

ORIGINAL



0000022996

14LF

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AZ CORP COMMISSION
DOCUMENT CONTROL

2005 AUG -8 P 3: 58

RECEIVED

7 **BEFORE THE ARIZONA CORPORATION COMMISSION**

8 IN THE MATTER OF THE APPLICATION
 OF CIRCLE CITY WATER COMPANY, LLC
 9 FOR APPROVAL OF A HOOK-UP FEE
 TARIFF.

DOCKET NO. W-03510A-05-0145

11 IN THE MATTER OF THE APPLICATION
 OF CIRCLE CITY WATER COMPANY, LLC
 12 FOR AN EXTENSION OF ITS EXISTING
 CERTIFICATE OF CONVENIENCE AND
 13 NECESSITY FOR WATER SERVICE.

DOCKET NO. W-03510A-05-0146

**NOTICE OF FILING LATE FILED
EXHIBIT**

14 Pursuant to the direction of the presiding Administrative Law Judge, Applicant Circle City
 15 Water Company hereby submits the following late filed exhibits:

- 17 A. Report on 2005 Service Interruptions to Customers of Circle City Water Company
- 18 B. Water Master Plan for Lake Pleasant 5000 (Revised)

19 By way of brief explanation, the Report on 2005 Service Interruptions to Customers
 20 Circle City Water Company ("Report") addresses concerns over recent service interruptions
 21 raised by customers making public comment at the July 26, 2005 hearing in this docket. The
 22 Company's President, Robert T. Hardcastle, testified that Circle City was aware of the
 23 interruptions and was working to find both the reasons for and resolution of the problem. The
 24 attached Report confirms Mr. Hardcastle's testimony that the interruptions were the result of
 25 faulty power supply equipment operated by Arizona Public Service. Report at 9. APS is
 26 currently exploring remedies for the problem.

1 Gale Graves
144 Peretz Circle
2 Morrystown, AZ 85342

3 Chief Harry Dame
Circle City/Morrystown Vol. Fire Dept.
4 P. O. Box 26
Morrystown, AZ 85342

5

6

7 By: Mary House

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1696882.1

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A

**Report on 2005 Service Interruptions to
Customers of Circle City Water Co., L.L.C.**



**In the Matter of the Application of Circle
City Water Co., L.L.C. for an Extension of
It's Certificate of Convenience and
Necessity for Water Service**

ACC Docket No. W-03510A-05-0146

**Report on the 2005 Service Interruptions to
Customers of Circle City Water Co., L.L.C.**

As it relates to:

**In the Matter of the Application of Circle City
Water Co., L.L.C. for an Extension of
Its Certificate of Convenience and
Necessity for Water Service**

ACC Docket No. W-03510A-05-0146

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Conventions

The following list of abbreviations is used throughout this report.

Abbreviation	Description
A.A.C.	Arizona Administrative Code
ACC	Arizona Corporation Commission
ADEQ	Arizona Department of Environmental Quality
ALJ	Administrative Law Judge
APS	Arizona Public Service
BUI	Brooke Utilities, Inc.
CC&N	Certificate of Convenience and Necessity
CCWCoLLC	Circle City Water Co., L.L.C.
CSC	Customer Service Center or Call Center
FNM	First National Management Co.
MCBD	Maricopa County Building Department
NOR	Normal Operating Range
RMU	Remote Monitoring Device

Background: Report Requirement

On July 25, 2004 at 10:00 a.m. a Hearing (the "Hearing") was conducted in the Hearing Room of the ACC to consider CCWCoLLC's Application for extension of its CC&N (the "Application").¹ This matter was presided over by ALJ Kinsey.

During direct testimony presented by Robert T. Hardcastle, Managing Member of CCWCoLLC, Judge Kinsey requested that CCWCoLLC supplement its testimony with a report on recent service interruptions affecting its water customers. Counsel for ACC Staff reiterated Judge Kinsey's request for supplemental information concerning this topic. Applicant's witness Hardcastle agreed to provide the requested report by not later than August 8, 2005.

Included herein is the Report on the 2005 Service Interruptions to Customers of Circle City Water Co., L.L.C. (the "Report").

Problem Definition

As discussed below and as can be see on attached Exhibit 1 water customers of CCWCoLLC have experienced low water supplies and corresponding reduced pressure on the following dates ("Incident Dates") in 2005:

- May 23
- June 13
- June 15
- July 1
- July 17
- July 31

The service interruptions on these dates has resulted in inconvenience to CCWCoLLC's customers and prompted the concerns expressed during the public comment session of the Hearing. These concerns have also been reflected in the increased number of customer calls to Brooke Utilities, Inc.'s ("Brooke" or "BUP") CSC². This is a very unusual operating condition for CCWCoLLC.

Source of the Problem

Three-phase electrical utility service is provided to CCWCoLLC through APS meter number C46543 under account number 891114289. Except for the May 23 and June 13 Incident Dates subsequent investigation of the service interruptions on each of the Incident Dates indicates an unbalanced or unstable electrical supply from APS to the transformer connected to CCWCoLLC's water system. The May 23 Incident Date, although unconfirmed, suspiciously resembles the same problem condition of the other Incident Dates involving unbalanced power supply from the 3-phase APS transformer.

The well and booster pump motors at CCWCoLLC are 460 volt units that normally operate between 414 and 506 volts (the "NOR"). In each case on the applicable Incident Dates CCWCoLLC's in-line motor saver³ interrupted power supply to the water pump and booster pump because the unbalanced power received from APS was outside the NOR parameters. The well pump is located approximately 680 feet below ground level and drafts water for storage in the adjacent 50,000 gallon tank at the rate of up to 155 gallons per minute. The booster pump pressurizes water from the storage tank for distribution into the underground piping infrastructure. This system normally delivers water to customers of CCWCoLLC at or above the pressure requirements of A.A.C. R14-2-407 (E).

When the electrical supply is terminated by the motor saver, in accordance with its design, a severe low pressure condition may not be immediately apparent to customers, despite the booster pump motor not functioning, because of the existence of remaining substantial water volumes in the storage tank that create head pressure⁴ in the system. While head pressure may not be as great as booster pump pressure the immediate effect may be difficult to discern. Until storage tank volumes are significantly depleted lower service pressure may not be recognizable by customers despite the problem occurring several hours previously.

Operational History

For the twelve months ending July 31, 2005 CCWCoLLC delivered water to its customers 99.96% of the available operating time.⁵

Operating Management

FNM is under contract with CCWCoLLC to provide water system operational management, including emergencies, on a 24-hour per day, 7-day per week basis. FNM has successfully provided these services for more than ten years.

Remote Monitoring Units (RMU's)

For some time BUI has utilized a telemetry supplier from Dallas, TX to provide RMU's that are mounted to water storage tanks. RMU's periodically "read" the water levels in storage tanks by use of the Internet.⁶ These devices have proven themselves to be invaluable when reporting "low" or "low low" water levels in storage tanks. RMU's not only provided periodic information concerning water tank storage levels but also send electronic mail alarms of troubled storage conditions to cellular telephones of operational managers, employees, supervisors, and contractors.

RMU's also provide a wealth of other important operating data. For example, the first and second RMU's provide graphical historical content of the water storage levels at the prescribed "read" times daily (see Exhibit 4 and Exhibit 5). This information also resolves customer disputes as to the dates of service interruptions based on low water storage levels. The RMU's also provide important operational data including tank capacity, high and low storage alarm levels, current water level, average daily use, and days to empty. The Internet site can also be prompted to provide total gallons used, average daily usage, maximum daily usage, average inventory, average fill volumes, last fill date and time, and a day-by-day schedule of tank level reads between prescribed dates (see Exhibit 6 and Exhibit 7).

RMU's read tank storage levels at pre-set times. Essentially, the RMU "wakes up" at a prescribed time and "reads" the water storage level, dials the hosted Internet server, reports the collected data to the server, returns to the "sleep" mode, and the server posts the collected data to a secured website. Unfortunately, RMU's do not read tank storage levels at various "real" times between the pre-set times. BUI has been working with the Dallas-based telemetry provider to co-develop a RMU that allows "polling" of tank water levels at any time for current and historic water levels. This information should not only provide BUI superior operating data for all water systems but also act as documentation to resolve customer complaints regarding alleged water supply conditions. BUI expects to have beta version "polling" units available before the end of 2005.

On each Incident Date the RMU's properly notified personnel of troubled water conditions – sometimes *before* customer calls were received by the CSC. For example, on the July 17th Incident Date a RMU low water trouble alarm was received that avoided a more serious condition and resulted in no customer calls

being received by the CSC. Using this technology customers were not aware that CCWCoLLC and FNM acted in a manner that prevented a low water condition from developing. In addition to water level reporting and trouble alarm notices, the RMU's at CCWCoLLC provide scheduled and graphical historical records of actual water storage conditions on the dates of measurement. This data is invaluable validation of actual operating conditions on the dates and times that concern customers.

Two RMU's are installed on the water storage tank at CCWCoLLC. The first RMU is scheduled to "read" water storage levels at approximately 0500 hours daily. This RMU was first installed on May 27, in response to and, after the first Incident Date. The second RMU is scheduled to "read" water storage levels at approximately 1300 hours daily. This RMU was first installed on July 12, in response to and, after subsequent Incident Dates. CCWCoLLC concluded that the repeated occurrence of low water levels due to electrical utility variances was sufficiently important to justify the installation of the second RMU so that better operational response could be provided.

Investigation of the May 23 Incident Date

The first contact of a customer's low water condition was received by FNM at 2224 hours on May 22. FNM dispatched an operational service person that arrived at CCWCoLLC at approximately 2314 hours and observed water storage tank levels nearly depleted and low pressure conditions present throughout the water system. FNM's personnel observed the motor saver in the "off" position. FNM's personnel re-started the well pump and booster pump motors by re-engaging the motor saver and immediately began delivering water to the storage tank and water system. The first RMU had not yet been installed but FNM's operational personnel waited at the site for more than four hours to determine that water was filling the storage tank and well pump and booster pump motors were operating normally. It should be noted that this Incident Date was the first low water condition incident managed by FNM and CCWCoLLC. No correlation to an electrical utility power supply problem had yet been made. This Incident Date prompted CCWCoLLC to expedite installation of the first RMU.

