny the application and close the file.

Once you have submitted the favorable staff report from the ACC recommending approval of the ACC application and we have determined your application to be complete, we will publish public notice. The final Decision and Order from the ACC will be required before the Modification of a Designation of Assured Water Supply can be issued.

The Department is currently reviewing the hydrologic study submitted. If the Department determines that the hydrologic study is not correct, you will be notified of the incorrect items in a subsequent letter and will be provided time to respond.

If you have any questions regarding the contents of this letter or the application in general, please do not hesitate to contact Diane Kusel at (520) 770-3800.

Sincerely,

John Schneeman, Manager
Office of Assured and Adequate Water Supply

JFS/djk

Cc: Robert Sharpe, Sharpe and Associates, Inc.
ADWR Hydrology

EXHIBIT A-18

(July 31, 2008 Response to ADWR July 28, 2008 Administrative Completeness Review Letter)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW

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OF COUNSEL TO
MUNGER CHADWICK, P.L.C.

ADMITTED TO PRACTICE IN:
ARIZONA, COLORADO, MONTANA,
NEVADA, TEXAS, WYOMING,
DISTRICT OF COLUMBIA

July 31, 2008

John Schneeman, Manager
Office of Assured and Adequate Water Supply
Arizona Department of Water Resources
3350 N. Central Avenue, 2nd Floor
Phoenix, Arizona 85012

Re: Application for a Modification of Designation of Adequate Water Supply
Sahuarita Water Company LLC (DWR No. 86-401203.0001)
Administrative Completeness Review

Dear Mr. Schneeman:

This letter is in response to your July 28, 2008 letter to Kristen Whatley of WestLand Resources, Inc., and I am writing to you in my capacity as the attorney of record for Sahuarita Water Company, L.L.C. ("SWC") in a proceeding currently pending before the Arizona Corporation Commission ("ACC") for a proposed extension of SWC's current Certificate of Convenience and Necessity ("CC&N").

Pursuant to the third complete paragraph of your July 28, 2008 letter, enclosed is a copy of a July 17, 2008 Staff Report in which the ACC's Staff is recommending approval of SWC's currently pending CC&N Extension Application. As you will note, the ACC Staff is recommending approval of SWC's Application subject to compliance with the four (4) conditions enumerated on pages 7 and 8 of the July 17, 2008 Staff Report. [1] In that regard, Condition No. 3 requires the submission by SWC of

> "...documentation from ADWR stating that the Company's DAWS has been modified to include this new extension area."

[1] During the course of a conversation I had yesterday in Phoenix with Steve Olea (Assistant Director of Utilities Division) of the ACC Staff, Mr. Olea characterized what the Staff was recommending (if approved by the ACC) as a "conditional CC&N extension."

Accordingly, SWC hopes that your office will be able to resume at this time its review of SWC's currently pending Application for a Modification of Designation of Adequate Water Supply (DWR No. 86-401203.0001).

With reference to the second complete paragraph of your July 28, 2008 letter, you indicate that if SWC does not submit a copy of a final decision and order from the ACC approving SWC's currently pending CC&N Extension Application within sixty (60) days from the date of your letter,

> "...the director of the Department may take action to deny the application and close the file."

In that regard, the ACC has scheduled a hearing on the aforesaid Application in Tucson for August 7, 2008, and I currently anticipate that the hearing will be concluded within one (1) day. However, given that time must be allowed thereafter for the assigned Administrative Law Judge to prepare a recommended Opinion and Order for consideration by the ACC, and additional time must be allowed thereafter for ACC consideration of and action upon the recommended Opinion and Order, a question exists as to whether or not the ACC will have issued a final decision in this matter by "the beginning of October 2008" deadline specified in your July 28, 2008 letter. Accordingly, SWC hereby requests by means of this letter that the director of the Department and the Office of Assured and Adequate Water Supply keep SWC's above-referenced DAWS file open until a final decision and order has been issued by the ACC.

Thank you in advance for your consideration of this request on behalf of SWC. Please let me know if you have any questions regarding either the above or the enclosed July 17, 2008 ACC Staff Report. Any questions pertaining to SWC's currently pending DAWS Application should be addressed to Ms. Whatley.

Sincerely,

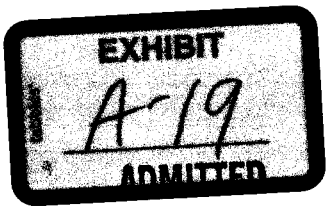
Lawrence V. Robertson, Jr.

cc: Diane Kusel – ADWR (Tucson Office)
Steve Olea – ACC (Phoenix Office)
Kristen Whatley – WestLand Resources, Inc.
Robert Sharpe – Sharpe and Associates, Inc.
Mark Seamans – SWC
Buck Schmidt – Brown and Caldwell

EXHIBIT A-19

(December 5, 2007 Well Impact Study Report)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



WELL IMPACT STUDY REPORT FOR SAHUARITA WATER COMPANY

Prepared for

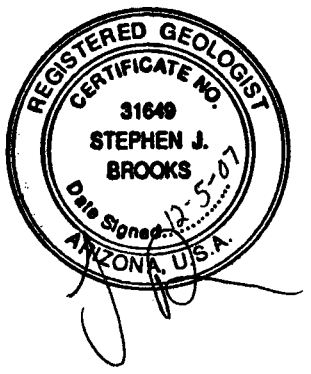
SAHUARITA WATER COMPANY,
SAHUARITA, ARIZONA

December 5, 2007

WELL IMPACT STUDY REPORT FOR
SAHUARITA WATER COMPANY

SAHUARITA WATER COMPANY, SAHUARITA, ARIZONA

December 5, 2007



BROWN AND CALDWELL

110 South Church Avenue, Suite 2300,
Tucson, Arizona 85701

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WELL IMPACT STUDY REPORT FOR SAHUARITA WATER COMPANY

EXECUTIVE SUMMARY

This report documents a well impact study conducted for the Sahuarita Water Company (SWC) to evaluate potential groundwater level impacts on neighboring wells not owned or operated by SWC from an augmentation of local groundwater development to serve potable water resources to an expanded water service area. The SWC is in the process of expanding the current limits of the Certificate of Convenience and Necessity (CC&N) water service area under the regulatory authority of the Arizona Corporation Commission (ACC). In 2006 the SWC developed about 1,260 acre-feet (AF) of groundwater to meet water demands. By 2034, the SWC has plans to develop about 11,000 AF annually to meet future potable water demands. More information on the development plans of SWC can be reviewed in the *Assured Water Supply Hydrology Report for Sahuarita Water Company* dated November 21, 2007 compiled by Brown and Caldwell.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and utilize one existing well into the future. Potential well sites were carefully selected with great emphasis in limiting water level impacts on neighboring wells not owned by SWC. To evaluate the potential water level impacts, the Arizona Department of Water Resources' (ADWR) well spacing rule R12-15-1302 *"Well Spacing Requirements - Applications to Construct New Wells or Replacement Wells in New Locations Under A.R.S. § 45-599"* was applied in the analysis.

The WINFLOW™ analytical element groundwater flow model was used to simulate two-dimensional, transient groundwater flow for the well impact study. The 10-foot drawdown radii contours that are projected to develop around each SWC well after five years of continuous pumping at the build-out production rates were calculated using the analytical groundwater model. The water-level drawdown radii contours are then compared to the locations of existing neighboring wells not owned by SWC.

The analytical model was used because a multi-well analysis is required (image well) to also simulate the projected hydrogeologic affects of shallow bedrock of the Sierrita Mountains to the west of the existing water service area. Image well theory provides a mechanism to create a "no flow" boundary at the shallow bedrock zone where the orientation of the boundary is near perpendicular to the pumping well.

Based on the well impact analyses presented, water-level drawdown impacts on neighboring wells from the augmentation of pumping of SWC wells will likely be nominal and will be in compliance with ADWR's well spacing requirements and well spacing regulations. All 10-foot drawdown radii calculated are 850 feet or less from the planned wells. No existing exempt and non-exempt wells are affected by greater than 10 feet or greater of additional water-level drawdown after 5 years of continuous pumping.

WELL IMPACT STUDY REPORT FOR SAHUARITA WATER COMPANY

1. INTRODUCTION

This report documents a well impact study conducted for the Sahuarita Water Company (SWC) to evaluate potential groundwater level impacts on neighboring wells not owned or operated by SWC from an augmentation of local groundwater development to serve potable water resources to a proposed expanded water service area. The SWC is in the process of proposing to expand the current limits of the Certificate of Convenience and Necessity (CC&N) water service area under the regulatory authority of the Arizona Corporation Commission (ACC). The current CC&N and proposed expanded area is shown on Figure 1-1. In 2006 the SWC developed about 1,260 acre-feet (AF) of groundwater to meet water demands. By 2034, the SWC has plans to develop about 11,000 AF annually to meet future potable water demands. More information on the development plans of SWC can be reviewed in the *Assured Water Supply Hydrology Report for Sahuarita Water Company* dated November 21, 2007 compiled by Brown and Caldwell.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and utilize one existing well into the future. Potential well sites were carefully selected with great emphasis on avoiding any regulatory water level impacts on neighboring wells not owned by SWC. To evaluate the potential water level impacts, the Arizona Department of Water Resources' (ADWR) well spacing rule R12-15-1302 *'Well Spacing Requirements - Applications to Construct New Wells or Replacement Wells in New Locations Under A.R.S. § 45-599'* was applied. Relevant excerpt of Section D of the rule is stated as follows:

> "If the director determines under subsection (B)(1) of this Section that the probable impact of the withdrawals from the proposed well or wells on one or more wells of record in existence as of the date of receipt of the application will exceed 10 feet of additional drawdown after the first five years of operation of the proposed well or wells, the director shall notify the applicant in writing of the location of the wells of record and the names and addresses of the owners of the wells as shown in the Department's well registry. "

This criterion formed the basis of the well impact study. In summary the rules require that no neighboring water wells can be impacted by more than 10 feet of additional water-level drawdown from operation of each well over a 5 year period.

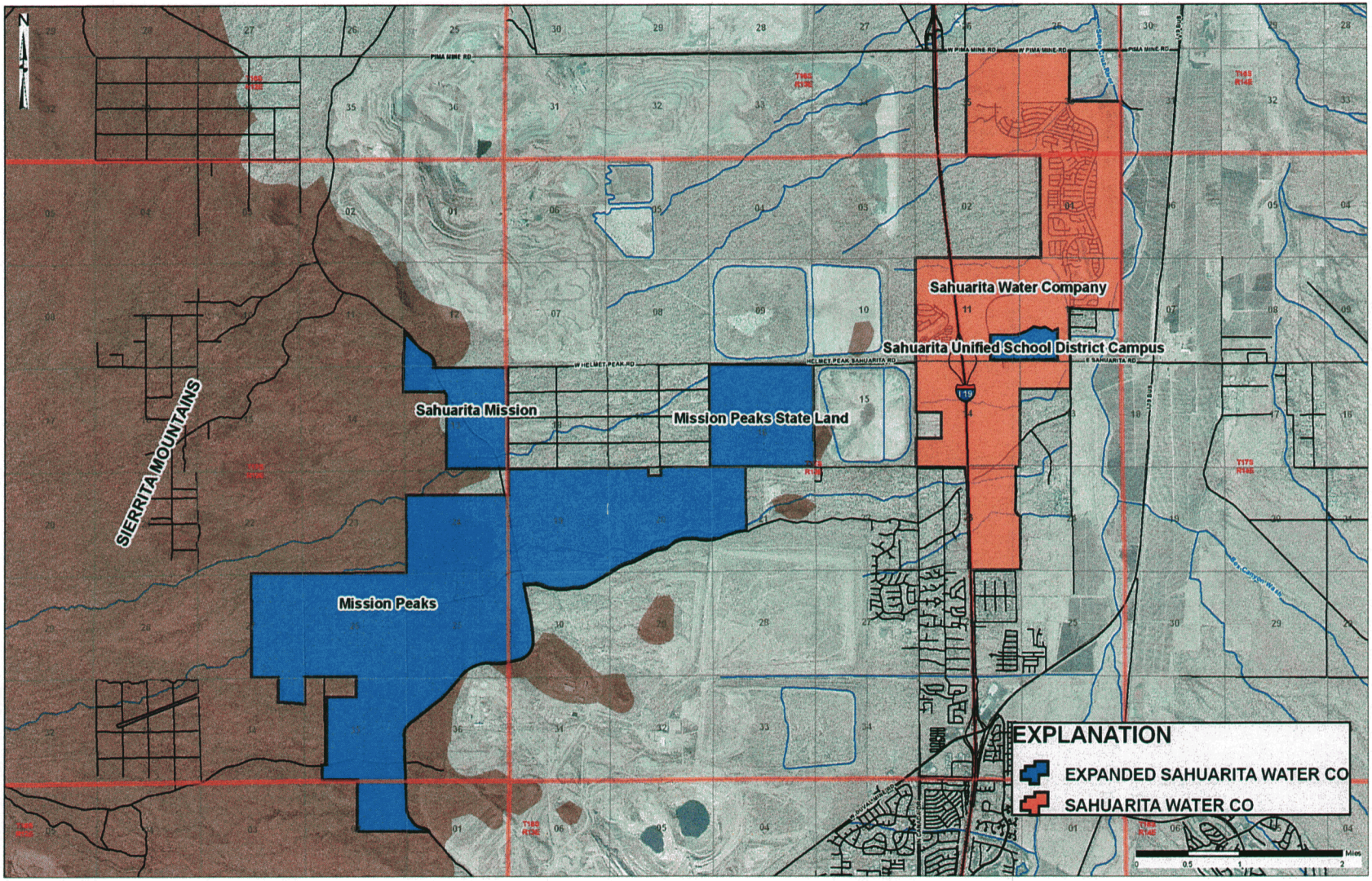

Figure 1-1 – Sahuarita Water Company's Certificate of Convenience and Necessity Current and Proposed Expanded Water Service Areas

2. CURRENT AND FUTURE GROUNDWATER DEVELOPMENT

Groundwater development from the local basinfill groundwater aquifer beneath the existing SWC's water service area will be the principal source of water to meet projected SWC water demands. The SWC, as of the date of this report, owns six wells and leases one well from the Town of Sahuarita. Information regarding these wells is included in Table 2-1 below. Groundwater is currently withdrawn from two active wells, Well Nos. 14 and 18. Well No. 14 is leased to the SWC by the Town of Sahuarita and is also used to maintain lake levels in the Sahuarita Town Lake.

Table 2-1. SAHUARITA WATER COMPANY WELLS

Well No.	ADWR Well Registration No.	Cadastral Location	Casing Diameter (inches)	Casing Materials	Well Depth (feet)	Upper Screen Depth (ft bls)	Lower Screen Depth (ft bls)	Drill Date
1	55-562962	D(17-13)11 dcd	8	Steel, Milled Slots, 12 cuts per foot, 3/16"x3" Slots	500	430	490	9/26/1997
12	55-611141	D(17-13)01 abb	24	Steel, Milled Slots, 24 rows, ¼"x3"	982	273	970	5/27/1970
14	**55-611142**	**D(17-13)01 acc**	**24**	**Steel, Milled Slots, 20 rows, ¼"x3"**	**1135**	**435**	**1135**	**10/9/1970**
17	55-611143	D(16-13)36 cbc	24	Steel, Milled Slots, 24 rows, ¼"x3"	1053	247	1030	12/20/1974
18	**55-611144**	**D(17-13)01 cdd**	**20**	**Steel, Slotted**	**905**	**424**	**890**	**4/18/1975**
19	55-611145	D(17-13)01 bac	24	Steel, Milled Slots, 24 rows, ¼"x3"	990	210	972	5/5/1981
20	55-611146	D(16-13)36 ddd	24	Steel, Milled Slots, 26 rows, ¼"x3"	975	240	975	9/22/1969

Note: Wells in bold are active wells as of the date of this report

Based on recent groundwater sampling and analysis, both wells, Well Nos. 14 and 18, produce potable groundwater. Other wells not utilized are considered to be beyond service life and plans are in place to abandon the wells. Well No. 1 has recently been converted to a monitoring well.