Investigation of the June 13 Incident Date

The first contact of a customer's low water condition was received by FNM at 0137 hours. FNM dispatched an operational service person that arrived at the well site at approximately 0220 hours and observed near-normal water storage tank levels but electrical utility service had been interrupted to the well pump and booster pump motors. FNM's personnel observed a blown fuse attributed to an electrocuted rat being found in the main disconnection electrical panel. The fuse was replaced and the well pump and booster pump motors were re-started. Water pressure was almost immediately restored and little water storage was lost. The first RMU had been previously installed. According to Exhibit 2 water storage levels were reported at 49,982 gallons on June 14. CCWCoLLC water customers did not experience a service interruption on this Incident Date despite the likelihood of decreased pressure related to the described condition.

Investigation of the June 15 Incident Date

The first contact of a customer's low water condition was received by FNM at 0121 hours. FNM dispatched an operational service person that arrived at CCWCoLLC at approximately 0220 hours and observed water storage tank levels lower than normal and low pressure conditions present throughout the system due to the non-operational condition of the booster pump motor. FNM's personnel observed that the main disconnection panel had shorted out and the motor saver in the "off" position. FNM contacted APS to terminate electrical power to the site not yet understanding the full extent of the problem. After obtaining expenditure authorization from CCWCoLLC, FNM contacted a local supplier to make arrangements for portable power generation while the electrical system damage was being assessed and

needed repairs were being made. The duration of need for the generator was not known at this time. FNM also contacted a licensed electrical contractor to assess the extent of damage and perform the main disconnect panel repairs and/or replacement. A MCBBD inspector came to the site and advised FNM that an electrical permit would be required even under the emergency circumstances that existed. After additional discussion the electrical contractor and inspector agreed that no permit would be required as long as the electrical utility meter was not removed.

On June 17 FNM's electrical contractor was able to locate a compatible main panel disconnect replacement part. FNM assisted the electrical contractor in the replacement of the replacement parts during the same day. FNM contacted APS to order re-energizing of the electrical system to restore service. APS arrived at the site and advised FNM that they could not re-energize the power system until the MCBBD had inspected and approved the replacement installation.

On June 20 FNM contacted the MCBBD inspector that further advised a "tracking" number, available only after issuance of a permit, was necessary prior to conducting an inspection. FNM's electrical contractor personally visited the MCBBD, in an attempt to expedite the process, and was told that a "line drawing" was necessary before a permit could be issued. FNM contacted a local licensed electrical engineer who agreed to provide the required "line drawing" and have it available the following day. FNM contacted CCWCoLLC and asked for any assistance in mitigating this matter so that re-energizing the system could be accomplished. CCWCoLLC immediately contacted the appropriate MCBBD and APS personnel and described the importance of customer service interruptions and stressed the importance of this situation under emergency conditions.

Finally, APS recognized the seriousness of not having electrical service to the system and the effect on customers. MCBBD approved the installation and APS re-energized the system on June 27. During the preceding twelve days the portable generator maintained electrical power service to CCWCoLLC's well pump and booster pump motors without service interruption. Contrary to some of the public comment made at the Hearing the cost to CCWCoLLC of the portable power generator was approximately \$7,302.

Investigation of the July 1 Incident Date

The first contact of a customer's low water condition was received by FNM at 0704 hours. FNM dispatched an operational service person that arrived at CCWCoLLC at approximately 0805 hours. FNM's personnel observed that water storage tank level had nearly been depleted and the motor saver was in the "off" position. FNM's personnel re-set the motor saver and made numerous attempts to re-start the well pump and booster pump. On the seventh re-start attempt the well pump and booster pump were re-energized and the water storage tank began to fill as the water system infrastructure was pressurized. According to "reads" from the first RMU the storage filled to 22,673 gallons at 0500 hours on July 2. The second RMU had not yet been installed. On that same day FNM's electrical contractor replaced the motor saver because it had been destroyed. On July 3 the water storage tank contained 31,562 gallons and was full the following day.

Investigation of the July 17 Incident Date

The first contact of a customer's low water condition was received by FNM at 0234 hours. FNM dispatched an operational service person that arrived at CCWCoLLC at approximately 0330 hours. FNM's personnel observed that the water storage tank level had almost been depleted and the motor saver was in the "off" position. At 0500 hours the first RMU recorded water storage levels at 5,243 gallons. FNM's personnel was unsuccessful in re-setting the motor saver. After numerous additional attempts and consultation with BUI a decision was made to "bypass" the motor saver in order to gain electrical power to the well pump and booster pump motor. FNM, working in conjunction with their electrical contractor,

successfully bypassed the motor saver using instructions over a cell phone. As quickly as possible FNM re-started the well pump and booster pump motors and the water storage tank began refilling.

On July 18 the first RMU recorded water storage levels at 0500 hours at 19,496 gallons. Later on the same day the recently installed second RMU recorded water storage levels at 1300 hours at 19,895 gallons. Late in the day on July 18 and much into the night FNM's electrical contractor repaired the system problems and replaced the faulty motor saver while tank levels declined as the power supply continued to be interrupted.

On July 19 the first RMU recorded 14,756 gallons in the storage tank. On the same day the second RMU recorded water storage levels at 15,347 gallons.

On July 20 FNM's electrical contractor replaced the motor saver for the third time in less than two months.

Consulting with its electrical contractors, FNM concluded that the power supply from APS's transformer to the well site must be involved in causing the repeated problems as voltage variations exceeded the NOR of the motor savers. FNM requested that APS install a multi-day chart recorder that would record actual voltage variations at the site. APS initially disagreed that unbalanced power was affecting CCWCoLLC and declined the need to install the chart recorder. APS later acquiesced to FNM's request and installed a five day chart recorder that was recently removed. A copy of APS's chart recorder data has been requested but not yet received.

Investigation of the July 31 Incident Date

On July 31 the first RMU sent operational personnel a trouble alarm of water level loss in the tank. No customer call had been received by the CSC complaining of a low water condition. At 0605 hours FNM's personnel and electrical contractor were dispatched to the well site. At 0630 hours FNM's electrical contractor measured each "leg" of the power supply and determined that two portions of the 3-phase power were providing 512 volts, outside of the NOR, while the third portion of power was providing 498 volts. FNM noted that such an operating condition of unbalanced power can cause the motor saver to terminate its connection to the electrical supply.

At no time during this Incident Date were CCWCoLLC customers without water or experience low water supplies or pressure. According to the second RMU a total of 19,305 gallons were contained in the storage tank at 1300 hours on July 30. On July 31 at 0500 hours the storage tank contained approximately 27,812 gallons of water.

FNM reported this incident to APS and received the following comment:

- "The Sunday (July 31) problem occurred prior to APS fixing one of their regulators. It is, therefore, unlikely that further problems will occur. Our field service people will perform a couple of more adjustments to better balance the local load. They believe, however, that the problem causing the problems at the well site have been corrected."

At the time, FNM concluded that APS has conceded that their provision of unbalanced power to the well pump and booster pump motors led to the disruption of the power system over the last several weeks. Consequently, the APS power supply problem caused a loss of electrical service to the primary components that operate the water system at CCWCoLLC. As a result water customer service interruptions were experienced.

Since July 31 the electrical supply and well pump and booster pump motors have operated without interruption. On August 3 the first RMU recorded water storage levels at 0500 hours at 48,955 gallons. Later on the same day the second RMU recorded water storage levels at 1259 hours at 46,788 gallons. In both cases it appears the APS power supply, well pump motor, and booster pump motor are operating normally.

APS Investigation

I contacted APS's representative in this matter on August 2 at 1530 hours. APS returned my call on August 3. I requested copies of all documents related to the power supply problems at CCWCoLLC's well site including the chart recorder. Further, I requested that APS provide an explanation as to their conclusion of this problem as well as their proposed corrective action.

On August 4 at 0741 hours APS's representative replied by means of electronic message (see Exhibit 3). APS concedes that a faulty substation voltage regulator in the immediate area was not operating properly. APS has redirected some local power load to balance the demand in the area. APS plans to replace the faulty regulator and return the local area to its regular operating condition. APS concedes that, *"[T]his corrective action has taken care of the voltage problems that were affecting the water company."*

On August 4 I subsequently asked APS to confirm completion of the replaced regulator and provide a copy of the chart recorder used at the CCWCoLLC service site. APS promptly replied that actual replacement of the faulty regulator had not yet occurred but would further advise when completion had occurred. APS agreed to forward the chart recorder data as soon as it was available from their engineers.

Except for the June 13 Incident Date the APS reply is consistent with the operational effects of unbalanced power at the CCWCoLLC well site since May 23. The motor saver operated exactly as it was designed by saving the water system and electrical components from damage or being completely destroyed. The unbalanced power supply from APS is consistent with site measurements of the 3-phase power supply. The APS reply comments are also consistent with the professional opinions rendered by FNM's electrical contractors over the last few weeks.

The most important comment from APS is that we should expect customer service interruptions from APS unbalanced power sources should not be experienced in the future.

Costs

In addition to the internal costs involving CCWCoLLC's management of this problem, the following costs are related to the APS power supply issue:

FNM labor and materials	\$ 1,193
FNM electrical contractor (estimated)	\$ 3,833
FNM electrical engineering (estimated)	\$ 800
Generator rental (see Exhibit 8)	\$ 7,302
Total projected cost	\$ 13,128

See Exhibit 9 for copies of FNM costs related to the APS power supply problem described above.

Conclusion

CCWCoLLC believes that all of the Incident Dates after June 15 are attributable to the unstable and unbalanced electrical power supply to its well site. It is unclear whether the Incident Date of May 23 is related, or unrelated, to this causation. However, the circumstances and facts of the May 23 Incident Date are consistent with the experiences after June 15. The Incident Date of June 13 is the responsibility of CCWCoLCC but beyond its control as an animal caused the power outage.

In conclusion, CCWCoLLC should not be held responsible for the customer service interruptions during the May 23 through July 31 periods due to electric service interruptions. CCWCoLLC and its operations management contractor diligently managed the frequent occurrences of service interruptions and further mitigated the effect of service interruptions, not caused by CCWCoLLC, on customers by incurring an expensive interim expense in the securing of a portable power generator.

This investigation and explanation are consistent with the testimony provided by CCWCoLLC at the Hearing.

References

¹ *In the Matter of the Application of Circle City Water Co., L.L.C. for an Extension of It's Certificate of Convenience and Necessity for Water Service*; ACC Docket No. W-03510A-05-0146.

² Brooke Utilities, Inc. is the parental holding company of nine water utility public service corporations operating twenty-seven separate water systems throughout Arizona. The CSC is an outsourced shared facility operated under contract by American States Utility Services Co. for the benefit of all BUI water systems and customers.

³ A motor saver is the commercial, high voltage equivalent of a circuit breaker. When electrical utility operating ranges are below or above the normal operating range of the power demand of the system the motor saver "trips" itself into an "off" condition preventing damage to the electrical components connected to the system.

⁴ The pressure created by the weight of a water column one foot in elevation is slightly less than .5 pound per square inch.

⁵ Based on 24 hours per day for the previous 365 calendar days.

⁶ RMU's are powered by solar batteries and communicate once daily through CDMA packet cellular networks (see Exhibit 2 for RMU's mounted on CCWCoLLC water storage tanks). BUI accesses a secured Internet site that is password protected for internal operations only.

Circle City Water Co. - RMU Device: Daily Reads at ~ 0500 Hours
- May 23 through August 2, 2005

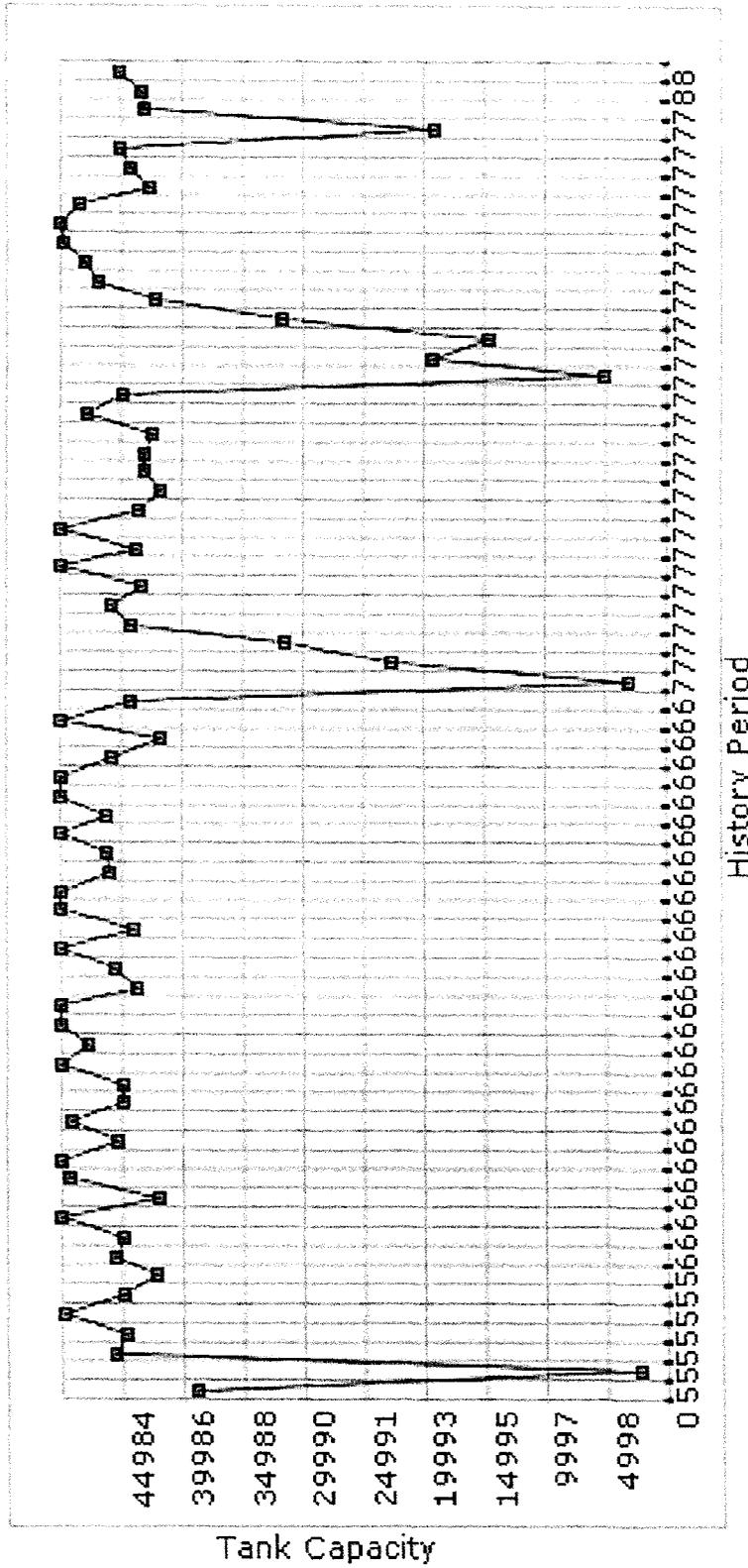
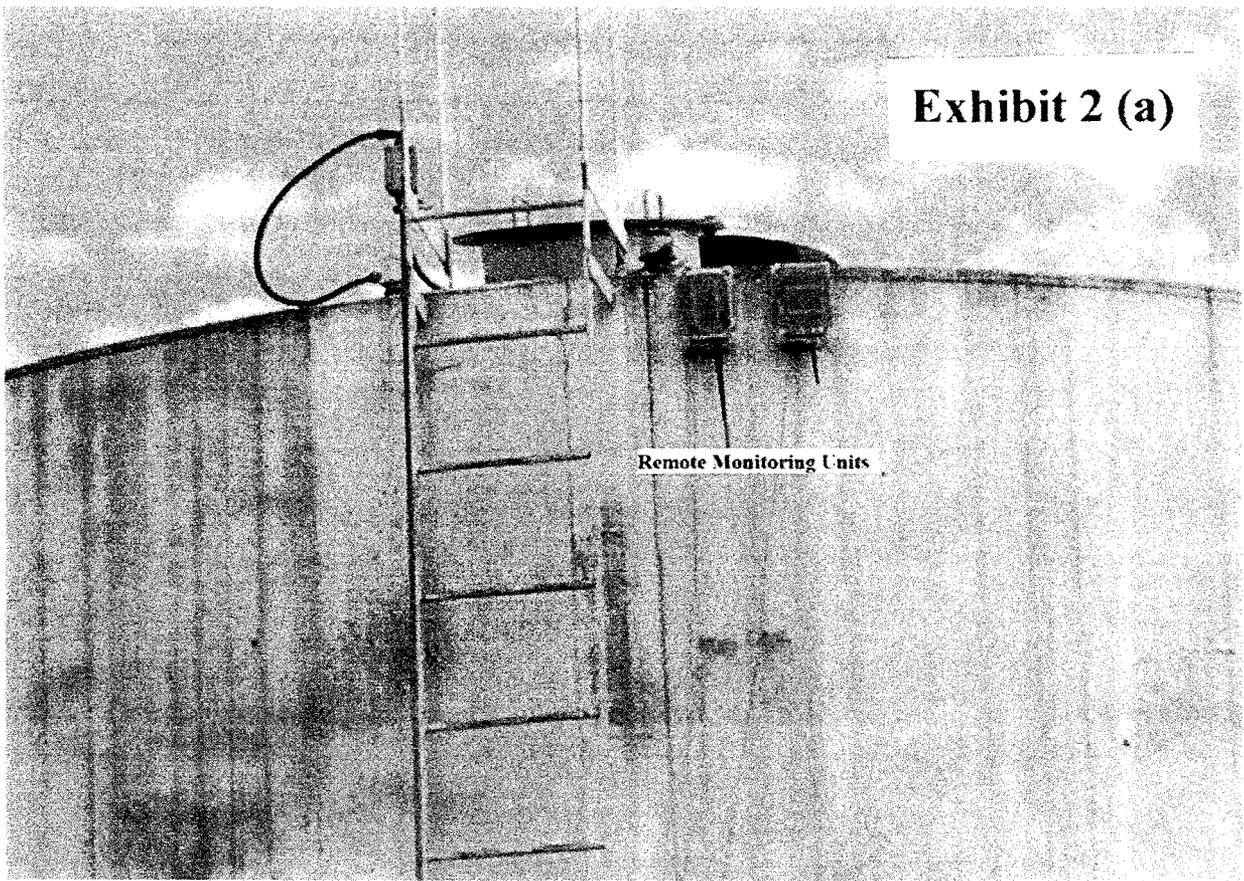


Exhibit 2 (a)



Circle City Booster Station

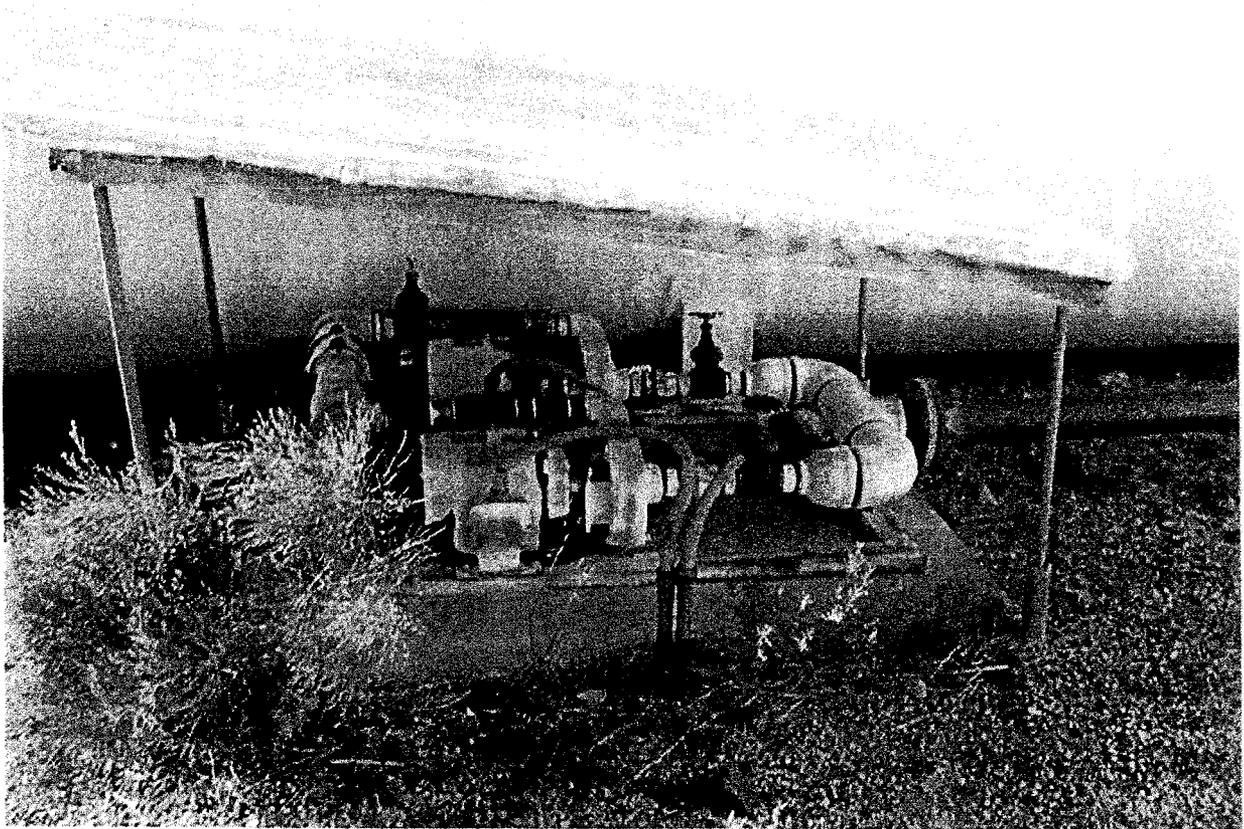


Exhibit 3

Bob Hardcastle

From: Bob Hardcastle
Sent: Thursday, August 04, 2005 8:05 AM
To: 'Judy.Cornman@aps.com'
Subject: RE: Circle City Water Company

Thank you, Judy, for the information.