Based on water demand requirements at build-out in 2034, the SWC has plans to install 10 new potable water supply wells and phase out use of existing Well No. 14 for domestic use in 2009. Well No. 14 is leased to SWC from the Town of Sahuarita. This well will continue to be used to maintain lake levels in the Sahuarita Town Lake by applying Type 1 water rights associated with the property area. Well No. 18 will be utilized into the future but will likely be replaced on-site before the build-out year 2034.

In 2006 and 2007 Brown and Caldwell conducted pilot hole and exploratory boring analyses programs to evaluate potential future well sites for the SWC. Potential well sites were carefully selected with great emphasis on avoiding regulatory water level impacts on neighboring wells not owned by SWC. Groundwater production potential and groundwater quality were evaluated at 6 sites, and currently, as of the date of this report, evaluating 2 additional well sites. The pilot hole analysis conducted for Well Site No. 24 concluded that the well site is not viable based on groundwater quality. This analysis is documented in a report titled *Well Site No. 24 Pilot Hole Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007b). Exploratory boring analyses were conducted at 5 additional well sites, Well Site Nos. 21, 22, 23, 25, and 26. Exploratory boring analyses at Well Site Nos. 21, 23, 25 and 26 revealed favorable groundwater production potential and

groundwater quality. The exploratory boring analyses program is documented in a report titled *Well Site Nos. 21, 22, 23, 25, and 26 Exploratory Boring Analyses Report* dated September 6, 2007 (Brown and Caldwell, 2007c).

Table 2-2 tabulates water supply wells and future well sites planned to be utilized through build-out in year 2034 and beyond by SWC. Projected annual groundwater withdrawals and anticipated well capacities are indicated for each planned well. Well No. 14 will be phased out in 2009 and Well No. 18 will be utilized into the future but will likely be replaced before the build-out year 2034. Table 2-2 also indicates whether groundwater production potential and groundwater quality has been confirmed or not as of the date of this report. Confirmation is noted where a well is existing or an exploratory boring analysis has been completed verifying favorable groundwater production potential and groundwater quality for potable use. Well sites where confirmation has yet to be determined are slated for future exploratory boring analyses.

Figure 2-1 shows the location of these wells, future well sites and neighboring wells. Other wells owned by the SWC, also noted on Figure 2-1 and designated as Well Nos. 1, 12, 17, 19, and 20, will not be used as a result of age and poor conditions of the wells. Neighboring wells are registered wells compiled from ADWR well registry database (ADWR, 2007a) not owned by the SWC and location symbols denote wells as either exempt or non-exempt wells.

Table 2-2. SAHUARITA WATER COMPANY ACTIVE AND FUTURE PLANNED WATER SUPPLY WELLS

Well	Active or Future Wells	ADWR Registration No.	Cadastral Location	Current or Anticipated Pump Capacity (gpm)	Groundwater Production Potential and Groundwater Quality Confirmed?	Projected Groundwater Production at Build-out (2034) (AF/yr)
Well No. 14	Active	55-611142	D-17-13 1ACC	1,900	Yes	0
Well No. 18	Active	55-611144	D-17-13 1CDD	1,400	Yes	1,014.9
Well Site No. 17R	Future	NA	D-16-13 36CCA	1,500	No	1,087.4
Well Site No. 19R	Future	NA	D-17-13 1BDB	1,500	No	1,087.4
Well Site No. 21	Future	NA	D-17-13 1CDB	1,000	Yes	724.9
Well Site No. 23	Future	NA	D-17-13 11BAA	1,500	Yes	1,087.4
Well Site No. 24B	Future	NA	D-17-13 11CAA	1,500	No	1,087.4
Well Site No. 25	Future	NA	D-17-13 14ABA	1,500	Yes	1,087.4
Well Site No. 26	Future	NA	D-17-13 14DDC	750	Yes	543.7
Well Site No. 27	Future	NA	D-17-13 23ACC	1,500	No	1,087.4
Well Site No. 28	Future	NA	D-17-13 23DDA	1,500	No	1,087.4
Well Site No. 30	Future	NA	D-17-13 14DBA	1,500	No	1,087.4
						Total = 10,983 AF/yr

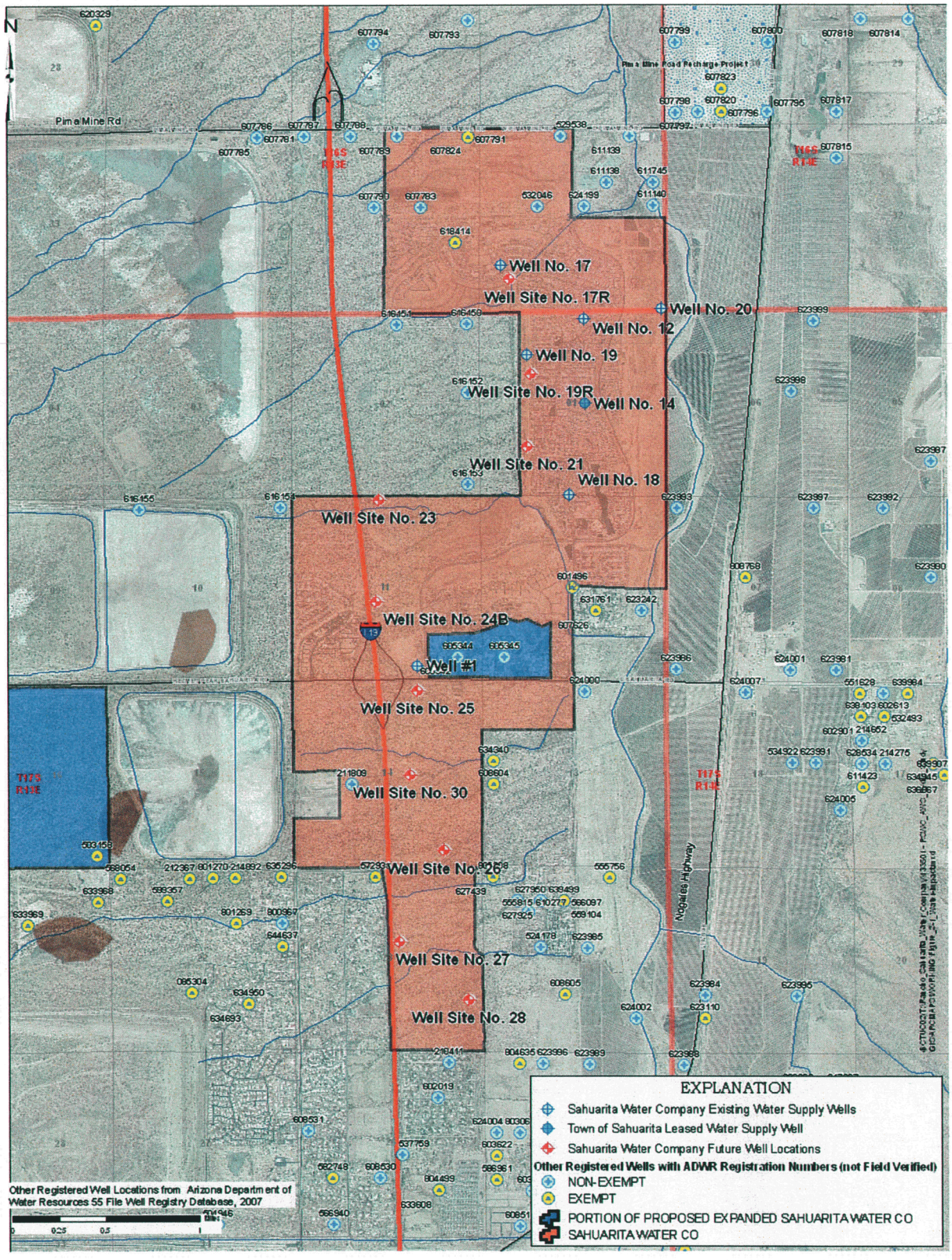

Figure 2-1 – Sahuarita Water Company's Existing and Future Planned Water Supply Well Locations, and Other Exempt and Non-Exempt Wells with ADWR Registration Numbers

3. WELL IMPACT ANALYSES

3.1 METHODOLOGY

The WINFLOW™ analytical element groundwater flow model was used to simulate two-dimensional, transient groundwater flow for the well impact analyses. The 10-foot drawdown radii contours that are projected to develop around each well after five years of continuous pumping at the build-out production rates were calculated using the analytical groundwater model. The water-level drawdown radii contours are then compared to the locations of existing neighboring wells not owned by SWC.

The analytical model was used because a multi-well analysis is required (image well) to also simulate the projected hydrogeologic effects of shallow bedrock of the Sierrita Mountains to the west of the existing water service area. Image well theory provides a mechanism to create a "no flow" boundary at the shallow bedrock zone where the orientation of the boundary is near perpendicular to the pumping well.

The steady-state module of the model simulates groundwater flow in a horizontal plane using analytical functions developed by Strack (1989). The transient module uses equations developed by Theis (1935) and by Hantush and Jacob (1955) for confined and leaky aquifers, respectively. Each module uses the principle of superposition to evaluate the effects from multiple analytical functions (wells, etc.) in a uniform, regional flow field. An image well was used to simulate the negative hydrologic boundary associated with bedrock of the nearby Sierrita Mountains. The input parameters for the model include: (1) aquifer hydraulic conductivity, (2) aquifer thickness, (3) aquifer storage coefficient, (4) pumping rate from the aquifer and (5) pumping duration.

Representative aquifer parameters are required to develop the model. These aquifer parameters were evaluated from aquifer tests recently performed on three water supply wells operated by SWC. Brown and Caldwell conducted an aquifer test and analysis on the SWC's Well No. 14 in May 2006. This aquifer test and analysis is documented in a memorandum report, "Well Spacing/Well Impact Investigation –Rancho Sahuarita Water Company's Well #21 – D-17-13 01CDB," dated December 22, 2006. In addition, Brown and Caldwell conducted aquifer test and spinner flow meter survey analyses on the SWC's Well Nos. 12 and 19 in July 2007. These tests are documented in a report *Well Nos. 12 and 19 Aquifer Test Analyses and Well Production Evaluations* dated July 16, 2007 (Brown and Caldwell, 2007a).

Transmissivity (T-values) evaluated and specific capacities measured from these aquifer tests are summarized on Table 3-1, along with pertinent information regarding the tests and wells.

Table 3-1. WELLS WITH AQUIFER TESTS

Well	ADWR Registration No.	Cadastral Location	Surface Elevation (ft amsl)	Date of Test	Duration (hr)	Static Water Level (ft bls)	Tested Rate (gpm)	Pumping Water Level (ft bls)	Measured Specific Capacity (gpm/ft)	T-Value (gpd/ft)	Analysis T	Upper Perforations (ft bls)	Lower Perforations (ft bls)
Well No. 12	55-611142	D-17-13 1ABB	2700	5/3/2007	24	252.2	536	269	32.7	65,325	Ave DD/Rec	273	970
Well No. 14	55-611144	D-17-13 1ACC	2706	5/25/2006	24	256.4	1811	331	24.3	73,300	Rec	435	1,135
Well No. 19	55-611145	D-17-13 1BAC	2726	5/10/2007	24	270.92	520	283	44.4	134,900	Ave DD/Rec	210	972

Notes: ft amsl = feet above mean sea level
hr = hour
ft bls = feet below land surface
gpm = gallons per minute
gpm/ft = gallons per minute per foot of drawdown
gpd/ft = gallons per day per foot of drawdown
DD = water-level drawdown analysis
Rec = water-level recovery analysis

Effective hydraulic conductivity (K-value) of the local aquifer is required for the model and was evaluated by the following relationship between transmissity and saturated thickness of the well under pumping conditions:

$$T = Kb$$

where

T = transmissivity of the aquifer perforated by the well;

b = saturated thickness of the aquifer perforated by the well under pumping conditions; and

K = effective hydraulic conductivity of the aquifer perforated by the well.

Table 3-2 below summaries the effective K-values calculated for the three wells that were tested and presents the average value used for all well impact analyses.

Table 3-2. EFFECTIVE HYDRAULIC CONDUCTIVITY (K-VALUE) CALCULATIONS

Well	Aquifer Thickness (b) (ft)[1]	T-Value (gpd/ft)	Effective K-Value (ft/d)
Well No. 12	697	65,325	12.5
Well No. 14	700	73,300	14.0
Well No. 19	689	134,900	26.2
		Average Effective K-Value =	17.6

Notes: 1 – Based on saturation of perforated interval of well under pumping conditions during aquifer test.
ft = feet
gpd/ft = gallons per day per foot of drawdown
ft/d = feet per day

Based on the average effective K-value and projected screen interval designs of the new wells that provide the saturated thickness of the local aquifer, estimated T-values for each well were calculated. Projected screen intervals of the wells are based in exploratory boring analyses performed at well sites and neighboring well sites (Brown and Caldwell, 2007c). The estimated T-values are tabulated in Table 3-3 below.

Table 3-3. ESTIMATED TRANSMISSIVITY VALUES FOR SAHUARITA WATER COMPANY FUTURE PLANNED WATER SUPPLY WELLS

Well	Screen Top Depth (ft/bls)	Screen Bottom Depth (ft bls)	Pump Gallary Top (ft bls)	Pump Gallary Bottom (ft bls)	Satuared Screen Thickness (ft)	Estimated T-Value of Sat. Screen Interval (gpd/ft)
Well No. 18	424	890	0	0	466	61,237
Well Site No. 17R	450	1050	600	630	570	74,903
Well Site No. 19R	450	1050	600	630	570	74,903
Well Site No. 21	440	760	590	620	290	38,109
Well Site No. 23	450	1050	570	600	570	74,903
Well Site No. 24B	450	1050	780	810	570	74,903
Well Site No. 25	500	980	640	670	450	59,134
Well Site No. 26	700	980	800	830	250	32,852
Well Site No. 27	500	980	600	630	450	59,134
Well Site No. 28	500	980	600	630	450	59,134
Well Site No. 30	500	980	600	630	450	59,134

Notes: ft bls = feet below land surface
gpd/ft = gallons per day per foot of drawdown

Specific yield (or aquifer storage coefficient) of the local aquifer was estimated based on regional groundwater modeling investigations of the area (Mason and Bota, 2006 and Brown and Caldwell, 2007d). The models include specific yield values for Layer 2 of the models associated with the Fort Lowell formation and upper Tinaja beds, and Layer 3 of the models associated with the lower Tinaja beds and Pantano formation. Value for the Layer 2 was assigned at 0.16. Value for Layer 3 was assigned 0.08. Since the proposed well designs will produce groundwater mostly from Layer 3, but not the Pantano formation, a conservative estimate 0.10 was adopted. More detailed information regarding the geologic formations that makeup the local aquifer can be reviewed in the *Assured Water Supply Hydrology Report for Sahuarita Water Company* dated November 21, 2007 compiled by Brown and Caldwell.

3.2 RESULTS

The WINFLOW™ analytical element groundwater flow model results of projected 10-foot water-level drawdown radii contour distances are tabulated in Table 3-4 and illustrated on Figure 3-1, along with exempt and non-exempt wells not operated by SWC. Model input and output files for each analysis of each planned SWC well are included as Appendix A. Table 3-4 also indicates the approximate boundary location orientation used to define the extent of shallow bedrock of the Sierrita Mountains to the west. These boundary orientations are defined as Nos. 1, 2 and 3 and are illustrated on Figure 3-1. As noted previously, a near perpendicular orientation is desired to define the boundary relative to the pumping well locations. An

image well pumping at a rate equal of the pumping well was placed in the model at a "mirror" image location west of the boundary to effectively create a "no-flow" boundary.

Table 3-4. ESTIMATED 10-FOOT WATER-LEVEL DRAWDOWN RADII AFTER 5 YEARS OF CONTINUOUS PUMPING AT BUILD-OUT PRODUCTION RATE FOR SAHUARITA WATER COMPANY FUTURE PLANNED WATER SUPPLY WELLS

Well	Sierrita Mtn Boundary No.	Projected 10-Foot Water-Level Drawdown Radius Distance From Well After 5 years of Continuous Pumping at Build-Out Production Rate (ft)
Well No. 18	1	~375
Well Site No. 17R	1	~175
Well Site No. 19R	1	~175
Well Site No. 21	1	~400
Well Site No. 23	1	~350
Well Site No. 24B	2	~400
Well Site No. 25	2	~650
Well Site No. 26	3	~200
Well Site No. 27	3	~650
Well Site No. 28	3	~500
Well Site No. 30	2	~850

Notes: ft = feet
gpd/ft = gallons per day per foot of drawdown

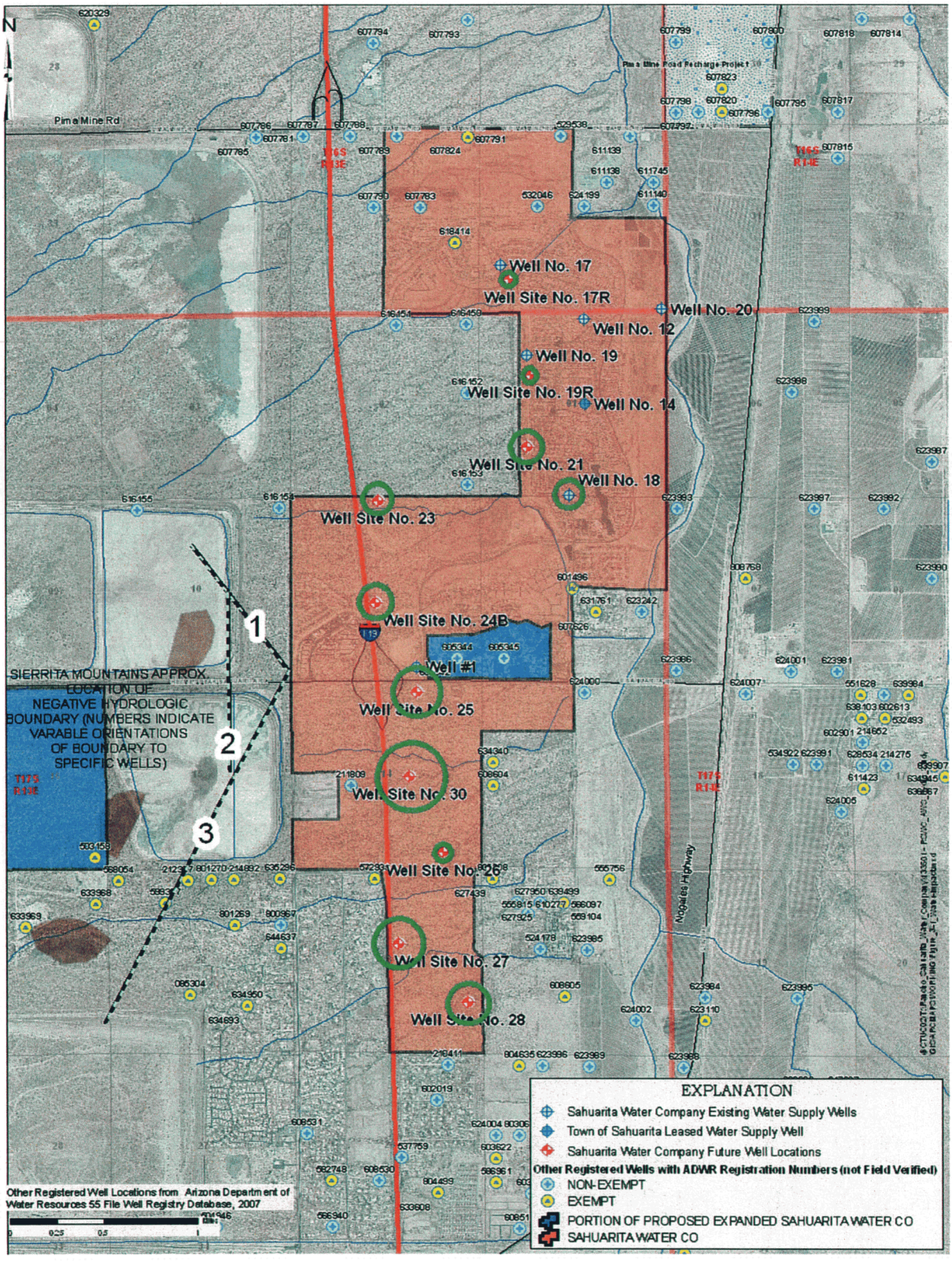

Figure 3-1 – Approximate Five Year, 10—Foot Water-Level Drawdown Impacts of Sahuarita Water Company Wells Pumping Individually at 2034 Build-Out Discharge Rates

4. CONCLUSIONS

Based on the well impact analyses presented, water-level drawdown impacts on neighboring wells from the augmentation of pumping of SWC wells will likely be nominal and will be in compliance with ADWR's well spacing requirements and well spacing regulations. All 10-foot drawdown radii calculated are 850 feet or less from the planned wells as indicated on Table 3-4. No existing exempt and non-exempt wells are affected by greater than 10 feet of additional water-level drawdown after 5 years of continuous pumping as illustrated on Figure 3-1.

5. LIMITATIONS

Report Limitations

This document was prepared solely for Sahuarita Water Company in accordance with professional standards at the time the services were performed and in accordance with the contract between Sahuarita Water Company and Brown and Caldwell, dated February 12, 2007. This document is governed by the specific scope of work authorized for Sahuarita Water Company; it is not intended to be relied upon by any other party, except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Sahuarita Water Company and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

REFERENCES

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APPENDIX A

WINFLOW™ Groundwater Model Output

Well Impact Analysis - Well No. 18

Image Well

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

==========
========
Date: 10/29/107
Time: 09:14:59.00

Input File: SWC18.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.445348
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1649772.000000 y: 11606167.000000
Radius = 0.750000
Pumping Rate = 121121.000000
Head at Well Radius = -23.542681
Well #2
Center of Well -- x: 1635652.000000 y: 11595127.000000
Radius = 0.750000
Pumping Rate = 121121.000000
Head at Well Radius = -23.542843

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -466.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1643873.500000
Minimum Y Coordinate = 11601414.530000

Maximum X Coordinate = 1656837.100000
Maximum Y Coordinate = 11609935.310000

Minimum Head = -13.839690
Maximum Head = -2.282738

Well No. 17R

Well No. 17R Well Impact Analysis

Image Well

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========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

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Date: 10/29/107
Time: 09:38:35.00

Input File: SWC17R.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -2.617927
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1648076.000000 y: 11612302.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.673759
Well #2
Center of Well -- x: 1630107.000000 y: 11598253.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.673853

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1646880.630000
Minimum Y Coordinate = 11610596.830000

Maximum X Coordinate = 1650501.760000
Maximum Y Coordinate = 11613071.270000

Minimum Head = -14.532557
Maximum Head = -4.304557

Well No. 19R Well Impact Analysis

Well No. 19R

Image Well

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========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 09:41:06.00

Input File: SWC19R.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.102571
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1648693.000000 y: 11609592.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.792963
Well #2
Center of Well -- x: 1632588.000000 y: 11597000.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -20.793083

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

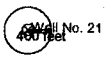
Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1647282.980000
Minimum Y Coordinate = 11608504.620000

Maximum X Coordinate = 1650723.050000
Maximum Y Coordinate = 11610757.770000

Minimum Head = -14.997571
Maximum Head = -4.831864

Well No. 21 Well Impact Analysis



⊗Image Well

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 09:43:34.00

Input File: SWC21.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.131058
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1648594.000000 y: 11607541.000000
Radius = 0.750000
Pumping Rate = 86511.000000
Head at Well Radius = -26.067978
Well #2
Center of Well -- x: 1634602.000000 y: 11596601.000000
Radius = 0.750000
Pumping Rate = 86511.000000
Head at Well Radius = -26.068115

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -290.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1647624.970000
Minimum Y Coordinate = 11606271.600000

Maximum X Coordinate = 1650421.290000
Maximum Y Coordinate = 11608544.860000

Minimum Head = -18.631055
Maximum Head = -5.405009

Well No. 23 Well Impact Analysis

Image Well

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========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

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Date: 10/29/107
Time: 09:45:41.00

Input File: SWC23.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1639451.375000 y1: 11604817.000000
x2: 1642206.125000 y2: 11601294.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.145582
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1644385.000000 y: 11606013.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.029911
Well #2
Center of Well -- x: 1637101.000000 y: 11600318.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.030329

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1639398.480000
Minimum Y Coordinate = 11602412.560000

Maximum X Coordinate = 1648477.300000
Maximum Y Coordinate = 11609044.600000

Minimum Head = -14.249449
Maximum Head = -3.864223

Well No. 24B Well Impact Analysis

==========
========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

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Date: 10/29/107
Time: 09:57:11.00

Input File: SWC24B.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1640500.375000 y1: 11603535.000000
x2: 1640500.000000 y2: 11598040.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.296631
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1644305.000000 y: 11603102.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.393927
Well #2
Center of Well -- x: 1636695.000000 y: 11603103.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -22.394300

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -570.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

==========
========

Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1642776.690000
Minimum Y Coordinate = 11601503.780000

Maximum X Coordinate = 1646438.050000
Maximum Y Coordinate = 11604662.210000

Minimum Head = -16.368509
Maximum Head = -5.801896

Well No. 25 Well Impact Analysis

==========
========

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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========
Date: 10/29/107
Time: 09:59:52.00

Input File: SWC25.WFL
Map File :

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========

Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1640500.375000 y1: 11603535.000000
x2: 1640500.000000 y2: 11598040.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.808351
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1645484.000000 y: 11600563.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.159061
Well #2
Center of Well -- x: 1635516.000000 y: 11600563.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.159391

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

==========
========

Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1644225.140000
Minimum Y Coordinate = 11599230.520000

Maximum X Coordinate = 1647464.030000
Maximum Y Coordinate = 11601664.720000

Minimum Head = -19.595329
Maximum Head = -6.646089

Well No. 26 Well Impact Analysis

⊗mage Well

Well No. 26
200 feet

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 10:15:11.00

Input File: SWC26.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1642206.125000 y1: 11601294.000000
x2: 1637018.875000 y2: 11591314.000000
Discharge per length = 0.000000
Head in Center of Linesink = -3.644881
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1646202.000000 y: 11596015.000000
Radius = 0.750000
Pumping Rate = 64886.000000
Head at Well Radius = -22.912327
Well #2
Center of Well -- x: 1635590.000000 y: 11601531.000000
Radius = 0.750000
Pumping Rate = 64886.000000
Head at Well Radius = -22.912407

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -250.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1644667.720000
Minimum Y Coordinate = 11593839.060000

Maximum X Coordinate = 1648610.720000
Maximum Y Coordinate = 11597621.130000

Minimum Head = -15.557647
Maximum Head = -3.799701

Well No. 27 Well Impact Analysis

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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========
Date: 10/29/107
Time: 10:18:13.00

Input File: SWC27.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1642206.125000 y1: 11601294.000000
x2: 1637018.875000 y2: 11591314.000000
Discharge per length = 0.000000
Head in Center of Linesink = -5.834194
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1644956.000000 y: 11593414.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.741333
Well #2
Center of Well -- x: 1634177.000000 y: 11599016.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.741440

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

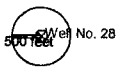
Minimum X Coordinate = 1643510.970000
Minimum Y Coordinate = 11592098.910000

Maximum X Coordinate = 1646850.450000
Maximum Y Coordinate = 11594714.170000

Minimum Head = -21.633819
Maximum Head = -6.381379

Well No. 28 Well Impact Analysis

⊗Image Well



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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 10:26:11.00

Input File: SWC28.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1642206.125000 y1: 11601294.000000
x2: 1637018.875000 y2: 11591314.000000
Discharge per length = 0.000000
Head in Center of Linesink = -4.185965
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1646898.000000 y: 11591753.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.119194
Well #2
Center of Well -- x: 1631702.000000 y: 11599651.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -26.119253

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1645220.940000
Minimum Y Coordinate = 11590046.940000

Maximum X Coordinate = 1649445.590000
Maximum Y Coordinate = 11593627.830000

Minimum Head = -17.903053
Maximum Head = -5.122971

Well No. 30 Well Impact Analysis

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WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

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Date: 10/29/107
Time: 10:29:30.00

Input File: SWC30.WFL
Map File :

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Model Entities

Number of Linesinks Defined by Infiltration Rate = 1

Line Sink #1
x1: 1640500.375000 y1: 11603535.000000
x2: 1640500.000000 y2: 11598040.000000
Discharge per length = 0.000000
Head in Center of Linesink = -6.379215
Total Linesink Discharge = 0.000000 [L3/T]

Number of Linesinks Defined by Head = 0

Number of Ponds = 0

Number of Wells = 2

Well #1
Center of Well -- x: 1645264.000000 y: 11598164.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.258942
Well #2
Center of Well -- x: 1635736.000000 y: 11598165.000000
Radius = 0.750000
Pumping Rate = 129773.000000
Head at Well Radius = -27.259293

Reference Head = 0.000000 Defined at -- x: 826068.500000 y:
5806116.500000

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Aquifer Properties

.... Transient Flow Model ....

Permeability.....= 17.600000 [L/T]
Porosity.....= 0.200000
Storage.....= 0.100000
Leakage factor.....= 0.000000
Elevation of Aquifer Top....= 0.000000
Elevation of Aquifer Bottom.= -450.000000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000

Model Results Computed at Time = 1825.000000

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Contour Matrix

Number of nodes in the X-direction = 75
Number of nodes in the Y-direction = 75

Minimum X Coordinate = 1643913.310000
Minimum Y Coordinate = 11596746.030000

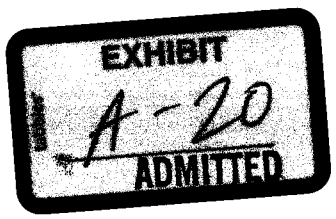
Maximum X Coordinate = 1647313.150000
Maximum Y Coordinate = 11599481.990000

Minimum Head = -19.300460
Maximum Head = -6.596577

EXHIBIT A-20

(Curtailment Tariff)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



WILLIAM A. MUNDELL
CHAIRMAN
JIM IRVIN
COMMISSIONER
MARC SPITZER
COMMISSIONER

BRIAN C. McNEIL
EXECUTIVE SECRETARY

ARIZONA CORPORATION COMMISSION

March 10, 2003

Ms. Diane Marie McKenzie
Rancho Sahuarita Water Company
6339 East Speedway, Suite 102
Tucson, Arizona 85710

RE: RANCHO SAHUARITA WATER COMPANY
DOCKET NO. W-03718A-02-0821
DECISION NO. 65464

Dear Ms. McKenzie:

Enclosed is a stamped copy of the tariffs that were approved pursuant to Decision No. 65464, with an effective date of December 19, 2002.

If you have questions regarding the filing of these tariffs, please contact me at (602) 542-4251.

Sincerely,

Lori H. Miller
Programs & Projects Specialist II
Utilities Division

/lhm

Enclosures

ORIGINAL

TARIFF SCHEDULE

Utility: Rancho Sahuarita Water Co. LLC
Docket No.:
Phone No.:
Tariff Sheet No.: 1 of 3
Decision No.:
Effective: 12.19.02

CURTAILMENT PLAN FOR: Rancho Sahuarita Water Co. LLC

ADEQ Public Water System Number: 10312

Rancho Sahuarita Water Co. LLC ("Company"), is authorized to curtail water service to all customers within its certificated area under the terms and conditions listed in this tariff.

This curtailment plan shall become part of the Arizona Department of Environmental Quality Emergency Operations Plan for the Company.

The Company shall notify its customers of this new tariff as part of its next regularly scheduled billing after the effective date of the tariff or no later than sixty (60) days after the effective date of the tariff.

The Company shall provide a copy of the curtailment tariff to any customer, upon request.

Stage 1 Exists When:

Company is able to maintain water storage in the system at 100 percent of capacity and there are no known problems with its well production or water storage in the system.

Restrictions: Under Stage 1, Company is deemed to be operating normally and no curtailment is necessary.

Notice Requirements: Under Stage 1, no notice is necessary.