Please confirm this work has been completed and on what date. If possible I'd like to get a copy of the recorded chart for my records.

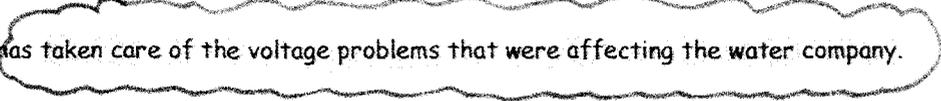
Thanks again for you help. Please advise.

RTH

Robert T. Hardcastle
Brooke Utilities, Inc.
P.O. Box 82218
Bakersfield, CA 93380-2218
(661) 633-7526 phone
(781) 823-3070 fax
RTH@brookeutilities.com

From: Judy.Cornman@aps.com [mailto:Judy.Cornman@aps.com]
Sent: Thursday, August 04, 2005 7:41 AM
To: Bob Hardcastle
Subject: Circle City Water Company

Here is the information you requested yesterday regarding the high voltage complaint from Circle City Water Co. After receiving the complaint - we investigated the area and found a voltage regulator in our substation was not working. We have switched some load around to even out the voltage and are in the process of changing the regulator out and then will switch the area back to normal.

This corrective action  has taken care of the voltage problems that were affecting the water company.

Please let me know if you have any further questions. Thanks, Judy

Judy L. Cornman
Customer Operations Liaison
Customer Account Management Dept
(602) 371-6939 Mail Sta 3108

"MMS <apsc.com>" made the following annotations.

--- NOTICE ---

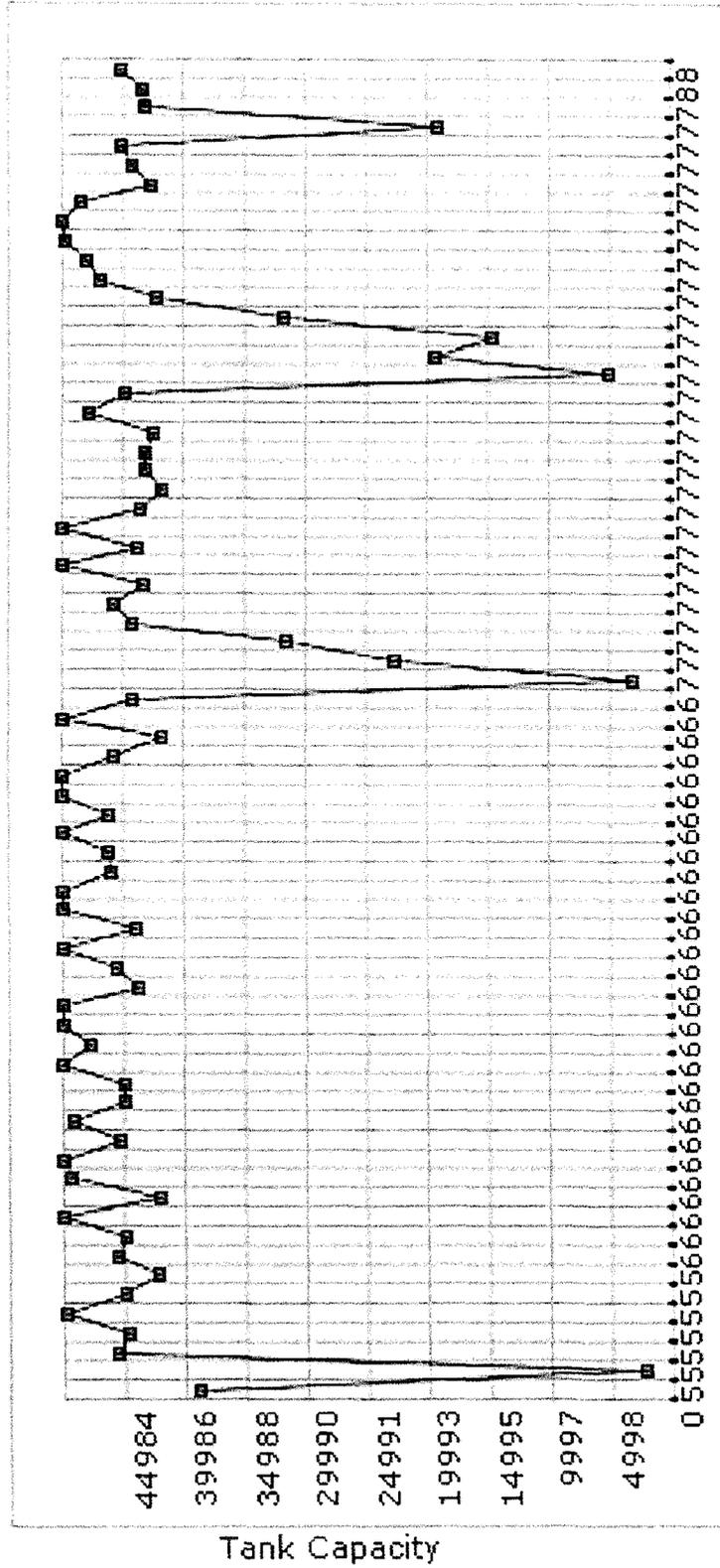
This message is for the designated recipient only and may contain confidential, privileged or proprietary information. If you have received it in error, please notify the sender immediately and delete the original and any copy or printout. Unintended recipients are prohibited from making any other use of this e-mail. Although we have taken reasonable precautions to ensure no viruses are present in this e-mail, we accept no liability for any loss or damage arising from

8/4/2005

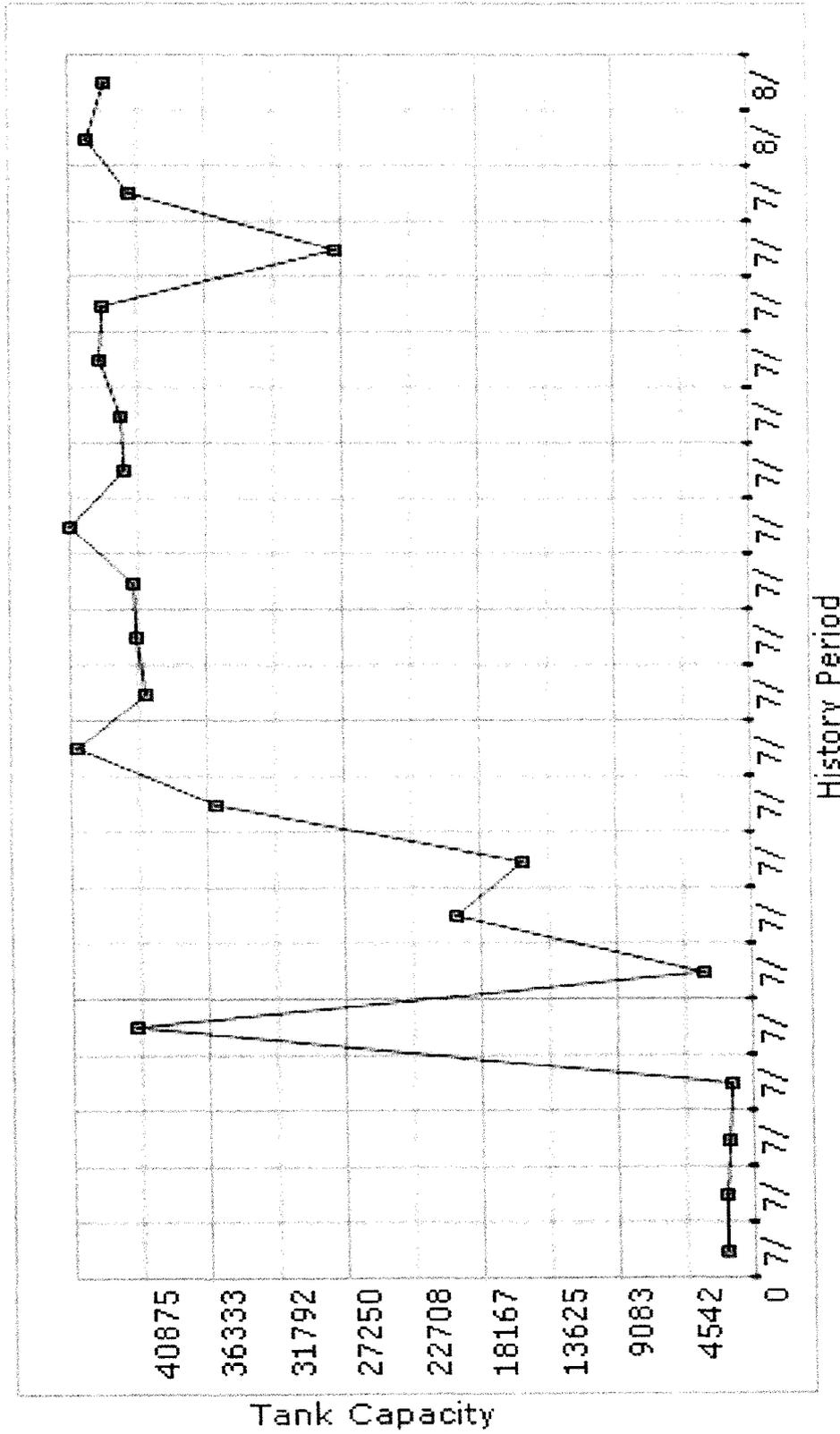
the use of this e-mail or attachments, or for any delay or errors or omissions in the contents which result from e-mail transmission.

8/4/2005

Circle City Water Co. – RMU Device; Daily Reads at ~ 0500 Hours
- May 23 through August 2, 2005



Circle City Water Co. – RMU Device #2; Daily Reads at ~ 1300 Hours
 - July 12 through August 2, 2005



LevelCon™

Exhibit 6

Tank Information

Tank # 0031022168-1
 Tank Description Circle City
 Sub Company Brooke Utilities Inc
 Product Type Water
 Capacity 50000 Gal
 High 0 Gal
 Low 25000 Gal
 Low Low 12500 Gal
 Current Level 45225 Gal
 As of 8/2/2005 4:51:00 AM
 Average Daily Use 11018.5 Gal
 Days to Low 1
 Days to LoLo 2
 Days to Empty : 4
 Battery Status : 12.3

USAGE DATA PERIOD

From : 5/23/2005 To : 8/2/2005
 Total Usage 200173 Gal
 Avg. Daily Usage 6255.42 Gal
 Max. Daily Usage 41163.1 Gal
 Average Inventory 43070.6 Gal

DELIVERY ESTIMATES

Last Fill Date Aug 2 2005 4:51AM
 Last Fill Amount 1788.19 Gal
 Number of Fills 35
 Avg. Fill Amount 5707.83 Gal
 Max. Fill Amount 23940.9 Gal

[Back to Summary View](#)
 [Messages & Notes](#)
 [Location](#)
 [Tank History & Charts](#)
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 [Ho](#)

LevelCon™

Tank and Battery History

0031022168-1 - Circle City

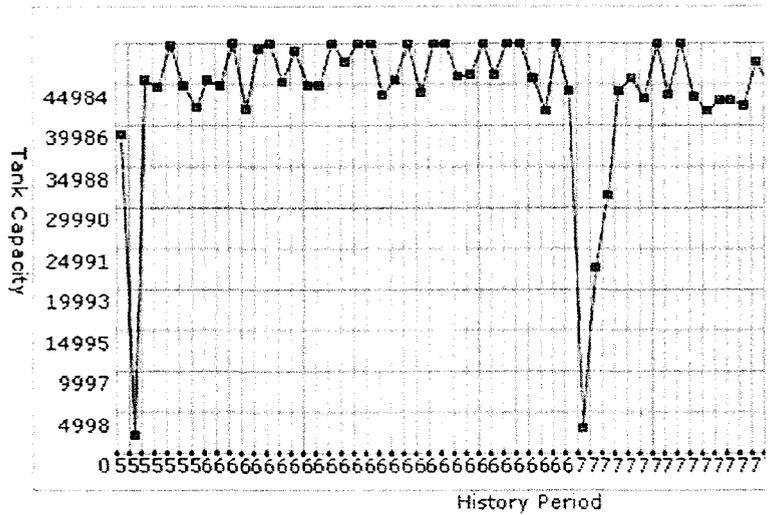
12 Week(s)

[View History](#)

Tank History

Inches	Inventory	Battery	Report Time	
260.5	45225.6 Gal	12.3	8/2/2005 4:51 AM	
250.2	43437.4 Gal	12.3	8/1/2005 4:51 AM	
249.1	43246.5 Gal	12.3	7/31/2005 4:51 AM	
111.2	19305.5 Gal	12.3	7/30/2005 4:51 AM	
260.5	45225.6 Gal	12.3	7/29/2005 4:51 AM	
255.9	44427 Gal	12.3	7/28/2005 4:51 AM	
246.8	42847.2 Gal	12.3	7/27/2005 4:51 AM	
279.9	48593.7 Gal	12.3	7/26/2005 4:51 AM	
287.9	49982.6 Gal	12.3	7/25/2005 4:51 AM	
286.7	49774.2 Gal	12.3	7/24/2005 4:51 AM	
277.6	48194.4 Gal	12.3	7/23/2005 4:51 AM	
270.8	47013.8 Gal	12.3	7/22/2005 4:51 AM	
243.4	42256.9 Gal	12.3	7/21/2005 4:51 AM	
183	31770.8 Gal	12.3	7/20/2005 4:51 AM	
85	14756.9 Gal	12.3	7/19/2005 4:51 AM	
112.3	19496.5 Gal	12.3	7/18/2005 4:51 AM	
30.2	5243.05 Gal	12.3	7/17/2005 4:52 AM	
259.4	45034.7 Gal	12.3	7/16/2005 4:52 AM	
275.3	47795.1 Gal	12.3	7/15/2005 4:52 AM	
244.5	42447.8 Gal	12.3	7/14/2005 4:52 AM	
249.1	43246.5 Gal	12.3	7/13/2005 4:52 AM	
249.1	43246.5 Gal	12.3	7/12/2005 4:52 AM	
241.1	41857.6 Gal	12.3	7/11/2005 4:52 AM	
251.4	43645.8 Gal	12.3	7/10/2005 4:52 AM	
287.9	49982.6 Gal	12.3	7/9/2005 4:52 AM	
252.5	43836.7 Gal	12.3	7/8/2005 4:52 AM	
287.9	49982.6 Gal	12.3	7/7/2005 4:52 AM	

Graphical View



250.2	43437.4 Gal	12.3	7/6/2005 4:52 AM	
263.9	45815.9 Gal	12.3	7/5/2005 4:52 AM	
254.8	44236 Gal	12.3	7/4/2005 4:52 AM	
181.8	31562.5 Gal	12.3	7/3/2005 4:52 AM	
130.6	22673.6 Gal	12.3	7/2/2005 4:52 AM	
18.8	3263.88 Gal	12.3	7/1/2005 4:52 AM	
255.9	44427 Gal	12.3	6/30/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/29/2005 4:53 AM	
241.1	41857.6 Gal	12.3	6/28/2005 4:53 AM	
263.9	45815.9 Gal	12.3	6/27/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/26/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/25/2005 4:53 AM	
266.2	46215.2 Gal	12.3	6/24/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/23/2005 4:53 AM	
266.2	46215.2 Gal	12.3	6/22/2005 4:53 AM	
265.1	46024.2 Gal	12.3	6/21/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/20/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/19/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/19/2005 4:53 AM	
253.7	44045.1 Gal	12.3	6/18/2005 4:53 AM	
287.9	49982.6 Gal	12.3	6/17/2005 4:53 AM	
262.8	45624.9 Gal	12.3	6/16/2005 4:53 AM	
252.5	43836.7 Gal	12.3	6/15/2005 4:54 AM	
287.9	49982.6 Gal	12.3	6/14/2005 4:54 AM	
287.9	49982.6 Gal	12.3	6/13/2005 4:54 AM	
275.3	47795.1 Gal	12.3	6/12/2005 4:54 AM	
287.9	49982.6 Gal	12.3	6/11/2005 4:54 AM	
259.4	45034.7 Gal	12.3	6/10/2005 4:54 AM	
259.4	45034.7 Gal	12.3	6/9/2005 4:54 AM	
283.3	49183.9 Gal	12.19	6/8/2005 4:54 AM	
261.6	45416.6 Gal	12.3	6/7/2005 4:54 AM	
287.9	49982.6 Gal	12.3	6/6/2005 4:54 AM	
284.4	49374.9 Gal	12.3	6/5/2005 4:54 AM	
242.3	42065.9 Gal	12.3	6/4/2005 4:54 AM	
287.9	49982.6 Gal	12.19	6/3/2005 4:54 AM	
259.4	45034.7 Gal	12.3	6/2/2005 4:54 AM	

				
262.8	45624.9 Gal	12.3	6/1/2005 4:54 AM	
243.4	42256.9 Gal	12.3	5/31/2005 4:55 AM	
259.4	45034.7 Gal	12.3	5/30/2005 4:55 AM	
286.7	49774.2 Gal	12.3	5/29/2005 4:55 AM	
258.2	44826.3 Gal	12.3	5/28/2005 4:55 AM	
262.8	45624.9 Gal	12.19	5/27/2005 4:55 AM	
13.1	2274.3 Gal	12.07	5/12/2005 4:56 AM	
224	38888.8 Gal	12.19	5/11/2005 8:52 AM	

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LevelCon™**Exhibit 7****Tank Information**

Tank # 0031022438-1
 Tank Description Circle City #2
 Sub Company Brooke Utilities Inc
 Product Type Water
 Capacity 50000 Gal
 High 0 Gal
 Low 25000 Gal
 Low Low 12500 Gal
 Current Level 43055 Gal
 As of 8/2/2005 12:59:00 PM
 Average Daily Use 4986.1 Gal
 Days to Low 2
 Days to LoLo 5
 Days to Empty : 8
 Battery Status : 13.13

USAGE DATA PERIOD

From : 5/23/2005 **To :** 8/2/2005
 Total Usage 75798.5 Gal
 Avg. Daily Usage 6890.77 Gal
 Max. Daily Usage 38003.4 Gal
 Average Inventory 28091 Gal

DELIVERY ESTIMATES

Last Fill Date Aug 1 2005 12:59PM
 Last Fill Amount 2777.77 Gal
 Number of Fills 12
 Avg. Fill Amount 9104.44 Gal
 Max. Fill Amount 39774.3 Gal

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LevelCon™

Tank and Battery History

0031022438-1 - Circle City #2

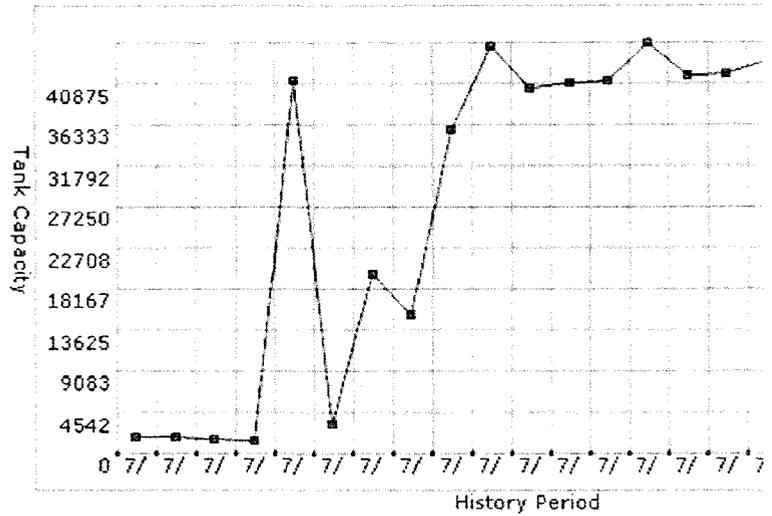
4 Week(s)

[View History](#)