Stage 2 Exists When:

a. Company's water storage or well production has been less than 80 percent of capacity for at least 48 consecutive hours, and

b. Company has identified issues such as a steadily declining water table, increased draw down threatening pump operations, or poor water production, creating a reasonable belief the Company will be unable to meet anticipated water demand on a sustained basis.

Restrictions: Under Stage 2, the Company may request the customers to voluntarily employ water conservation measures to reduce water consumption by approximately 50 percent. Outside watering should be limited to essential water, dividing outside watering on some uniform basis (such as even and odd days) and eliminating outside watering on weekends and holidays.

APPROVED FOR FILING
DECISION #: 65464
REVISED: September 18, 2002

ORIGINAL

TARIFF SCHEDULE

Utility: Rancho Sahuarita Water Co, LLC Tariff Sheet No.: 2 of 3
Docket No.: _____ Decision No.: _____
Phone No.: _____ Effective: 12-19-02

Notice Requirements: Under Stage 2, the Company is required to notify customers by delivering written notice door to door at each service address, or by United States first class mail to the billing address or, at the Company's option, both. Such notice shall notify the customers of the general nature of the problem and the need to conserve water.

Stage 3 Exists When:

a. Company's total water storage or well production has been less than 50 percent of capacity for at least 24 consecutive hours, and

b. Company has identified issues such as a steadily declining water table, increased draw down threatening pump operations, or poor water production, creating a reasonable belief the Company will be unable to meet anticipated water demand on a sustained basis.

Restrictions: Under Stage 3, Company shall request the customers to voluntarily employ water conservation measures to reduce daily consumption by approximately 50 percent. All outside watering should be eliminated, except livestock, and indoor water conservation techniques should be employed whenever possible.

Notice Requirements:

1. Company is required to notify customers by delivering written notice to each service address, or by United States first class mail to the billing address or, at the Company's option, both. Such Notice shall notify the customers of the general nature of the problem and the need to conserve water.

2. Beginning with Stage 3, Company shall post at least 8 signs showing the curtailment stage. Signs shall be posted at noticeable locations, like at the well sites and at the entrance to major subdivisions served by the Company.

3. Company shall notify the Consumer Services Section of the Utilities Division of the Corporation Commission at least 12 hours prior to entering stage 3.

Once Stage 3 has been reached, the Company must begin to augment the supply of water by either hauling or through an emergency interconnect with an approved water supply in an attempt to maintain the curtailment at a level no higher than Stage 3 until a permanent solution has been implemented.

Stage 4 Exists When:

a. Company's total water storage or well production has been less than 25 percent of capacity for at least 12 consecutive hours, and

APPROVED FOR FILING
DECISION #: 65464

ORIGINAL

TARIFF SCHEDULE

Utility: Rancho Sahuarita Water Co., LLC
Docket No.:
Phone No.:

Tariff Sheet No.: 3 of 3
Decision No.:
Effective: 12.19.02

b. Company has identified issues such as a steadily declining water table, increased draw down threatening pump operations, or poor water production, creating a reasonable belief the Company will be unable to meet anticipated water demand on a sustained basis.

Restrictions: Under Stage 4, Company shall inform the customers of a **mandatory** restriction to employ water conservation measures to reduce daily consumption. Failure to comply will result in customer disconnection. The following uses of water shall be prohibited:

- Irrigation of outdoor lawns, trees, shrubs, or any plant life is prohibited
- Washing of any vehicle is prohibited
- The use of water for dust control or any outdoor cleaning uses is prohibited
- The use of drip or misting systems of any kind is prohibited
- The filling of any swimming pool, spas, fountains or ornamental pools is prohibited
- Restaurant patrons shall be served water only upon request
- Any other water intensive activity is prohibited

Notice Requirements:

1. Company is required to notify customers by delivering written notice to each service address, or by United States first class mail to the billing address or, at the Company's option, both. Such notice shall notify the customers of the general nature of the problem and the need to conserve water.

2. Company shall post at least 25 signs showing curtailment stage. Signs shall be posted at noticeable locations, like at the well sites and at the entrance to major subdivisions served by the Company.

3. Company shall notify the Consumer Services Section of the Utilities Division of the Corporation Commission at least 12 hours prior to entering stage 4.

Customers who fail to comply with the above restrictions will be given a written notice to end all outdoor use. Failure to comply within two (2) working days of receipt of the notice will result in temporary loss of service until an agreement can be made to end unauthorized use of outdoor water. To restore service, the customer shall be required to pay all authorized reconnection fees.

If a customer believes he/she has been disconnected in error, the customer may contact the Commission's Consumer Services Section at 1-800-222-7000 to initiate an investigation. Once Stage 4 has been reached, the Company must augment the supply of water by hauling or through an emergency interconnect from an approved supply or must otherwise provide emergency drinking water for its customers until a permanent solution has been implemented.

APPROVED FOR FILING
DECISION #: 65464

EXHIBIT A-21

(Pima County Public Utility License Agreement)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008

F. ANN RODRIGUEZ, RECORDER
RECORDED BY: C_V
DEPUTY RECORDER
1016 PE1
PCREA
PIMA CO REAL PROPERTY SERVICES
PICK UP
ATTN LISA

DOCKET: 13161
PAGE: 153
NO. OF PAGES: 9
SEQUENCE: 20072000057
10/16/2007
AG 10:04

PICKUP
AMOUNT PAID $ 0.00

PIMA COUNTY PUBLIC UTILITY LICENSE AGREEMENT

WHEREAS, this License Agreement is entered into between Pima County, a political subdivision of the State of Arizona (hereinafter "County"), and Rancho Sahuarita Water Company, LLC, fka Interchange Water Company, Inc. (hereinafter "Licensee"); and

WHEREAS, Licensee has applied and petitioned to the Board of Supervisors of the County for the right and privilege to construct, install, maintain, and operate Licensee's facilities within the public rights-of-way within Pima County and outside the confines of any incorporated city or town as required by A.R.S. § 40-283; and

WHEREAS, notice of the County's intent to enter into this agreement has been duly given as required by law; and

WHEREAS, said application came before the Board of Supervisors of the County of Pima, State of Arizona, and no petition to the Board of Supervisors to deny such privilege was filed or presented to the Board; and

WHEREAS, it being determined by the Board of Supervisors that the granting of this License is authorized by law and in the best interests of Pima County and the inhabitants thereof;

THEREFORE, the County and Licensee agree to the following:

Section 1. Grant of License. Licensee is hereby authorized and empowered, on a non-exclusive basis, to use all County public rights-of-way now existing or hereafter established and lying within the unincorporated areas of Pima County, under the terms and conditions set forth herein, for the purpose of installing, repairing, replacing, and maintaining its facilities.

Section 2. Term. This License is granted for a term of fifteen (15) years from the date this License is approved by the Board of Supervisors and extinguishes, supersedes and replaces all preceding franchises or licenses granted to Licensee by County.

Section 3. Regulation of County Rights-of-Way. All rights hereunder are granted under the express condition that County shall have the power at any time to impose restrictions and limitations, and to make regulations as to Licensee's use of the County's rights-of-way as may be deemed best for the public interests, safety or welfare.

Section 4. Superior Rights. The rights of County in and to the use of all public rights-of-way located within the unincorporated areas of Pima County are and forever shall be paramount and superior to the rights of Licensee.

Section 5. Alteration of Public Rights-of-Way. Nothing in this License shall be construed to prevent County from, altering, improving, adjusting, repairing, or maintaining its facilities and public rights-of-way and for that purpose to require Licensee to adjust, remove, replace or relocate Licensee's facilities to accommodate or facilitate the County's use of its facilities or rights-of-way. Facilities of Licensee shall mean any physical object or improvement owned, possessed, made, installed, constructed or maintained by Licensee or made, installed or constructed by County or others at the request of Licensee. Facilities of County shall mean any physical object or improvement owned, possessed, made, installed, maintained or constructed by County or others at the request of County, including all paving, highway, transportation, flood control and wastewater facilities located within County rights-of-way.

Section 6. Non-Exclusive Use. Nothing in this agreement shall be construed to grant Licensee an exclusive right to use the public rights-of-way. Licensee's facilities shall be erected, adjusted, installed, replaced, removed, relocated and maintained in a manner that will not interfere with the reasonable use of the public rights-of-way by the public, the County, or any other franchisee or licensee. The location of Licensee's facilities in the public rights-of-way shall not create or establish a vested interest in the rights-of-way and its facilities shall be removed or relocated by Licensee whenever County determines that Licensee's facilities impact, restrict, obstruct or hinder the County or the public's existing or future use of the rights-of-way or the County's operation or location of County facilities.

Section 7. Relocation. Licensee shall be solely responsible for the design, adjustment, removal or relocation, temporarily or permanently, of all Licensee's facilities that impact, conflict or interfere with the County's use of its rights-of-way or the County's improvement, relocation or adjustment of any facilities located in County rights-of-way. The cost of designing, adjusting, removing, relocating or replacing Licensee's facilities shall be Licensee's sole responsibility, unless Licensee has established prior rights with the County for the facilities to be affected. Prior to beginning any activity in the County rights-of-way, Licensee shall obtain all required permits from the County and any other applicable jurisdiction for the activity. The Licensee's facilities shall be adjusted, removed, replaced or relocated by Licensee in accordance with an activity schedule determined by County and provided to Licensee within a reasonable period of time prior to the scheduled activity start date. If the schedule is unacceptable to the Licensee or Licensee finds it necessary to plead financial hardship regarding the cost of relocating its facilities, the Licensee may appeal to the Board of Supervisors. If Licensee's facilities are not adjusted, removed, replaced or relocated within the time period allotted by the County's activity schedule, County may, at its discretion, adjust or relocate Licensee's facilities. Licensee hereby agrees to be liable for all costs incurred by County for the adjustment or relocation of Licensee's facilities necessitated by County's activities, including overhead and maintenance costs and an administrative surcharge in the amount of fifteen (15) percent of the total cost attributed to the adjustment or relocation of Licensee's facilities. In the event County incurs such costs, County shall submit a bill to Licensee for the incurred costs, and Licensee shall pay County the invoiced amount within ninety (90) calendar days of receipt of the invoice. If the invoice is not timely

paid by Licensee, all rights granted to Licensee under this agreement shall be suspended and no permits will be issued to Licensee for any work within the County rights-of-way until the invoiced costs are paid in full to County.

Section 8. Undergrounding. The parties acknowledge that County has the authority to require Licensee to underground its above ground facilities in County rights-of-way when the County determines that undergrounding of Licensee's facilities is necessary to conform to existing County Ordinances or is in the public interest. The County may require Licensee to conduct a study of the cost of undergrounding any portion or segment of Licensee's facilities located in the County rights-of-way. The study shall set forth an estimate of the costs of undergrounding Licensee's facilities including a breakdown of the cost allocated to labor, material, design and construction for converting above ground facilities to underground facilities. The Licensee shall submit a cost study for any specified segment of Licensee's facilities within ninety (90) calendar days after receiving written notice from County requesting the cost study. The cost of preparing and providing any cost study requested by County shall be borne by the Licensee.

Section 9. Scenic Routes. The installation of Licensee's facilities within any public rights-of-way designated by the Board of Supervisors as a scenic route must be constructed in accordance with the County's Scenic Routes Ordinance.

Section 10. Performance of Work. The work required by Licensee to design, construct, reconstruct, pothole for design, adjust, relocate, replace or repair Licensee's facilities shall be Licensee's sole responsibility. The cost of any delays to County projects caused by Licensee's failure to complete its work in accordance with the County's activity schedule shall be the Licensee's sole responsibility. In the event County incurs such costs, County shall submit a bill to Licensee for the incurred costs and Licensee shall pay County the invoiced amount within ninety (90) calendar days of receipt of the invoice. If the invoice is not timely paid by Licensee, all rights granted to Licensee under this agreement shall be suspended and no permits will be issued to Licensee for any work within the County rights-of-way until the invoiced costs are paid in full to County.

Section 11. Location of Facilities. As a condition of this License, Licensee hereby agrees to have and maintain precise, up-to-date maps of Licensee's facilities located in County rights-of-way and to make this information available to County within fifteen (15) calendar days of receiving a written request from the County. Beginning on the effective date of this Agreement, Licensee shall maintain precise and verifiable horizontal and vertical location information tied to an accepted County datum and provide such information to the County within fifteen (15) calendar days of receiving written notice from County. As a condition of the issuance of this License, Licensee agrees to provide surface location marking of Licensee's undergrounded facilities located within the public rights-of-way within two working days of a request from the County. In the event the Licensee is unable to provide the location information to County within the allotted time frame, County may, at its discretion, locate Licensee's facilities and Licensee shall be liable for the cost incurred in locating Licensee's facilities.

Section 12. Work in Rights-of-Way.

12.1. *Damage to other facilities.* In the construction, adjustment, removal, relocation, repair, operation and maintenance of its facilities, Licensee shall avoid causing or permitting any damage, disturbance or unnecessary modification or alteration to County facilities including pavement, or the facilities of others, located in the County rights-of-way. If Licensee causes or permits any such damage, disturbance or unnecessary alteration or modification, Licensee, at its sole expense and in a manner approved by the County Engineer, shall restore the damaged, disturbed, altered, or modified facilities to the condition in which they existed before being damaged, disturbed, modified, or altered. Licensee shall also be liable to owners of said facilities for any other losses or expenses which may accrue because of said damage, disturbance, modification or alteration. The restoration of facilities shall be initiated promptly and completed expeditiously by Licensee, who shall give priority to the restoration, repair or replacement of such facilities over all non-emergency activities of Licensee.

12.2. *Damage to vegetation.* In the construction, adjustment, removal, relocation, repair, operation and maintenance of its facilities, Licensee shall use all necessary care to avoid any damage to or disturbance of existing vegetation in the public rights-of-way. If Licensee causes or permits any such damage or disturbance, Licensee shall re-vegetate the rights-of-way at its sole expense and in accordance with all County regulations then in effect.

12.3. *Adjacent properties.* Licensee shall provide prior written notice to the owners or residents of adjoining properties of any activity of Licensee which may temporarily interfere with access to or use of said adjoining property. Licensee shall maintain access to adjoining properties during all construction activities or other operations, unless the requirement of access is waived in writing by the owners and residents of adjoining properties. If an emergency requires activity without written notice, Licensee shall use its best efforts to provide timely actual notice to the owners and residents of the adjoining properties.

Section 13. Design and Location of Facilities.

13.1. Licensee shall use reasonable care at all times to avoid damage or injury to persons and property during the construction, adjustment, removal, relocation, repair, operation and maintenance of Licensee's facilities.

13.2. The location and construction of Licensee's facilities in public rights-of-way shall conform to County standards and guidelines then in effect and as may be directed by County, in order not to interfere with a planned future use of the public rights-of-way by the County.

13.3. Licensee's facilities shall be located in a manner designed to cause the least amount of interference with the public's existing or future use of roads, streets, alleys and other public rights-of-way and in such a way as will minimize interference with the rights and convenience of adjacent property owners.

13.4. County may require Licensee to remove, relocate or underground, at Licensee's sole expense, any of Licensee's facilities that present a potential hazard to the public, that

interfere with the public's use of the public rights-of-way, or are determined by County to be aesthetically undesirable.

13.5. Licensee shall be responsible for notifying owners or residents of adjoining properties in writing about permanent or temporary above or below ground facilities to be constructed in the County rights-of-way. Licensee shall make every reasonable effort to resolve the concerns of property owners and residents regarding the construction of Licensee's facilities. Should the County determine that Licensee failed to reasonably evaluate all options available to alleviate residents concerns, County may require the Licensee to relocate its facilities at Licensee's sole expense.

13.6. Licensee shall be responsible for the cost to excavate in a "careful and prudent manner" Licensee's underground facilities pursuant to A.R.S. § 40-360.21 and § 40-360.22A on all County construction projects occurring within County rights-of-way.

Section 14. Construction Safety. Any opening or obstruction in the public rights-of-way caused by Licensee during the course of Licensee's activities in the rights-of-way shall be guarded and protected at all times by safety barriers erected by Licensee which shall be clearly designated by warning lights during periods of dusk and darkness. Any work performed by Licensee in or adjacent to a public roadway open for travel shall be properly signed and marked by Licensee with warning and directional devices in accordance with all applicable state and local traffic regulations and in accordance with the Arizona Department of Transportation's Traffic Control Manual for Highway Construction and Maintenance.

Section 15. Drainage. During construction or excavation in the public rights-of-way, Licensee shall provide proper drainage so that the public rights-of-way will be free from standing surface water and adequately drained so as not to cause flood or erosion damage to the facilities of the County or surrounding property. Licensee may be required, at the request of the County, to submit drainage engineering data and design plans to the County for review and approval prior to the issuance of any Right-of-Way Use Permit by County.

Section 16. Issuance of Permit not County Approval. County's review, approval or acceptance of plans or specifications or issuance of a permit for the installation, construction or location of a facility by Licensee shall not be construed to be an authorization for or approval of a violation of any federal, state or local law or regulation, or any industry standard, pertaining to the location or construction of a utility facility in public rights-of-way. No permit or approval presuming to give such authority shall be valid or otherwise relieve Licensee of its obligations under this License regarding the location and construction of facilities.

Section 17. County Inspection. County, if it deems necessary, has the right to inspect any work by Licensee in the public rights-of-way to insure proper performance of the terms of this License and conformance with any applicable federal, state and local laws, ordinances and regulations. County may require Licensee to pay a reasonable and uniform fee to cover the actual costs of inspections performed by County or its contractor under this provision. County may, at its discretion, pothole Licensee's facilities to verify conformance with *Section 11. Location of Facilities* of this License. Licensee shall be liable for the cost of potholing and an

administrative surcharge in the amount of fifteen (15) percent of the total cost of potholing should Licensee's facilities be out of conformance. Licensee shall be responsible for taking corrective action to bring as-builts into conformance with verified facilities.

Section 18. Abandonment of Facilities. Abandonment in place, of any of Licensee's facilities located within the County rights-of-way may only occur by acquiring written approval from the County.

Section 19. Liability and Indemnity. Licensee acknowledges its sole liability for its facilities installed in the public rights-of-way and for any activities it performs within the public rights-of-way. Licensee agrees to indemnify, hold harmless, and defend the County, its officials, agents, servants, and employees against all claims for injuries to persons or damage to property arising out of Licensee's work in the public rights-of-way or due to the existence of Licensee's facilities in the public rights-of-way, or in any way related to Licensee's exercise of its rights under this License. Neither the issuance of a County permit for installation or location of a facility, nor County approval of the activity, installation or location, nor the failure of the County to direct Licensee to take any precautions or make any changes or to refrain from doing anything shall excuse Licensee of its responsibilities hereunder to County or others in the case of any injury to persons or damage to property. If County is sued in any court by any person, firm, association or corporation to recover damages for injuries to person or property on account of the installation, repairing, operation and maintenance of facilities of Licensee, Licensee shall defend all such suits and pay any resulting judgments and shall, at the option of County, be made a party to any such court proceeding.

Section 20. County Participation in Legal Actions. The County shall have the right at all times to take part in any suit or action instituted by or against Licensee in which any judgment or decree can be rendered or foreclosing any lien on any of Licensee's property situated within public rights-of-way, or affecting the rights, powers or duties of Licensee to do or not to do anything which by this License it may be required to do or not to do, and also to take such steps as the County may deem essential to protect the interests of County or the public interest. County shall have the right to intervene in any suit, action, or proceeding by any person or persons, firm or corporation seeking to enjoin, restrain, or in any manner interfere with Licensee in the performance or observance by it of any of the terms or conditions of this License, or any regulation, notice or direction of County in such connection, or which involves or might involve the constitutionality, validity or enforcement of this License. County may also move for dissolution of any such injunction or restraining order or take any other appropriate step, in any such suit, action or proceeding which it may deem necessary or advisable to protect its interests.

Section 21. Compliance with License Conditions and Ordinances. Licensee agrees to conform to, abide by, and perform all the conditions, provisions, requirements, and limitations in this License Agreement. Licensee shall be subject to all County ordinances now in force or hereafter adopted, including all ordinances relating to the use of public rights-of-way by utilities. Licensee agrees that it will not assert any claim against the County that the provisions of this License or any applicable County ordinance or regulation in force at the time of execution of this License are unreasonable, arbitrary or void.

Section 22. Non-Exclusive License. This License and the privileges granted herein shall not be exclusive. The Board of Supervisors expressly reserves the right to grant, at any time, similar franchises, licenses and privileges over the same highways, roads, streets, alleys, and thoroughfares, or any thereof, to any other persons, firms or corporations.

Section 23. Assignment. Licensee hereby agrees that this License shall not be sold, assigned or transferred without the prior written approval of the Pima County Board of Supervisors, which approval shall not be unreasonably withheld. The decision to approve or deny the sale, assignment or transfer of this License shall be within the sole discretion of the Board of Supervisors and the Board may deny Licensee's request to sell, assign or transfer the License if such denial is in the best interests of the County. Licensee further agrees that none of Licensee's facilities in the County rights-of-way shall be sold, assigned, or transferred without prior written notice thereof to County pursuant to Section 24 below."

Section 24. County's Contact Information. All notices or contact concerning this License shall be provided in writing to:

Pima County Real Property Services
201 North Stone, 6th Floor
Tucson, Arizona 85701
(520) 740-6313

Section 25. Licensee's Contact Information. Any change in any of the Licensee's contact information below shall be made in writing to the County.

Name: _____

Title: _____

Address: _____

Phone: _____

LICENSEE:

By: _____

President, Sharpe & Associates Inc

Title: Managing Partner, Rancho Sahuarita Water Co.

State of Arizona)
) ss
County of Pima)

This instrument was acknowledged before me this 14 day of August, 2007, by Robert Sharpe, as President, Sharpe & Associates, Inc. Acting Partner Rancho Sahuarita Water Co. of _____.

Cynthia Gaunt
Notary Public

My Commission Expires:
Nov. 29, 2008

Official Seal
NOTARY PUBLIC
STATE OF ARIZONA
County of Pima
CYNTHIA GAUNT
My Commission Expires November 29, 2008

PIMA COUNTY, ARIZONA

Chairman, Pima County Board of Supervisors

Date: OCT 02 2007

ATTEST:

Clerk, Pima County Board of Supervisors

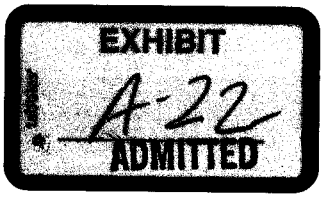
Approved as to form:

Deputy County Attorney

EXHIBIT A-22

(SWC's July 31, 2008 Response to July 17, 2008 Staff Report)

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
August 7, 2008



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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
KRISTIN K. MAYES
GARY PIERCE

IN THE MATTER OF THE APPLICATION OF SAHUARITA WATER COMPANY, L.L.C. FOR AN EXTENSION OF ITS EXISTING CERTIFICATE OF CONVENIENCE AND NECESSITY.	DOCKET NO. W-03718A-07-0687 APPLICANT'S RESPONSE TO JULY 17, 2008 STAFF REPORT

I.

IDENTIFICATION OF APPLICANT

Pursuant to the Eighth Ordering Paragraph of the Procedural Order issued on May 29, 2008 in the above-captioned and above-docketed proceeding, Sahuarita Water Company, L.L.C. ("SWC"), hereby responds to the July 17, 2008 Staff Report filed in the aforesaid proceeding. In that regard, attached hereto as Appendix "A" and incorporated herein by this reference is a redlined/strikethrough revised version of the July 17, 2008 Staff Report and Exhibit 2 thereto, which reflects certain revisions which SWC suggests for consideration by the Commission Staff in advance of the August 7, 2008 evidentiary hearing in the aforesaid proceeding.

At the outset, SWC desires to express (i) its appreciation for the Commission's Staff's recommendation that the requests set forth in SWC's Application and Amended Application be granted, and (ii) its agreement with three (3) of the four (4) recommended conditions of the Commission's Staff, as set forth at items 1 through 4 on numbered page 7 of the July 17, 2008 Staff Report. In that regard, the suggested revisions reflected in Appendix "A" hereto and discussed below are primarily intended to clarify information previously submitted by SWC in

(i) supporting appendices to the Application, (ii) responses to Insufficiency Letter Nos. 1 and 2 received from the Commission's Staff and/or (iii) responses to Commission Staff Data Requests.

II.

DISCUSSION OF SUGGESTED REVISIONS

Time Period For Compliance With Condition No. 2:

Two (2) different time periods appear within the July 17, 2008 Staff Report and Exhibit 2 with regard to that period of time SWC should be allowed within which to docket as a compliance item

> "...copies of the Approval to Construct for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area."

On pages 5 and 7 of the July 17, 2008 Staff Report, the suggested time period for compliance is three (3) years. On page one of the Executive Summary, and on pages 3 and 4 of Exhibit 2 document, the recommended time period is two (2) years. Inasmuch as SWC anticipates that it will not commence construction of the water system facilities in the proposed CC&N extension area until 2010,[1] and a five- (5) year build-out period is contemplated for the initial phase of water system infrastructure construction in that area, SWC believes that a three- (3) year time period for submittal of the Approval(s) to Construct referenced in Condition No. 2 is the more appropriate time period for compliance with this condition.

Inasmuch as the period of time allowed for compliance is measured from the effective date of issuance of a decision in this proceeding, and in the event that a favorable decision should be forthcoming by the end of this year, a two- (2) year period for compliance would allow SWC only through 2010 within which to submit all of the Approval(s) to Construct for a five- (5) year build-out program for all of the infrastructure needed to serve the initial subdivision in the

[1] In an April 25, 2008 letter from the undersigned to Vicki Wallace of the ACC Staff, in response to the Commission Staff's Insufficiency Letter No. 2, SWC advised the Commission's Staff that

> "...it is currently anticipated that construction of the company's water system facilities in the proposed CC&N extension area will begin in 2010." [April 25, 2008 letter at page 2] [emphasis supplied]

A copy of the aforesaid April 25, 2008 letter is attached hereto as Appendix "B" and is incorporated herein by this reference.

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extended CC&N area. SWC is concerned that that might prove to be an insufficient period of time within which to obtain all of the necessary Approval(s) to Construct. Accordingly, it suggests that the July 17, 2008 Staff Report be revised in the aforesaid portions of the Executive Summary and Exhibit 2 to substitute three (3) years for two (2) years as the time period for compliance with Condition No. 2. In that regard, the suggested revisions are indicated with redlining and strikethroughs in Appendix "A" hereto.

Clarification of SWC's Existing and Planned Water System Facilities and Anticipated Construction Costs:

The discussion of SWC's existing water system facilities in the last paragraph on page 4 of the July 17, 2008 Staff Report appears to have inadvertently omitted any recognition of one (1) drinking water well SWC currently owns and operates in addition to the drinking water well that SWC leases from the Town of Sahuarita under a 99-year lease, which is mentioned in the discussion of SWC's existing water system facilities. Accordingly, as may be noted from Appendix "A" hereto, SWC is suggesting certain language additions and deletions with redlining and strikethroughs to address that apparent omission.[2]

In that regard, it is conceivable that a March 13, 2008 letter from the undersigned to Vicki Wallace of the Commission's Staff, in response to Commission Staff Insufficiency Letter No. 1, may have created some confusion[3]. More specifically, on page 3 of that letter, and in response to Item No. 5 of the aforementioned Insufficiency Letter, the undersigned referred to the leased well but did not refer to the additional existing well which SWC owns and operates in connection with the provision of potable water service to its customers.

In addition, in the first paragraph on page 5 of the July 17, 2008 Staff Report, the discussion does not fully reflect the new water system facilities SWC is proposing to install during the first five (5) years of construction activity in order to serve the requested CC&N extension area. The omitted items include (i) a second 1,500 GPM well and (ii) a 900,000 gallon

[2] Similar language additions and deletions are also suggested for the applicable paragraph on page 1 of Exhibit 2 to the July 17, 2008 Staff Report.

[3] A copy of the March 13, 2008 letter is attached hereto as Appendix "C" and is incorporated herein by this reference.

storage reservoir in 3570 Zone. Accordingly, in Appendix "A" hereto, SWC is suggesting certain language additions with redlining to address these facilities omissions.[4]

Finally, in the second and fourth paragraphs of page 5 of the July 17, 2008 Staff Report, $16,533,375 is portrayed as SWC's estimated plant costs for the initial five (5) year period, if the requested CC&N extension request is granted. However, in actuality, this figure represents only the estimated plant expenditures for the first three (3) years, once construction has actually begun in 2010.

More specifically, and as may be noted from both (i) page 1 of the February 15, 2008 Opinion of Probable Construction Costs ("OPCC"),[5] as prepared by WestLand Resources, Inc., and (ii) the table shown on page 2 of Exhibit 2 to the July 17, 2008 Staff Report, no construction expenditures for water system facilities in the CC&N extension area are anticipated during 2008 or 2009. Accordingly, the February 15, 2008 OPCC five- (5) year projection of expenditures begins with 2010 (as Year 1) and continues through 2014 (as Year 5). Whereas, Exhibit 2 to the July 17, 2008 Staff Report begins with 2008 (as Year 1) and continues through 2012 (as Year 5). It is apparent that the two (2) approaches utilize a different annual starting point, and thus result in different years of conclusion. However, the effect of the approach reflected in Exhibit 2 to the July 17, 2008 Staff Report is to exclude from consideration the water system facilities and construction costs of $4,497,500 for 2013 (Year 4) and $720,000 for 2014 (Year 5), which are contemplated by the February 15, 2008 OPCC.[6]

SWC is uncertain why the July 17, 2008 Staff Report utilized a five- (5) year projection period which begins in 2008. However, SWC wants to be sure that all concerned are aware that the figure SWC anticipates for the initial five- (5) year period of construction of new water system facilities in the extended CC&N area would be $21,750,875, and not the $16,533,375

[4] Similar language additions are also suggested for the applicable paragraph on page 1 of Exhibit 2 to the July 17, 2008 Staff Report.

[5] The OPCC was submitted as a part of SWC's March 13, 2008 response to Insufficiency Letter No. 1, and a copy is attached hereto as Appendix "D" and incorporated herein by this reference.

[6] In this regard, the July 17, 2008 Staff Report's omission of SWC's projected plant additions for 2013 and 2014 may explain why one (1) additional 1,500 GPM well and 900,000 gallons of additional storage were omitted, because the February 15, 2008 OPCC shows those facilities being constructed in 2013.

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shown in the July 17, 2008 Staff Report and Exhibit 2.[7] In that regard, as may be noted in Appendix "A" hereto, SWC has suggested with redlining that the amount of $21,750,875 be substituted for the amount of $16,533,375 wherever the latter figure appears in both the July 17, 2008 Staff Report and Exhibit 2 thereto.[8]

Miscellaneous Revisions:

Appendix "A" hereto also contains a few additional suggested language revisions which are intended by SWC to be of a clarifying nature. These also are indicated with redlining and strikethroughs.

III.

CONCLUSION

SWC appreciates the opportunity to respond to the July 17, 2008 Staff Report, and to offer suggested revisions for consideration by the Commission's Staff. In addition, SWC reiterates (i) its appreciation for the Commission's Staff's recommendation that the requests set forth in SWC's Application and Amended Application be granted, and (ii) its agreement with three (3) of the four (4) recommended conditions of the Commission's Staff, as set forth at items 1 through 4 on numbered page 7 of the July 17, 2008 Staff Report.

Dated this 31st day of July 2008.

Respectfully submitted,

Lawrence V. Robertson, Jr.
Attorney for Sahuarita Water Company, L.L.C.

The original and thirteen (13) copies of the foregoing Applicant's Response will be filed this 31st day of July 2008 with:

[7] $21,750,875 minus $4,497,500 (2013 or OPCC Year 4) and $720,000 (2014 or OPCC Year 5), equals $16,533,375.

[8] If the Commission's Staff should agree with this suggestion, then the table on page 2 of Exhibit 2 would need to be revised to include plant expenditures projected by the February 15, 2008 OPCC for 2013 and 2014.