Tank History

Inches	Inventory	Battery	Report Time	
248	43055.5 Gal	13.13	8/2/2005 12:59 PM	🕒
254.8	44236 Gal	13.13	8/1/2005 12:59 PM	🕒
238.8	41458.3 Gal	13.13	7/31/2005 12:59 PM	🕒
160.2	27812.5 Gal	13.13	7/30/2005 12:59 PM	🕒
249.1	43246.5 Gal	13.13	7/29/2005 12:59 PM	🕒
250.2	43437.4 Gal	13.13	7/28/2005 12:59 PM	🕒
242.3	42065.9 Gal	13.01	7/27/2005 12:59 PM	🕒
241.1	41857.6 Gal	13.01	7/26/2005 12:59 PM	🕒
261.6	45416.6 Gal	13.01	7/25/2005 12:59 PM	🕒
237.7	41267.3 Gal	13.13	7/24/2005 12:59 PM	🕒
236.6	41076.3 Gal	13.13	7/23/2005 12:59 PM	🕒
233.1	40468.7 Gal	13.01	7/22/2005 12:59 PM	🕒
259.4	45034.7 Gal	13.01	7/21/2005 12:59 PM	🕒
205.8	35729.1 Gal	13.01	7/20/2005 1:00 PM	🕒
88.4	15347.2 Gal	13.01	7/19/2005 1:00 PM	🕒
114.6	19895.8 Gal	12.89	7/18/2005 1:00 PM	🕒
18.8	3263.88 Gal	12.89	7/17/2005 1:00 PM	🕒
237.7	41267.3 Gal	12.77	7/16/2005 1:00 PM	🕒
8.6	1493.05 Gal	12.42	7/15/2005 2:43 PM	🕒
9.7	1684.03 Gal	12.66	7/13/2005 1:00 PM	🕒

Graphical View



10.9	1892.36 Gal	12.3	7/13/2005 3:59 AM	
10.9	1892.36 Gal	12.19	7/12/2005 7:16 AM	

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First National Management, Inc.
 P.O. Box 1020
 Apache Junction, AZ. 85217-1020

Exhibit 8 Invoice

Date	Invoice #
7/7/2005	3323

Bill To
Circle City Water Co., Inc. P O Box 82218 Bakersfield, Ca. 93380

Ship To

P.O. Number	Terms	Rep	Ship	Via	F.O.B.	Project
	Due on receipt		7/7/2005			
Quantity	Item Code	Description			Price Each	Amount
	421.000	TO BILL you for the cost of generator rental incurred during the repair of the service entry section serving the Circle City Water System. Rental of generator was on June 15, 2005. The total cost of \$7,302.21 was paid via credit card. A copy of the credit card receipt is attached along with a copy of the vendors quote. Generator rental Sales Tax			7,302.21 0.00	# 7,302.21 0.00
					Total	57,302.21

First National Management, Inc.

Exhibit 9

Invoice

P.O. Box 1020
 Apache Junction, AZ.
 85217-1020

DATE	INVOICE NO.
7/19/2005	3325

BILL TO
Circle City Water Co., Inc. P O Box 82218 Bakersfield, Ca. 93380

SHIP TO

P.O. NO.	TERMS	REP	SHIP DATE	SHIP VIA	FOB	PROJECT
			7/19/2005			
ITEM	DESCRIPTION			QTY	RATE	AMOUNT
CCD	TO BILL you for management services in accordance with the terms and conditions of that management agreement dated January 20, 1996 This billing includes management services for the period beginning June 20, 2005 through July 19, 2005.				1,340.00	1,340.00
421.000	Met with APS & inspector. Virgil 6-27-05			4	45.00	#180.00
290.01	Mileage			70	0.385	#26.95
421.000	Dispatched George to investigate well site. Per Misti. George 6-28-05			2	27.50	*55.00
290.01	Mileage			60	0.385	*23.10
421.000	Dispatched to turn on Lot 39. Well kicked out, reset. Replaced starter on Saturday. George 7-1-05			5	27.50	*137.50
290.01	Mileage			125	0.385	*48.13
421.000	Checked system, found meter saver kicked out. George 7-17-05			4	27.50	*110.00
290.01	Mileage			125	0.385	*48.13
				Total		

First National Management, Inc.

P.O. Box 1020
 Apache Junction, AZ.
 85217-1020

Invoice

DATE	INVOICE NO.
7/19/2005	3325

BILL TO
Circle City Water Co., Inc. P O Box 82218 Bakersfield, Ca. 93380

SHIP TO

P.O. NO.	TERMS	REP	SHIP DATE	SHIP VIA	FOB	PROJECT
			7/19/2005			
ITEM	DESCRIPTION			QTY	RATE	AMOUNT
421.000	Purchased diesel and gas for generator, checked well. Dan Rinker 6-16-05 / 6-26-05				257.40	# 257.40
Total						\$2,226.21

First National Management, Inc.

P.O. Box 1020
 Apache Junction, AZ.
 85217-1020

Invoice

DATE	INVOICE NO.
8/3/2005	3334

BILL TO
Circle City Water Co., Inc. P O Box 82218 Bakersfield, Ca. 93380

SHIP TO

P.O. NO.	TERMS	REP	SHIP DATE	SHIP VIA	FOB	PROJECT
	Due on receipt		8/3/2005			
ITEM	DESCRIPTION			QTY	RATE	AMOUNT
	TO BILL you for services on July 20, 2005. This invoice is for meetings with APS.					
421.000	Meeting with APS to put a recorder on APS side of meter. Virgil 7-20-05			4	45.00	*180.00
290.01	Mileage			120	0.385	* 46.20
421.000	Meeting with APS to remove recorder from APS side of meter. Virgil 7-25-05			2	45.00	*90.00
290.01	Mileage			70	0.385	*26.95
				Total		\$343.15

First National Management, Inc.

P.O. Box 1020
 Apache Junction, AZ.
 85217-1020

Invoice

DATE	INVOICE NO.
6/20/2005	3311

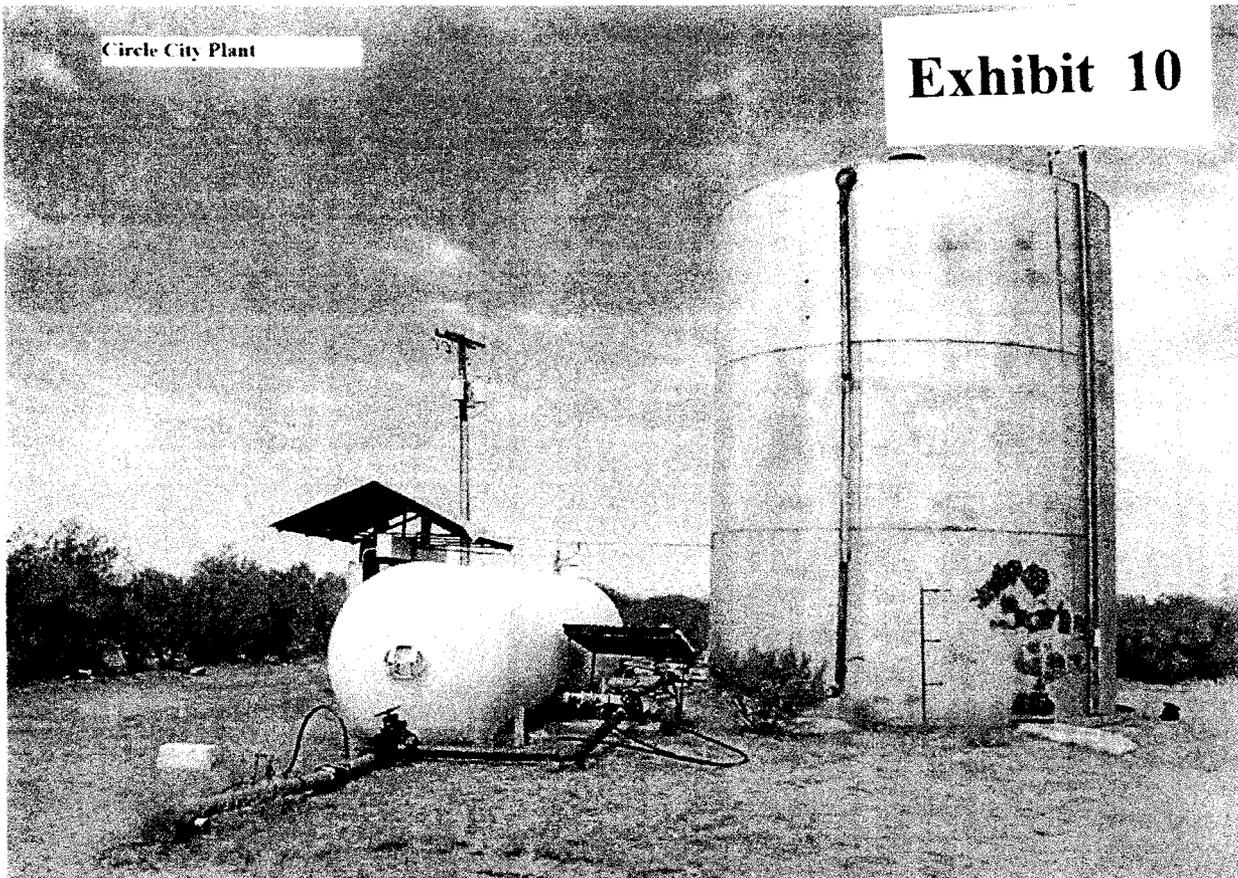
BILL TO
Circle City Water Co., Inc. P O Box 82218 Bakersfield, Ca. 93380