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(520) 398-0411

Docket Control
Arizona Corporation Commission
c/o 400 W. Congress, Suite 218
Tucson, Arizona 85701

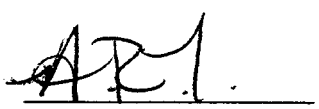
A copy of the foregoing Applicant's Response will be mailed/emailed this 31st day of July 2008 to:

Hon. Belinda A. Martin
Arizona Corporation Commission
400 West Congress, Suite 218
Tucson, Arizona 85701

Janice Alward, Chief Counsel
Legal Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Ernest Johnson, Director
Utilities Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Arizona Reporting Service, Inc.
2200 North Central Avenue, Suite 502
Phoenix, Arizona 85004-1481



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ATTORNEY AT LAW
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Appendix "A"

to

Applicant's Response to July 17, 2008 Staff Report

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
July 31, 2008

UTILITIES DIVISION
REVIEW OF STAFF REPORT

SAHUARITA WATER COMPANY, LLC
DOCKET NO: W-03718A-07-0687

ORIGINATING STAFF: VICKI WALLACE

DOCKET DUE DATE & TIME: JULY 17, 2008

FINAL

Final review by Supervisor/Manager:_____ **(Due)** Date: _____ Time:_____

Final review by Chief:_____ **(Due)** Date: _____ Time:_____

Received by Admin Staff:_____ Date: __ Time:

Reviewed by Chief of Compliance: _____ Date: _____ Time:_____

Received by Admin Staff:_____ Date: _____ Time:_____

Reviewed by Consumer Services: _____ Date: _____ Time:_____

Received by Admin Staff:_____ Date: _____ Time:_____

Review by Legal Division:_____ **(Due)** Date: _____ Time:_____

Received by Admin Staff:_____ Date: _____ Time:_____

Received by Carolyn Buck:_____ Date: _____ Time:_____

Review by Director' s Office: _____ **(Due)** Date: _____ Time:_____

DUE TO: _____ **Date:** _____ **Time:**_____

NOTE: THIS CHECKLIST MUST TRAVEL WITH THE DOCUMENT THROUGH ALL REVIEWS. PLEASE DO NOT DETACH FROM THE DOCUMENT. THE CHECKLIST WILL BE FILED IN THE DIRECTOR'S OFFICE AFTER DOCKETING.

MEMORANDUM

TO: Docket Control

FROM: Ernest G. Johnson
Director
Utilities Division

DATE: July 17, 2008

RE: SAHUARITA WATER COMPANY - APPLICATION FOR AN EXTENSION OF ITS CERTIFICATE OF CONVENIENCE AND NECESSITY TO PROVIDE WATER SERVICE IN UNINCORPORATED AREAS PIMA COUNTY, ARIZONA (DOCKET NO. W-03718A-07-0687)

Attached is the Staff Report for the above referenced application. Staff is recommending approval of the application with conditions.

EGJ:VW:red

Originator: Vicki Wallace

ORIGINAL

Service List for: Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687

Mr. Mark J. Seamans
General Manager
Sahuarita Water Company, L.L.C.
PO Box 1520
Sahuarita, Arizona 85629

Mr. Lawrence V. Robertson, Jr.
Attorney for Sahuarita Water Company, L.L.C.
PO Box 1448
Tubac, Arizona 85646

Ms. Janice Alward
Chief, Legal Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Mr. Ernest G. Johnson
Director, Utilities Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Ms. Lyn Farmer
Chief, Hearing Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

ORIGINAL

STAFF REPORT
UTILITIES DIVISION
ARIZONA CORPORATION COMMISSION

SAUARITA WATER COMPANY, L.L.C.

DOCKET NO. W-03718A-07-0687

APPLICATION FOR AN EXTENSION OF ITS
CERTIFICATE OF CONVENIENCE & NECESSITY
TO PROVIDE WATER SERVICE TO
UNINCORPORATED AREAS IN PIMA COUNTY, ARIZONA

JULY 17, 2008

ORIGINAL

STAFF ACKOWLEDGEMENT

The Staff Report for Sahuarita Water Company, L.L.C. (Docket No. W-03718A-07-0687) was the responsibility of the Staff members listed below. Vicki Wallace was responsible for the review and analyses of the Company's application. Dorothy Hains was responsible for the engineering and technical analysis.

_____

Vicki Wallace
Executive Consultant II

_____

Dorothy Hains
Utilities Engineer

ORIGINAL

EXECUTIVE SUMMARY
SAHUARITA WATER COMPANY, L.L.C.
DOCKET NO. W-03718A-07-0687

On December 14, 2007, Sahuarita Water Company, L.L.C. ("SWC" or "Company"), a certificated Arizona public service corporation, filed an application with the Arizona Corporation Commission ("ACC" or "Commission") requesting approval for an extension of its existing Certificate of Convenience and Necessity ("CC&N") to provide water service to additional areas within Pima County, Arizona. On May 2, 2008, SWC filed an amended application requesting an Opinion and Order: (1) transferring the CC&N currently held in the name of Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C.; and (2) granting SWC an extension to the existing CC&N thereby authorizing SWC to provide water service to include additional areas within Pima County, Arizona.

SWC is an Arizona limited liability corporation, authorized by the ACC to provide water service within portions of Pima County, Arizona. By this application, SWC is seeking to extend its current approximate five (5) square mile CC&N to include an additional 5,322 acres (approximately seven (7) square miles in size) located southwest of the Company's existing CC&N.

Staff concludes that the existing SWC system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N, and the described plant will provide the Company with sufficient capacity to serve the requested extension area. Staff further concludes that it is reasonable to assume that SWC will develop additional capacity as needed to meet future growth in the requested extension area.

Staff concludes that the Company's estimates of the initial five year period expenditures of ~~$16,533,375~~21,750,875 (w-25% contingencies) are reasonable and appropriate for this project. However, approval of this CC&N application does not imply any particular future treatment for rate base. No "used and useful" determination of the proposed plant in service was made, and no conclusions should be inferred for future rate making or rate base purposes.

Staff recommends that the Commission approve the SWC's request to transfer its CC&N from Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C., and for an extension of its Certificate of Convenience and Necessity in portions of Pima County to provide water service, subject to compliance with the following conditions:

1. To require the SWC to charge its existing rates and charges in the proposed extension area.

2. To require SWC to docket as a compliance item in this case within ~~two~~three (3) years of the effective date of an order in this proceeding copies of the Approval to Construct for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

3. That the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's Designation of Assured Water Supply- has been modified to include this new extension area.

4. To require that off-site infrastructure for new connections be funded through hook-up fees and not off-site facilities agreements.

Staff further recommends that the Commission's decision granting this extension of its Certificate of Convenience and Necessity to the SWC be considered null and void after due process without further order from the Commission should SWC fail to meet conditions 2 and 3 within the time specified.

ORIGINAL

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ORIGINAL

INTRODUCTION

On December 14, 2007, Sahuarita Water Company, L.L.C. ("SWC" or "Company"), a certificated Arizona public service corporation, filed an application with the Arizona Corporation Commission ("ACC" or "Commission") requesting approval for an extension of its existing Certificate of Convenience and Necessity ("CC&N") to provide water service to additional areas within Pima County, Arizona. On May 2, 2008, SWC filed an amended application requesting an Opinion and Order: (1) transferring the CC&N currently held in the name of Rancho Sahuarita Water Company, L.L.C. ("RSWC") to Sahuarita Water Company, L.L.C.; and (2) granting SWC an extension to the existing CC&N thereby authorizing SWC to provide water service to include additional areas within Pima County, Arizona. The amended application also deleted the request to extend its CC&N to include 112 acres to serve the Sahuarita Unified School District ("SUSD") as SWC had learned since filing the original application that SUSD facilities were located within the boundaries of SWC's existing CC&N.

On January 14, 2008, the ACC Utilities Division ("Staff") filed an Insufficiency Letter indicating that the Company's application did not meet the sufficiency requirements of the Arizona Administrative Code ("A.A.C.") R14-2-402. Staff sent additional data requests to the Company on January 31, 2008. On March 13, 2008, the Company filed its response to the first sufficiency letter. On April 9, 2008, Staff filed a Second Insufficiency Letter listing additional deficiencies to be cured for administrative purposes. On April 25, 2008, the Company filed its response providing additional information to address the deficiencies. On May 27, 2008, Staff filed a Sufficiency Letter indicating that the application had met the sufficiency requirements of the A.A.C.

On May 30, 2008, a Procedural Order was issued setting the matter for hearing on August 7, 2008.

BACKGROUND

SWC is an Arizona limited liability company and is in good standing with the Commission's Corporations Division. On December 20, 1995, in Decision No. 59431, the Commission granted Interchange Water Company ("IWC"), an Arizona corporation, a CC&N to provide water service within portions of Pima County. The water service area therein certificated included the then contemplated master-planned community of Rancho Sahuarita, which has since become a reality. On November 2, 1999, in Decision No. 62032, the Commission authorized RSWC, an Arizona limited liability Company, to acquire the water system assets and then existing CC&N of IWC.

On October 15, and October 18, 2007, respectively, RSWC filed Articles of Amendment with the Commission's Corporations Division for Rancho Sahuarita Water Company, L.L.C. in which RSWC indicated that Mission Peaks 4000, LLC ("Mission Peaks 4000"), a Nevada limited liability company, had acquired a 20 percent or greater membership interest in RSWC and that its name was being changed to Sahuarita Water Company, L.L.C. SWC currently serves

approximately a five square mile area with approximately 4,250 customers located in the Rancho Sahuarita and Rancho Resort residential communities.

By this application and amended application, SWC is seeking to extend its current CC&N to include an additional 5,322 acres (approximately seven square miles in size) to provide water service to approximately 20,300 additional customers. The requested extension area is located southwest of the Company's existing CC&N near the Town of Sahuarita in southwest Pima County and is non-contiguous to the existing service area. The Company estimates that ~~2,204~~5,696 new residential customers will be served in the requested area by the end of the fifth year, as well as 150,000 square feet of commercial space and a new elementary school. Exhibit 1 is the legal description and map of the proposed extension area.

THE NAME/OWNERSHIP CHANGE

The change in name from RSWC to SWC was occasioned by requests for water service which RSWC had received from several owners of real property near to the exterior boundaries of its existing CC&N. Each of the three entities requesting service are located outside of the boundaries of the Rancho Sahuarita master-planned community but within the general vicinity of the Town of Sahuarita, and the owners of ~~Sahuarita Water~~RSWC thus concluded the name change would be appropriate to reflect a more regional presence.

RSWC was initially owned by Sharpe & Associates, Inc. and Interchange Opportunity Fund, L.L.L.P. As indicated above, Mission Peaks 4000, L.L.C. acquired a share of the Company in 2007. With the filing of the Amended Articles of Organization and the name change, SWC's current ownership percentages are as follows: Sharpe & Associates, Inc., 2/3 percent (.667); Mission Peaks 4000, L.L.C., 33 1/3 percent (33.333), and Interchange Opportunity Fund, L.L.L.P., 66 percent (66.00). Both limited liability companies are in good standing with the ACC Corporations Division. Interchange Opportunity Fund, a limited liability limited partnership, is filed and up-to-date with the Arizona Secretary of State's Office; and the agent/owners listed are David S. Cutler, CPA, and Sharpe & Associates, Inc.

In response to Staff's inquiry regarding any organizational and managerial structure changes resulted from the name change and/or ownership change, SWC advised that the organizational structure of SWC changed only in the sense that Mission Peaks 4000, L.L.C. acquired a minority membership interest. SWC further advised that the managerial structure did not change and that Sharpe and Associates, Inc. continued to be the Manager of SWC. Staff also inquired if Mission Peaks, L.L.C. had any previous experience operating a water or wastewater company and was advised that it did not and that in its status as a minority member, Mission Peaks, L.L.C. would not be directly involved in the day-to-day operations of SWC.

Mission Peaks 4000, L.L.C., a Nevada limited liability company, is in good standing with the ACC Corporations Division and is owned by American Nevada Company, L.L.C., Rancho Maria Colorado, L.L.C., ANC Arizona I, L.L.C., and Tucson 4000, L.L.C. American Nevada Company, L.L.C. is the managing partner for Mission Peaks, L.L.C. and was formed in 1974 as

the real estate development arm of the Greenspun group of companies. America Nevada's community developments are touted to be the most recognized in the Las Vegas valley setting high standards for land use, architectural design and engineering. American Nevada Company, L.L.C. is also in good standing with the ACC Corporations Division.

REQUESTS FOR SERVICE

SWC has received requests for services from Mission Peaks 4000, L.L.C. (part owner of SWC), Sahuarita Mission Partners, an Arizona general partnership, and the Arizona State Land Department.

The Mission Peaks 4000 development covers 4,228 acres that it owns and anticipates serving 15,000 residences. SWC indicates that this development, which will be referred to as Mission Peaks Master-Planned Community ("Mission Peaks"), will consist of: (1) 11,123 single-family units; (2) 2,371 active-adult units; (3) 1,506 multi-family units; and (4) an additional 1.1 million square feet of non-residential use, which will include commercial developments, recreation centers, places of worship, and a police and fire station. In addition, current plans contemplate one (1) high school, one (1) middle school, and two (2) elementary schools.

The Sahuarita Mission development covers 471 acres that it owns and anticipates serving 3,000 single-family residences. The Arizona Land Department currently contemplates a buildout density of 2,300 single-family units for the 634 acres that it owns.

SWC anticipates that development in the proposed CC&N extension area will occur in multiple phases over a thirty (30) year period of time. The applicant indicates that the overall development pattern projected for the entire proposed CC&N extension area will be conducted in three phases starting with the Mission Peaks 4000 development. This development will also be divided into three phases, the first of which is not anticipated to be completed until 2014.

During Staff's review, it was noted that none of the requested extension areas were contiguous to SWC's current CC&N, but that some of the extension area was contiguous to Las Quintas Serenas Water Company ("Las Quintas"). Staff asked SWC if any of the entities requesting service had contacted Las Quintas about providing water. The Company advised that the only entity requesting service from SWC whose property boundary was adjacent to Las Quintas was Mission Peaks. It was the Company's understanding that Mission Peaks spoke with the majority owner of Las Quintas approximately two years ago regarding the possibility of receiving water service, but that such contact did not result in any subsequent substantive discussions. Although it's not a current requirement of water companies, Staff asked if SWC had notified Las Quintas that SWC was requesting to serve the area. SWC responded that it did not notify Las Quintas itself. However, the prospect of SWC being the water provider to Mission Peaks and the other properties has been a matter of common knowledge in the Sahuarita/Green Valley area for more than a year, and it has been the subject of a number of newspaper articles discussing the proposed Mission Peaks development. Through its own

research, Staff did find multiple articles about the Mission Peaks development and the provision of water by SWC. Additionally, no other utility companies or individuals have filed to intervene in this docket.

FINANCE OF FACILITIES

The Company indicates that SWC will initially finance the required transmission and distribution facilities using a combination of funds in the form of main line extension agreements ("MXAs") and off-site facilities agreements (Advances in Aid of Construction ("AIAC") and Contributions in Aid of Construction ("CIAC")) with master developer(s) and/or subdivision developer(s) approved by the Commission's Utility Division and common equity. The Company indicates the reason that it will initially utilize MXA's and off-site facilities agreements for funding was due to the size of the project and the fact that no infrastructure currently exists within the CC&N extension area. The Company further indicates that once customers begin taking service, the Company will utilize hook-up fees as the main source of funding. The Company feels it is conceivable that at some point in the buildout of the existing CC&N and CC&N extension areas, SWC might conclude that it also would be appropriate to finance a portion of the water system capacity with long-term debt. At that point, SWC would seek and obtain Commission authorization before incurring any long-term debt. The Company further advised that depending on its financial situation at the time, SWC might consider common equity as a means of financing a portion of the overall transmission system.

In Decision No. 62032 (November 2, 1999), the Commission authorized the Company an Off-site Facilities Hook-up Fee Tariff. The tariff requires SWC to obtain a hook-up fee CIAC determined by meter size and number of connections. The amount collected is to be deposited into a trust account and used to finance the construction of off-site facilities. The hook-up fee tariff states that its purpose is "to equitably apportion the costs of off-site water facility development to serve the Company's Service Area among all new service connections in that area." It is Staff's position that a company cannot use a combination of off-site service agreements and hook-up fees for new infrastructure. In other words, once a company has an approved hook-up fee, that would be the method of funding new off-site infrastructure requirements for new connections in addition to investment by the Company if needed. Thus, Staff recommends that off-site infrastructure for new connections be funded through hook-up fees and not off-site facilities agreements.

THE WATER SYSTEM

Staff's Engineering Report which is attached as Exhibit 2 describes the existing and proposed water system in detail. ~~The Company has one drinking water well with a production capacity of 1,620 gallons per minute ("GPM").~~ The Company currently has two (2) drinking water wells available to it to serve the existing base of customers in its existing CC&N. One well is owned by the Company and it has a production capacity of 1,600 GPM. The second well is owned by The Town of Sahuarita, and it is leased to the Company under a 99-year lease agreement. This well has a production capacity of 1,620 GPM. In addition, the Company owns

three storage tanks with combined capacity of 2,550,000 gallons, and five pressure tanks which serve the existing CC&N. ~~Although the Company does not own the production well, the Company holds a 99 year lease agreement from the Town of Sahuarita who does own the well.~~ Staff concludes that the existing SWC system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N.

To serve the requested extension area the Company proposes to install, within the initial five years of construction activity, new plant items including, but not limited to: (1) ~~one~~two new 1,500 GPM wells; (2) three 600,000 gallon storage tanks in two (2) forebays and the 3420 Zone and a 900,000 gallon storage tank in the 3570 Zone; (3) one 2,500 GPM booster station; (4) one 1,700 GPM booster station; (5) one 2,300 GPM booster station; and (6) one 3,300 GPM booster station and transmission mains.

In response to Staff data requests, the Company submitted an ~~Engineer's Report and Infrastructure Analysis~~ Opinion of Probable Construction Costs ("OPCC") prepared by Westland Resources, Inc., that included a description of the proposed new water system and estimated plant costs for the next five years (a summary of which is in Exhibit 2) that totaled ~~$16,533,375~~21,750,875 (w-25% contingencies). The Company does not expect to provide service in the requested extension area until 2010~~late 2009~~.

Staff concludes that the plant items listed above will provide the Company with sufficient capacity to serve the requested extension area. Staff further concludes that it is reasonable to assume that SWC will develop additional capacity as needed to meet future growth in the requested extension area.

Staff concludes that the Company's estimates of the initial five year period of construction expenditures of ~~$16,533,375~~21,750,875 (w-25% contingencies) are reasonable and appropriate for this project. However, approval of this CC&N application does not imply any particular future treatment for rate base. No "used and useful" determination of the proposed plant in service was made, and no conclusions should be inferred for future rate making or rate base purposes.

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY ("ADEQ") COMPLIANCE

Compliance Status

ADEQ regulates the water system under ADEQ Public Water System I.D. No. 10-312. ADEQ reported that it has determined that SWC is in compliance with ADEQ requirements and is currently delivering water that meets the water quality standards required by Arizona Administrative Code, Title 18, Chapter 4.[1]

[1] Compliance status reports received from ADEQ on May 30, 2008.

Certificate of Approval to Construct

The Company has not submitted ADEQ or other authorized agency-issued permits, either Certificates of Approval to Construct ("ATC") or Certificates of Approval of Construction ("AOC"), for the plant items needed to serve the requested extension area. Staff recommends that the Company docket as a compliance item in this case within three years of the effective date of an Order in this proceeding copies of the ATCs for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

ARIZONA DEPARTMENT OF WATER RESOURCES ("ADWR") COMPLIANCE

Compliance Status

SWC is located in the Tucson Active Management Area ("AMA"), as designated by ADWR. Staff received an ADWR compliance status report on June 23, 2008, and ADWR reported that it has determined that SWC is currently in compliance with departmental requirements governing water providers and/or community water systems.

Designation of Assured Water Supply ("DAWS")

In its application, SWC indicates that it currently has a Designation of Assured Water Supply from ADWR of 4,700 annual acre feet, and it submitted an application to ADWR on November 23, 2007, to modify the Designation of Assured Water Supply, by way of an increase, to reflect its ability to fully provide the projected water demand at buildout in both the existing and proposed CC&N extension areas for the statutorily-prescribed 100 years. Accompanying that request was an Assured Water Supply Hydrology Report for SWC that was prepared by Brown and Caldwell, an engineering and hydrology consultant firm. SWC received an ~~insufficiency~~administrative completeness review letter from ADWR~~ on April 1, 2008~~dated March 27, 2008, and a response to ~~the insufficiency~~ADWR's letter was sent to ADWR by SWC on July 7, 2008. SWC asserts the hydrology analysis in the above-referenced report demonstrates the physical availability of 10,983 acre feet of local groundwater for both the existing CC&N and the proposed CC&N extension areas of SWC at buildout for the requisite 100 year period.

Staff recommends that the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's DAWS has been modified to include this new extension area.

ACC COMPLIANCE

According to the Utilities Division Compliance Section, the Company has no delinquent ACC compliance item.

WASTEWATER PROVIDER

According to the Company, wastewater service in the requested extension area will be provided by either Pima County Wastewater Management or the Town of Sahuarita. The Company advised that a determination had not yet been made between those two (2) jurisdictional entities as to which would be the provider of wastewater services.

CURTAILMENT PLAN TARIFF AND CROSS CONNECTION TARIFF

In Decision No. 65464, (December 19, 2002) the Commission approved a Curtailment Plan Tariff for SWC. SWC also has a Cross Connection Tariff in place.

PROPOSED RATES

SWC has proposed to extend service to the extension property at its tariffed rates.

CITY OR COUNTY FRANCHISE/PERMIT

The Town of Sahuarita does not issue franchises. A permit is obtained from the Town each time a project enters into the property, roads, or alley ways of Sahuarita. All extensions of the SWC's facilities under the proposed CC&N extension would occur within unincorporated areas of Pima County. SWC currently has a Public Utility License Agreement between Pima County and SWC that pertains to SWC's use of public rights-of-way within the municipal boundaries.

RECOMMENDATIONS

Staff recommends that the Commission approve SWC's request to transfer its CC&N from Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C., and for an extension of its Certificate of Convenience and Necessity in a portion of Pima County to provide water service as requested in the Application and Amended Application, subject to compliance with the following conditions:

1. To require the SWC to charge its existing rates and charges in the proposed extension area.

2. To require SWC to docket as a compliance item in this case within three years of the effective date of an order in this proceeding copies of the Approval to Construct for well(s), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

3. That the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR

stating that the Company's DAWS has been modified to include this new extension area.

4. To require that off-site infrastructure for new connections be funded through hook-up fees and not off-site facilities agreements.

Staff further recommends that the Commission's decision granting this extension of its Certificate of Convenience and Necessity to the SWC be considered null and void after due process without further order from the Commission should SWC fail to meet conditions 2 and 3 within the time specified.

ORIGINAL

EXHIBIT 2

MEMORANDUM

DATE June 26, 2008

TO: Vicki Wallace, Chief
Consumer Services & Special Projects

FROM: Dorothy Hains, P. E.
Utilities Engineer

RE: **WATER CC&N EXTENSION FOR SAHUARITA WATER COMPANY, LLC.**
DOCKET NOS. W-03718A-07-0687

I. Introduction

Sahuarita Water Company, LLC. ("Sahuarita" or "Company") has submitted a Certificate of Convenience and Necessity ("CC&N") extension application to the Arizona Corporation Commission ("ACC") to provide water services near the Town of Sahuarita ("Town") in southwest Pima County. The Company currently serves approximately a five square mile service area. The Company has an existing customer base of approximately 4,250 customers. The requested extension area, which is non-contiguous to the existing service area, is approximately seven square miles in size. The requested extension area is located southwest of the Company's existing CC&N. If this application is approved, the Company estimates that it will be serving ~~2,204~~5,696 new residential customers in the extension area ~~within~~by the end of five years, as well as 150,000 square feet of commercial space and a new elementary school.

II. Analysis of Water Systems

Existing System

~~The Company operates a water system that consists of one drinking water well (having a production rate of 1,620 gallons per minute ("GPM")).~~ The Company currently has two (2) drinking water wells available to it to serve the existing base of customers in its existing CC&N. One well is owned by the Company and it has a production capacity of 1,600 GPM. The second well is owned by The Town of Sahuarita, and it is leased to the Company under a 99-year lease agreement. This well has a production capacity of 1,620 GPM. In addition, the Company owns three storage tanks (having a combined capacity of 2,550,000 gallons); and five pressure tanks which serve the existing CC&N. ~~Although the Company does not own the production well, the Company holds a 99 year lease agreement from the Town who owns the well.~~ The existing Sahuarita system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N.

Proposed System

To serve the requested extension area ~~within the next five years~~, the Company proposes to install, within the initial five years of construction activity, new plant items including but not limited to (1) ~~one~~two new 1,500 GPM wells, (2) three 600,000 gallon storage tanks in two (2) forebays and the 3420 Zone and a 900,000 gallon storage tank in the 3570 Zone, (3) one 2,500 GPM booster station, (4) one 1,700 GPM booster station, (5) one 2,300 GPM booster station, (6) one 3,300 GPM booster station and transmission mains. The Company does not expect to provide service in the requested extension area until ~~late~~ 2010~~09~~.

Estimated Cost of the Proposed System

In response to Staff data requests, the Company submitted an ~~Engineer's Report and Infrastructure Analysis~~ Opinion of Probable Construction Costs ("OPCC") prepared by Westland Resources, Inc. The ~~report~~OPCC included a description of the proposed new water system and estimated plant costs which totaled $~~16,533,375~~21,750,875 (w-25% contingencies).

The summary of the infrastructure pipelines and their estimated costs for the first five years of expenditures are as follows:

Year		~~Quality~~ Quantity	Unit Price ($/unit)	Amount ($)
~~2008~~	~~No Activity~~			~~0~~
~~2009~~	~~No Activity~~			~~0~~
2010	New 1,500 GPM well	1 unit	1,100,000	1,100,000
	600,000 gallon forebay reservoir	1 unit	600,000	600,000
	24-inch DIP water main	7,200 (in feet)	175	900,000
	16-inch DIP water main	14,400 (in feet)	120	1,728,000
	12-inch PVC main	3,000 (in feet)	80	240,000
	2,500 GPM booster pump station	1 unit	525,000	525,000
	1,700 GPM booster pump station	1 unit	425,000	425,000
	2,300 GPM booster pump station	1 unit	525,000	525,000
	16-inch PVC water main	2~~,~~1,600 (in feet)	120	259,200
	12-inch PVC water main	8,400 (in feet)	80	672,000
	24-inch DIP main	4,700 (in feet)	175	822,500
	25% Engineering, Contingencies, Inspection & Permits			1,949,175
	Subtotal			**9,745,875**
2011	600,000 gallon reservoir	1 unit	600,000	600,000
	3,300 GPM booster pump station	1 unit	600,000	600,000
	12-inch PVC water main	27,000 (in feet)	80	1,584,000
	24-inch DIP main	8,400 (in feet)	175	1,470,000
	25% Engineering, Contingencies, Inspection & Permits			1,207,500
	Subtotal			**6,037,500**

2012	600,000 gallon forebay reservoir	1 unit	600,000	600,000
	25% Engineering, Contingencies, Inspection & Permits			150,000
	Subtotal			**750,000**
	~~Total~~			~~16,533,375~~
2013	New 1,500 GPM well	1 unit	1,100,000	1,100,000
	16-inch PVC main	2,900 (in feet)	120	348,000
	24-inch DIP water main	3,600 (in feet)	175	630,000
	16-inch DIP water main	6,000 (in feet)	120	720,000
	900,000 gallon reservoir	1 unit	800,000	800,000
	25% Engineering, Contingencies, Inspection & Permits			899,500
	Subtotal			**4,497,500**
2014	12-inch PVC water main	7,200 (in feet)	80	576,000
	25% Engineering, Contingencies, Inspection & Permits			144,000
	Subtotal			**720,000**
	Total			**21,750,875**

Staff concludes that the estimated costs listed above are reasonable. However, no "used and useful" determination of the proposed plant was made, and no conclusions should be inferred for rate making or rate base purposes.

III. Arizona Department of Environmental Quality ("ADEQ") Compliance

Compliance Status

ADEQ regulates the water system under ADEQ Public Water System I.D. #10-312. ADEQ reported that it has determined that Sahuarita is in compliance with ADEQ requirements and is currently delivering water that meets the water quality standards required by Arizona Administrative Code, Title 18, Chapter 4.[1]

Certificate of Approval to Construct

The Company has not submitted ADEQ or other authorized agencies issued permits, either Certificates of Approval to Construct ("ATC") or Certificates of Approval of Construction ("AOC") for the plant items needed to serve the requested extension area. Staff recommends that the Company docket, as a compliance item in this case, within ~~two~~three years of the effective date of the Order copies of the ATCs for well(s), storage tank(s), booster pump

[1] Compliance status reports received from ADEQ on May 30, 2008.

station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

IV. Arizona Department of Water Resources ("ADWR") Compliance

Compliance Status

Sahuarita is located in the Tucson Active Management Area ("AMA"), as designated by ADWR. Staff received an ADWR compliance status report on June 23, 2008, ADWR reported that it has determined that Sahuarita Water Company is currently in compliance with departmental requirements governing water providers and/or community water systems.

Designation of Assured Water Supply ("DAWS")

Staff recommends that the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's DAWS has been modified to include this new extension area.

V. ACC Compliance

According to the Utilities Division Compliance Section, the Company has no delinquent ACC compliance items.

VI. Curtailment Tariff

The Company has an approved curtailment tariff.

VII. Wastewater Provider

According to the Company wastewater service in the requested extension area will be provided by either Pima County Wastewater Management or the Town.

VIII. Summary

I. Conclusions

1. According to the Utilities Division Compliance Section, Sahuarita has no delinquent ACC compliance items.

2. Sahuarita is in compliance with ADEQ requirements and is currently delivering water that meets the water quality standards required by Arizona Administrative Code, Title 18, Chapter 4.

3. Sahuarita is currently in compliance with ADWR requirements governing water providers and/or community water systems.

4. Sahuarita is in ADWR Tucson AMA.

5. The existing Sahuarita system has adequate production and storage capacity to serve the existing base of customers in the existing CC&N. Staff concludes that the plant items listed above will provide the Company with sufficient capacity to serve the requested extension area. Staff further concludes that it is reasonable to assume that Sahuarita will develop additional capacity as needed to meet future growth in the requested extension area.

6. The Company estimates that the total cost to install the water infrastructure to serve the requested area for the ~~next~~first five years of construction activity is $~~16,533,375~~21,750,875 (w-25% contingencies). Staff concludes that the Company's estimates of the initial five year period of expenditures are reasonable and appropriate for this project. However, approval of this CC&N application does not imply any particular future treatment for rate base. No "used and useful" determination of the proposed plant in service was made, and no conclusions should be inferred for future rate making or rate base purposes.

II. Recommendations

1. Staff recommends that the Company docket, as a compliance item in this case, within ~~two~~three years of the Order copies of the Approval to Construct for wells), storage tank(s), booster pump station(s) and distribution system that will be needed to serve the initial subdivision in the requested extension area.

2. Staff recommends that the Company docket, as a compliance item in this case, within two years of the effective date of the order granting the extension, documentation from ADWR stating that the Company's DA WS has been modified to include this new extension area.

Appendix "B"

to

Applicant's Response to July 17, 2008 Staff Report

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
July 31, 2008

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW

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TUBAC, ARIZONA 85646

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OF COUNSEL TO
MUNGER CHADWICK, P.L.C.

ADMITTED TO PRACTICE IN:
ARIZONA, COLORADO, MONTANA,
NEVADA, TEXAS, WYOMING,
DISTRICT OF COLUMBIA

April 25, 2008

Docket Control
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

Re: Sahuarita Water Company, L.L.C. – Application for Extension of its Certificate of Convenience and Necessity ("CC&N")
Docket No. W-03718A-07-0687

To Whom It May Concern:

Enclosed for filing in the above-referenced docket are fourteen (14) copies of Sahuarita Water Company, L.L.C.'s Response to the ACC Staff's April 9, 2008 Insufficiency Letter #2 ("Response"). The original is being mailed to Vicki Wallace.