SHIP TO
<i>Circle City Water Co.</i>

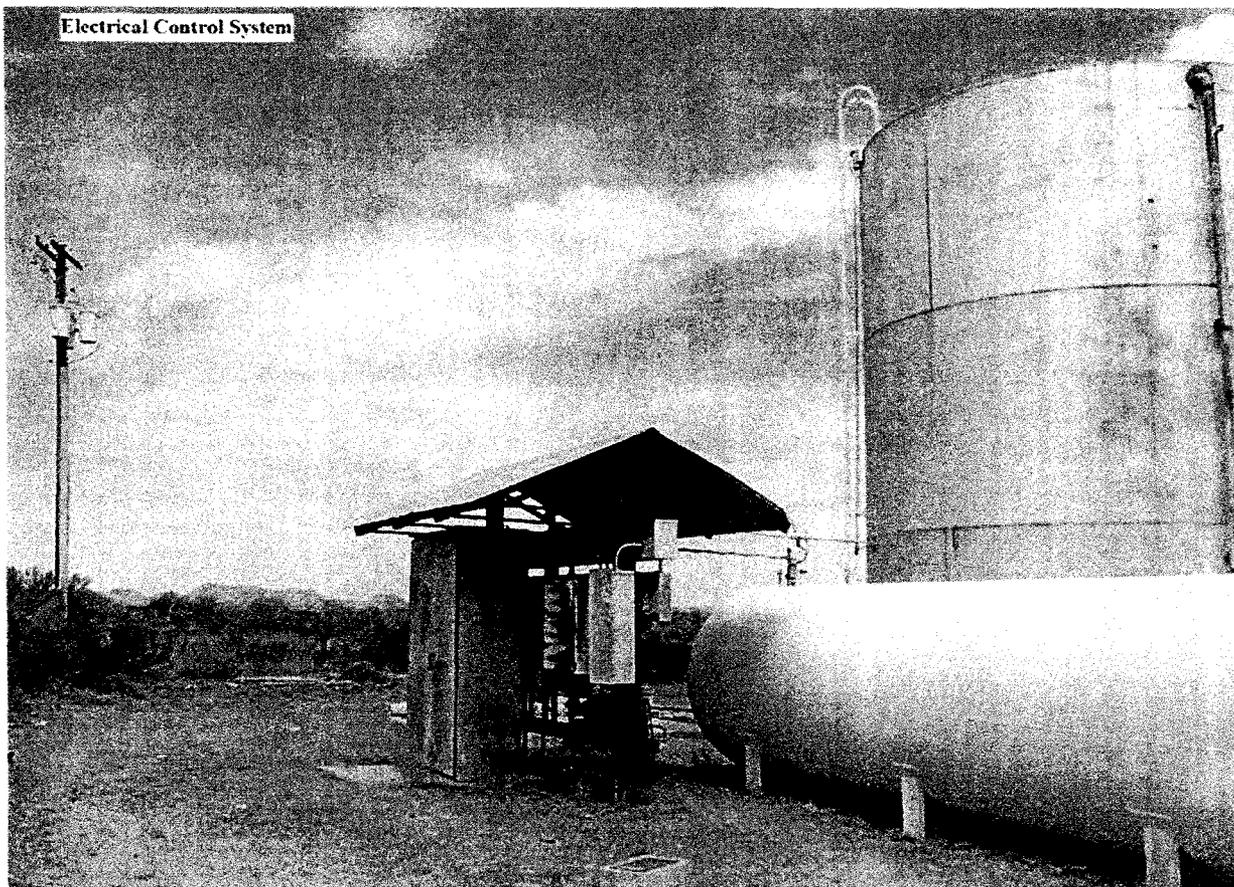
P.O. NO.	TERMS	REP	SHIP DATE	SHIP VIA	FOB	PROJECT
			6/20/2005			
ITEM	DESCRIPTION			QTY	RATE	AMOUNT
CCD	TO BILL you for management services in accordance with the terms and conditions of that certain management agreement dated January 20, 1996. This billing includes management services for the period beginning May 20, 2005 through June 19, 2005.				1,340.00	1,340.00
421.000	Call out for no water. reset and build pressure. 5-22-05 George			4.5	27.50	* 123.75
290.01	Mileage			125	0.385	* 48.13
421.000	No water callout. Rat in main disconnect box. 6-13-05 Virgil			4	45.00	# 180.00
290.01	Mileage			125	0.385	# 48.13
421.000	Main disconnect shorted out, called APS & electrician. Generator brought in. 6-15-05 Virgil			11	45.00	# 495.00
290.01	Mileage			125	0.385	# 48.13
421.000	Helped electrician to install main disconnect. 6-17-05 Virgil			6	45.00	# 270.00
290.01	Mileage			125	0.385	# 48.13
				Total		\$2,601.27