Also enclosed are two (2) additional copies of the aforesaid Response. I would appreciate it if you would "filed" stamp the same and return them to me in the enclosed stamped and addressed envelope.

Thank you for your assistance. Please advise me if you have any questions.

Sincerely,

Angela R. Trujillo
Secretary
Lawrence V. Robertson, Jr.

LAWRENCE V. ROBERTSON, JR.
ATTORNEY AT LAW

P. O. BOX 1448
TUBAC, ARIZONA 85646

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OF COUNSEL TO
MUNGER CHADWICK, P.L.C.

ADMITTED TO PRACTICE IN:
ARIZONA, COLORADO, MONTANA,
NEVADA, TEXAS, WYOMING,
DISTRICT OF COLUMBIA

RECEIVED
2008 APR 29 A 9:34
AZ CORP COMMISSION
DOCKET CONTROL

April 25, 2008

Vicki Wallace
Chief, Consumer Services & Special Projects
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

Re: Sahuarita Water Company, L.L.C. – Application for Extension of its Certificate of Convenience and Necessity ("CC&N") Docket No. W-03718A-07-0687

INSUFFICIENCY LETTER #2

Dear Ms. Wallace:

This letter and the enclosed documents are in response to your April 9, 2008 Insufficiency Letter #2 regarding the above-referenced matter. I will respond to each of the three (3) requests set forth in your letter in the same sequence in which they appear.

With reference to Item #1, Sahuarita Water Company will file an Amended Application in the above-referenced docket within the next 10-14 days which is responsive to this request.

With reference to Item #2, attached as Appendix "A" is a copy of the October 2, 2007 Public Utility License Agreement between Pima County and Sahuarita Water Company which pertains to the water company's use of public rights-of-way within unincorporated areas of Pima County. Attached as Appendix "B" is a copy of a April 1, 2008 Consent to Assignment of Pima County Public Utility License Agreement, wherein Pima County has consented to the assignment of the aforesaid license agreement from Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C. The Town of Sahuarita does not issue franchises. Rather, its authorization for utility occupancy of public rights-of-way within the municipal boundaries is embodied within individual permits which are job-specific to the installation of facilities in question. In that regard, with the exception of that water service which is proposed to be provided to Sahuarita Unified School District's ("SUSD") facilities within the Town of Sahuarita, all further extensions of the water company's facilities under the proposed CC&N extension would occur within unincorporated areas of Pima County; and, if the provision of

water service to SUSD's aforesaid facilities did entail any use of the public rights-of-way, a permit authorizing the same would be obtained from the Town of Sahuarita.

With reference to Item #3, it is currently anticipated that construction of the company's water system facilities in the proposed CC&N extension area will begin in 2010. With the exception of the filing of the Amended Application, I believe that this letter and the attached documents are responsive to your April 9, 2008 Insufficiency Letter #2.

Thank you for your assistance. Please let me know if you have any questions.

Sincerely,

Lawrence V. Robertson, Jr.

CC: Docket Control
Del Smith
Dorothy Hains
Barbara Wells
Lyn Farmer
Robin Mitchell

Appendix "C"

to

Applicant's Response to
July 17, 2008 Staff Report

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
July 31, 2008

March 13, 2008

Vickie Wallace
Chief, Consumer Services & Special Projects
Utilities Division
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

Re: Sahuarita Water Company, L.L.C.
CC&N Extension Application
Docket No. W-03718A-07-0687

Dear Ms. Wallace:

This letter and the enclosed information are in response to your January 14, 2008 Insufficiency Letter to me, and are also a follow-up to the January 30, 2008 meeting at the Commission's offices in Phoenix among representatives of the Commission's Staff and Sahuarita Water Company, L.L.C. ("SWC") discussing the Insufficiency Letter. For your convenience, the information discussed below and the enclosed information are organized using the same numbering sequence set forth in your January 14, 2008 letter.

Item No. 1

Enclosed are copies of the following information, as prepared and provided to me by WestLand Resources, Inc. ("WestLand").

1) A map which depicts the contemplated water utility system infrastructure which will be constructed in SWC's proposed CC&N extension area during the first five (5) years of system development in that area. As representatives of SWC indicated during the January 30, 2008 meeting, because of the development timeline associated with the Mission Peaks project, there will not be any water system construction and associated customer growth during 2008 and 2009. Accordingly, 2010 represents the first year in the "preliminary construction plan for the next five years" which you have requested, and 2014 represents the fifth year.

2) An Opinion of Probable Construction Cost ("OPCC") for the first five (5) years of actual construction activity. As you will note, the OPCC is organized into the following information categories for calendar years 2010 through 2014: (i) Item Description; (ii) Unit; (iii) Quantity; (iv) Unit Price; (v) Amount and (vi) Remarks. In that regard, page 7 of 7 indicates that the total currently estimated cost of facilities for the first five (5) years of construction is $21,750,875.

3) A projection of water customer additions by year and class of service or category of use during the first five (5) years of customer additions in the extended CC&N area. As you will note, and consistent with subparagraph 1) above, no new customer growth is projected to occur within the proposed CC&N area during 2008 and 2009. In addition, as indicated during the January 30, 2008 meeting, no new school customer additions are shown for the proposed CC&N extension area until 2014, because the Sahuarita Unified School District ("SUSD") facilities which are to be immediately connected to SWC's existing system are already located in SWC's existing CC&N. Accordingly, the Application filed on December 14, 2007 will be amended shortly to request that SUSD's acreage within The Town of Sahuarita be deleted from SWC's proposed CC&N Extension.

4) A color-coded map which depicts in three (3) phases the development pattern which is projected for the Mission Peaks project.

5) A color-coded map which depicts in three (3) phases the overall development pattern which is projected for the entire proposed CC&N extension area, which includes (i) Mission Peaks, (ii) Sahuarita Mission and (iii) Arizona State Land Department acreage.

Item No. 2

Based upon our understanding of the results of the January 30, 2008 meeting, SWC believes that the information enclosed in connection with subparagraph 3) of Item No. 1 is responsive to your Item No. 2 request. If not, please let me know, and in what manner it is not responsive.

Item No. 3

Based upon our understanding of the results of the January 30, 2008 meeting, SWC believes that the information enclosed in connection with subparagraph 2) of Item No. 1 is responsive to your Item No. 3 request. If not, please let me know, and in what manner it is not responsive.

Item No. 4

Enclosed are copies of a January 7, 2008 letter from Mark Seamans (SWC's General Manager) to Dorothy Hains, and a January 16, 2008 letter (with attachments) from Mark Seamans to me which should provide the information you seek in connection with SWC's plan to deal with such arsenic concentration as may exist in its production wells. In the event you find that the combined information set forth in these two letters (and attachments) upon that subject is not sufficient for your purposes, please let me know. However, based upon the discussion which occurred at the January 30, 2008 meeting, SWC believes that it is responsive to the Insufficiency Letter request.

Item No. 5

Enclosed is a copy of the July 23, 2001 Well Site Lease Agreement between The Town of Sahuarita and SWC (formerly known as Rancho Sahuarita Water Company, L.L.C.). As Mark Seamans explained during the January 30, 2008 meeting, SWC is in the process of developing a new production well which will substantially reduce its need for the well (#14) which is the subject of the Well Site Lease as a source of supply for SWC's future water system operations.

Item No. 6

Page 2 of the aforesaid enclosed copy of Mark Seamans' January 16, 2008 letter to me contains information which is intended to be responsive to this specific information request. This subject was also discussed during the January 30, 2008 meeting. Accordingly, SWC believes that this enclosure and the discussion which occurred at the aforesaid meeting should be responsive. However, if you should conclude you need further information, please let me know.

Item No. 7

Either Pima County Wastewater Management or The Town of Sahuarita will be providing wastewater services in the proposed CC&N extension areas. A determination has not as yet been made between those two (2) jurisdictional entities as to which will be the provider of wastewater services.

Item No. 8

It is SWC's understanding that (i) on February 15, 2008, Kristen Whatley of WestLand emailed revised legal descriptions for the proposed CC&N extension area to Barbara Wells of the Utilities Division Staff, and (ii) on March 3, 2008, Barbara Wells advised Kristen Whatley by email that the revised legal description was "...perfect and can be filed as an amended legal description" for the Mission Peaks and Arizona State Land Department acreage, respectively, within the proposed CC&N extension area. Accordingly, enclosed are the revised legal descriptions for the aforesaid acreage, together with the aforesaid email exchanges between Kristen Whatley and Barbara Wells. In that regard, as indicated in Kristen Whatley's February

15, 2008 email to Barbara Wells, apparently the legal description for the Sahuarita Mission portion of the proposed CC&N extension did not require any revision.

SWC and I believe that the foregoing discussion and the enclosed information should be fully responsive to the requests set forth in your January 14, 2008 Insufficiency Letter. If it is not, or if you have any questions, please let me know. Within the next two to three weeks, I will be filing an amendment to the December 14, 2007 Application, which will (i) delete SUSD's acreage within The Town of Sahuarita from the proposed CC&N extension, and (ii) request that the existing CC&N be reissued to SWC in order to reflect the recent change in name from Rancho Sahuarita Water Company, L.L.C. to Sahuarita Water Company, L.L.C.

Sincerely,

Lawrence V. Robertson, Jr.

cc: Docket Control
Del Smith
Dorothy Hains
Barbara Wells
Robin Mitchell
Lyn Farmer
WestLand Resources
Sahuarita Water Company

Appendix "D"

to

Applicant's Response to July 17, 2008 Staff Report

Sahuarita Water Company, L.L.C.
Docket No. W-03718A-07-0687
July 31, 2008

OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	2008 – No growth				$0	
	2009 – No growth				$0	
	Year 1 (2010)					
1	24-inch 3150 Zone water main (DIP)	LF	7,200	$175	$900,000	Includes valving, air releases, fittings, and corrosion protection. From 3150 Zone Booster to Helmet Peak Rd.
2	16-inch 3150 Zone water main	LF	14,400	$120	$1,728,000	Includes valving, air releases, fittings, and corrosion protection. From Helmet Peak Rd. to forebay reservoir.
3	0.6 MG forebay reservoir	LS	1	$600,000	$600,000	Located in Mission Peaks, Assumes 2,250 gpm fire flow requirement for 3270 Zone Phase I. Cost includes site work, block wall and piping.
4	2,500 gpm 3150 Zone Booster Station (Phase 1)	LS	1	$525,000	$525,000	Located at existing 2850 Zone reservoir site. Cost includes electrical and telemetry.
5	New 1,500-gpm well	LS	1	$1,100,000	$1,100,000	Well 24B drilling and equipping, site work, block wall, and piping. Assumes rotary drilling. Assumes no water treatment necessary.
6	12–inch well transmission main	LF	3,000	$80	$240,000	Well collection main from Well 24B to 2850 Zone Reservoir site.

OPINION OF PROBABLE CONSTRUCTION COST

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
7	1,700 gpm 3270 Zone Booster Station	LS	1	$425,000	$425,000	Located at forebay reservoir site. Assumes 1,000 gpm fire flow requirement for 3270 Zone. Cost includes electrical, telemetry, and portable back-up generator.

OPINION OF PROBABLE CONSTRUCTION COST

8	2,300 gpm 3420 Zone Booster Station	LS	1	$525,000	$525,000	Located at forebay reservoir site. Assumes 1,750 gpm fire flow requirement for 3420 Zone. Cost includes electrical and telemetry.
9	16-inch 3270 Zone water main	LF	2,160	$120	$259,200	Includes valving, air releases, and fittings. Spine Main only.
10	12-inch 3420 Zone water main	LF	8,400	$80	$672,000	Includes valving, air releases, and fittings. Spine Main only.
11	24-inch 3420 Zone water main (DIP)	LF	4,700	$175	$822,500	Includes valving, air releases, fittings, and corrosion protection. From 3420 Zone Booster to proposed 3420 Zone reservoir site.
	Subtotal				$7,796,700	
	25% Engineering, Contingencies, Inspection & Permits				$1,949,175	
	Total Year 1				**$9,745,875**	Assumes no additional water treatment is necessary

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name: Sahuarita Water Company CC&N Expansion
Project No. 217.132 A 8000
Location: Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East
Description: Water System Infrastructure Requirements – 1st 5 years

Prepared by: KLW **Date:** 2/15/08
Checked by: MFT **Date:** 2/15/08
Client: Sahuarita Water Company, LLC

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 2 (2011)					
1	0.6 MG 3420 Zone Reservoir	LS	1	$600,000	$600,000	Located in Mission Peaks, Assumes 1,750 gpm fire flow requirement for 3420 Zone. Cost includes site work, block wall and piping.
2	3,300 gpm 3570 Zone Booster Station	LS	1	$600,000	$600,000	Located at 3420 Zone reservoir site. Assumes 2,250 gpm fire flow requirement for 3570 Zone. Cost includes electrical and telemetry.
2	12–inch 3570 Zone water main	LF	19,800	$80	$1,584,000	Includes valving, air releases, and fittings. Spine Main only.
3	24-inch 3420 Zone water main (DIP)	LF	8,400	$175	$1,470,000	Includes valving, air releases, fittings, and corrosion protection. From 3420 Zone Booster to proposed 3420 Zone reservoir site.
4	12-inch 3420 Zone water main	LF	7,200	$80	$576,000	Includes valving, air releases, and fittings. Spine Main only.
	Subtotal				$4,830,000	
	25% Engineering, Contingencies, Inspection & Permits				$1,207,500	
	Total Year 2				**$6,037,500**	

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 3 (2012)					
1	0.6 MG Forebay reservoir	LS	1	$600,000	$600,000	Located in Mission Peaks, Assumes 2,250 gpm fire flow requirement for 3270 Zone. Cost includes site work, block wall and piping.
	25% Engineering, Contingencies, Inspection & Permits				$150,000	
	Total Year 3				**$750,000**	

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name:	Sahuarita Water Company CC&N Expansion				
Project No.	217.132 A 8000	**Prepared by:**	KLW	**Date:**	2/15/08
Location:	Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East	**Checked by:**	MFT	**Date:**	2/15/08
Description:	Water System Infrastructure Requirements – 1st 5 years	**Client:**	Sahuarita Water Company, LLC		

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 4 (2013)					
1	New 1500-gpm well	LS	1	$1,100,000	$1,100,000	Includes site work, block wall, and onsite piping, Well No. 19R, assumes rotary drilling. Assumes no water treatment necessary.
2	16-inch well transmission main	LF	2,900	$120	$348,000	Well collection main from Well 19R to Well 21.
3	24-inch 3570 Zone water main	LF	3,600	$175	$630,000	Includes valving, air releases, and fittings. Spine Main only.
4	16–inch 3570 Zone water main	LF	6,000	$120	$720,000	Includes valving, air releases, and fittings. Spine Main only.
5	0.9 MG 3570 Zone Reservoir	LS	1	$800,000	$800,000	
	Subtotal				$3,598,000	
	25% Engineering, Contingencies, Inspection & Permits				$899,500	
	Total Year 4				**$4,497,500**	Assumes no additional water treatment is necessary

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.

OPINION OF PROBABLE CONSTRUCTION COST

Project Name: Sahuarita Water Company CC&N Expansion
Project No. 217.132 A 8000
Location: Sections 16,19, 20, 21, and 30, Township 17 South, Range 13 East, Section 13, Township 17 South, Range 12 East
Description: Water System Infrastructure Requirements – 1st 5 years

Prepared by: KLW **Date:** 2/15/08
Checked by: MFT **Date:** 2/15/08
Client: Sahuarita Water Company, LLC

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
	Year 5 (2014)					
1	12–inch 3570 Zone water main	LF	7,200	$80	$576,000	Includes valving, air releases, and fittings. Spine Main only.
	25% Engineering, Contingencies, Inspection & Permits				$144,000	
	Total Year 5				**$720,000**	
	Total Cost 1st 5 years				**$21,750,875**	

Note: All costs exclude rock excavation, property and easement acquisition, and 3-phase electrical requirements. All costs in 2007 dollars.