Circle City Plant

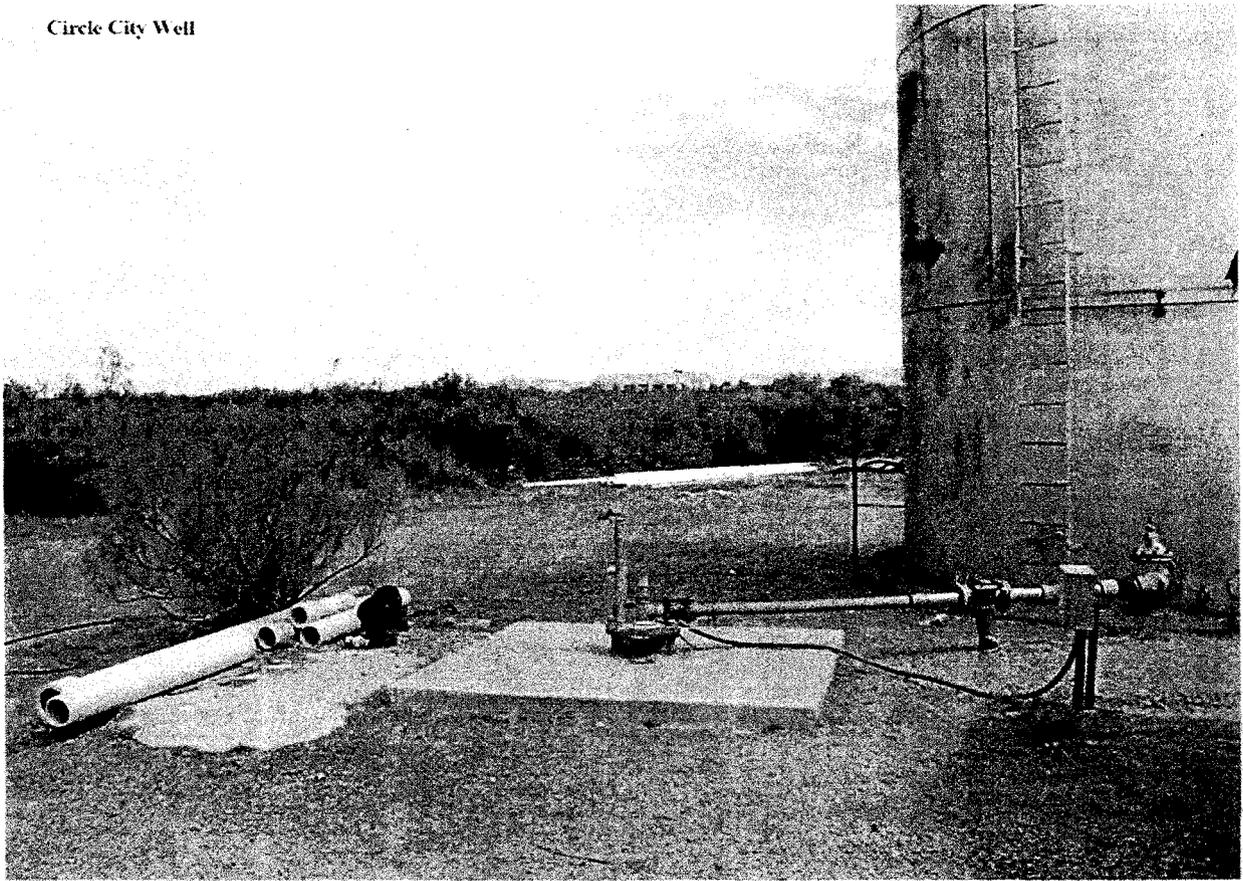
Exhibit 10



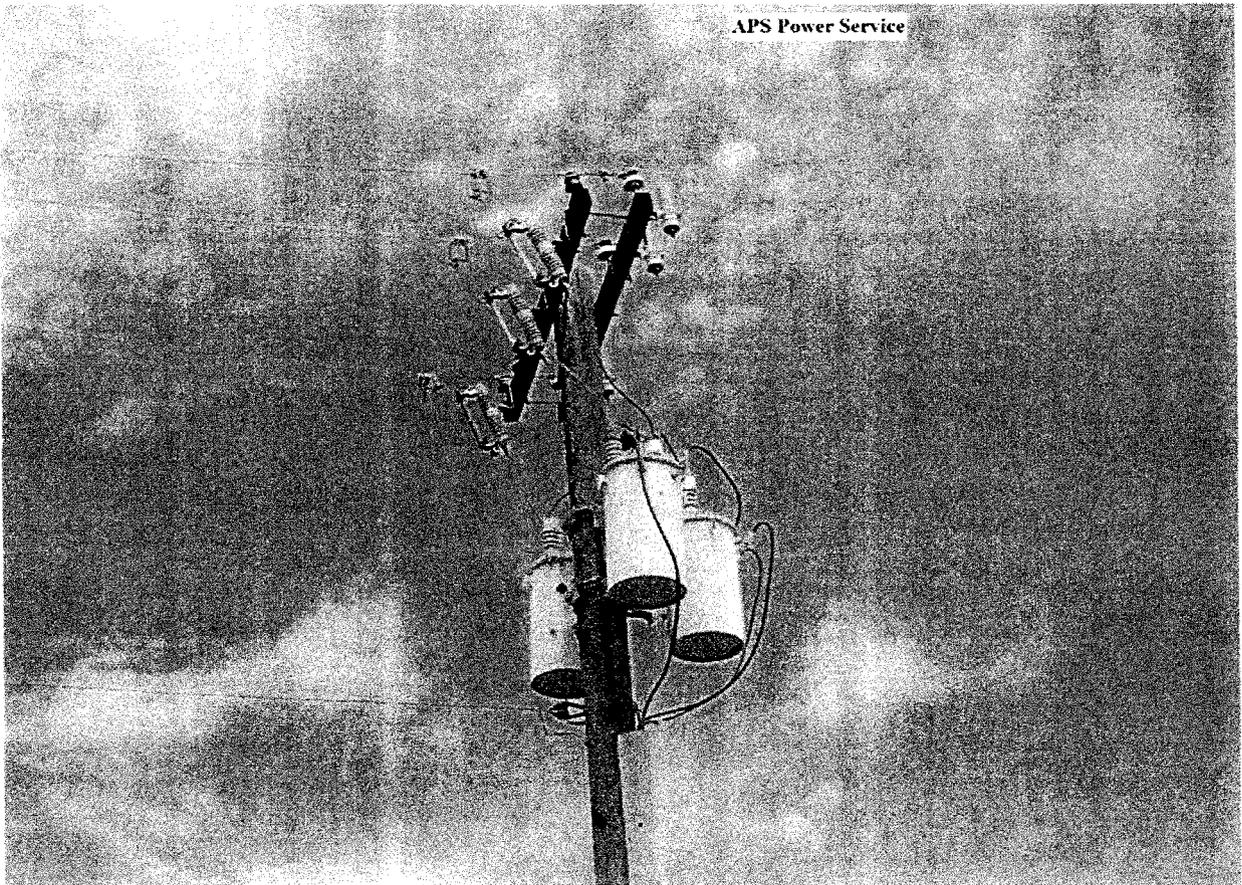
Electrical Control System

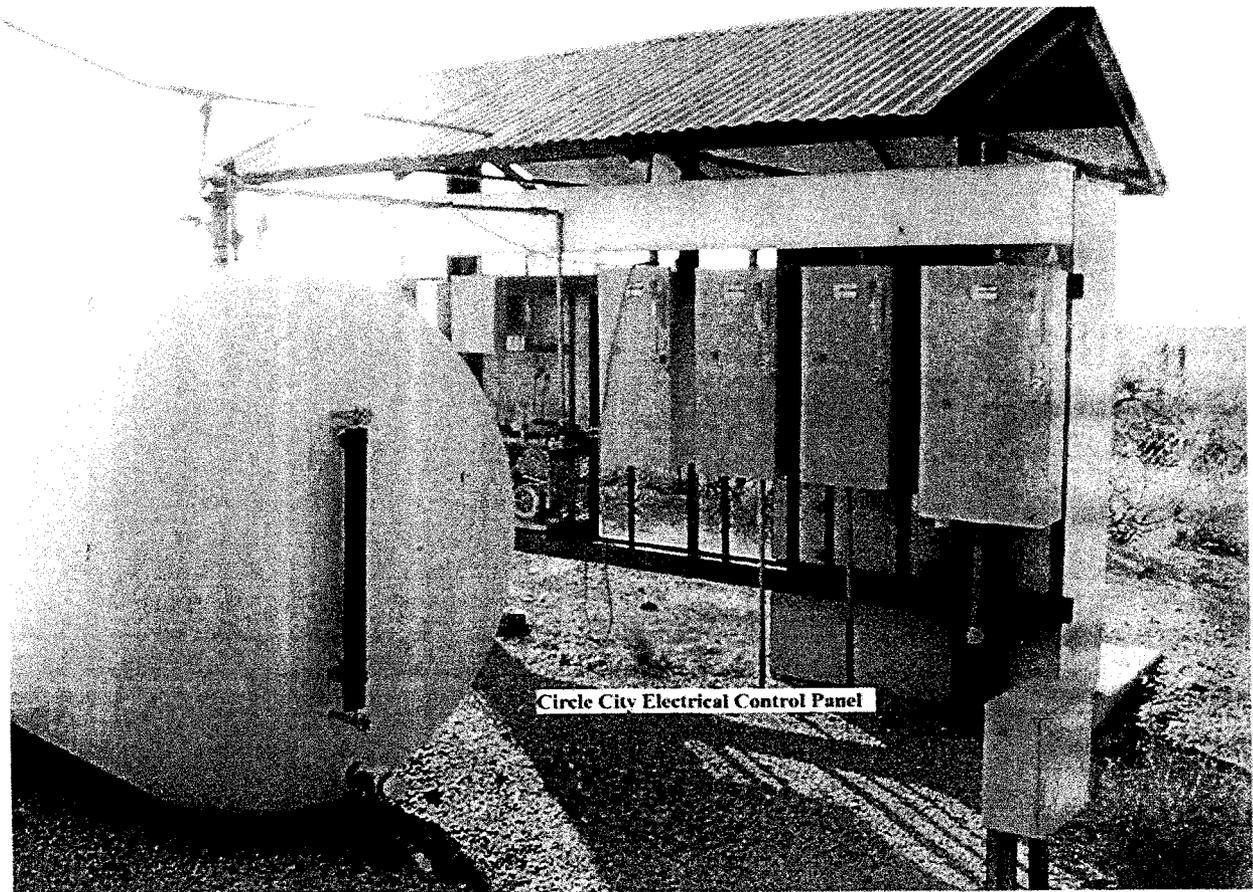


Circle City Well

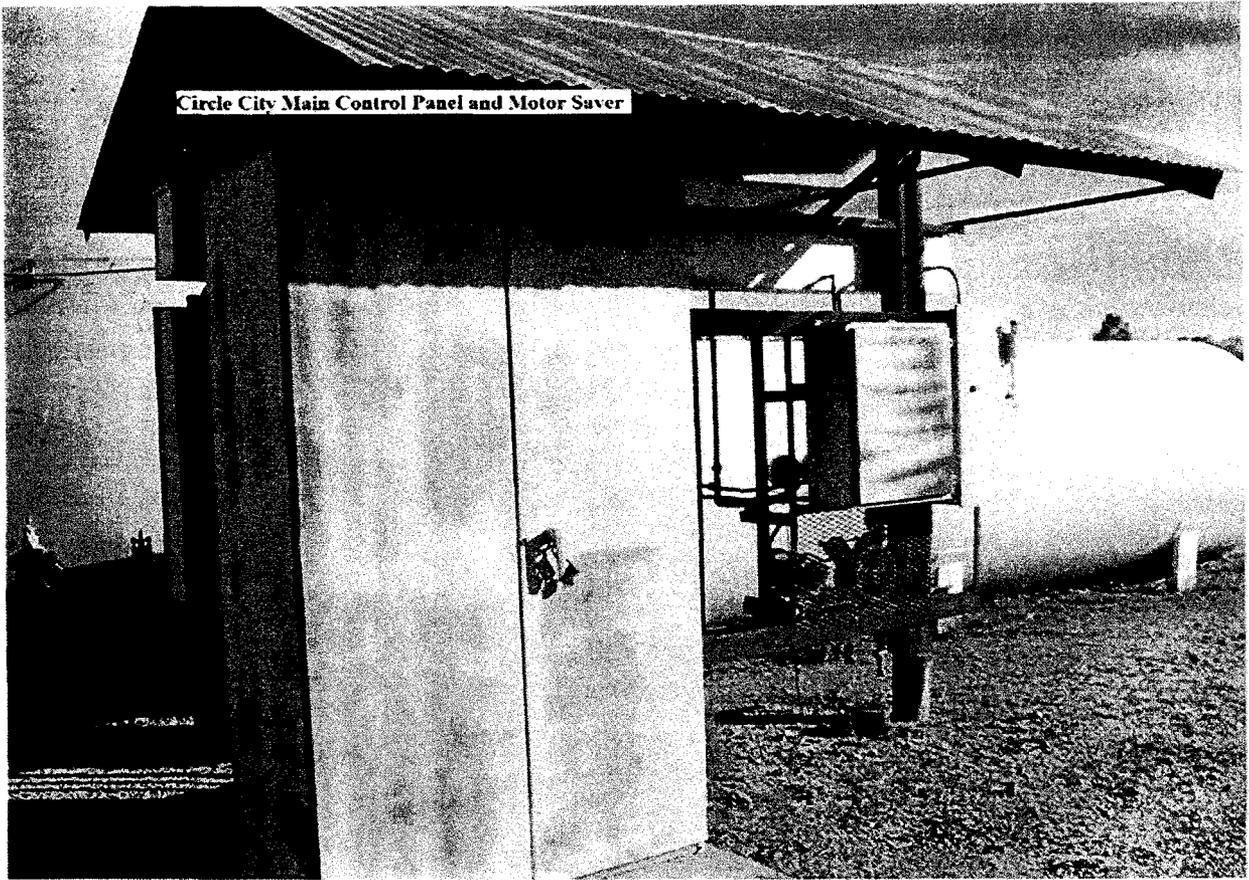


APS Power Service





Circle City Main Control Panel and Motor Saver



B

Water Master Plan

for

Lake Pleasant 5,000

Original Report Date: December 8, 2004

Revised Report Date: August 3, 2005

Prepared For:

Harvard Investments
17700 North Pacesetter Way
Scottsdale, Arizona 85255
Phone: 480-348-1118
Fax: 480-348-8976



Prepared By:

Scott M. Larson P.E.
J. Ryan Christensen P.E.



16605 North 28th Avenue, Suite 100
Phoenix, AZ 85053-7550
Phone: 602-467-2200
Fax: 602-467-2201

JN: 45-101888

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Abbreviations

ac	Acres
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AWWA	American Water Works Association
DU	Dwelling Units
EDU	Equivalent Dwelling Units
gal	Gallons
gpcpd	Gallons Per Capita Per Day
gpd	Gallons Per Day
gpm	Gallons Per Minute
LF	Linear Feet
MAG	Maricopa Association of Governments
MDR	Medium Density Residential (single family housing)
MF	Multiple Family
MG	Million Gallons
MGD	Million Gallons Per Day
n	Manning's Roughness
psi	Pounds Per Square Inch

1.0 Introduction

1.1 General Description

The proposed Lake Pleasant 5,000 development covers approximately 4,882 acres within Maricopa County. The proposed development is located within the City of Surprise General Plan area, and is anticipated to consist of approximately 10,000 residential dwelling units and 300 acres of commercial development. The general site location can be seen in Figure 1 Lake Pleasant 5,000 Vicinity Map.

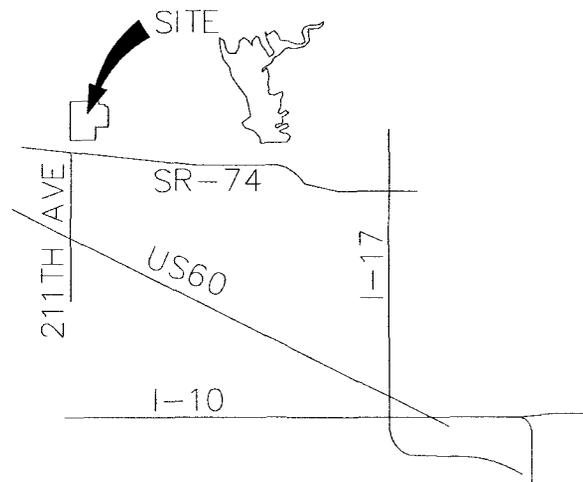


Figure 1 Lake Pleasant 5,000 Vicinity Map

1.2 Project Location

The Lake Pleasant 5,000 development includes sections 5, 6, 7, 8, 9, 17 and 18 as well as a majority portion of Section 4 in Township 6 North, Range 2 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is located north of SR 74, south of the Maricopa County line, and east of the 211th Ave alignment.

1.3 Topographic Conditions

The Lake Pleasant 5000 development consists of undeveloped desert land. The northern and northeast portions of the site are dominated by mountainous terrain, while the eastern third of the site is fairly flat sloping from north to south at approximately a 3% grade.

1.4 Scope of Study

The purpose of this study is to provide a conceptual discussion of the water infrastructure necessary to serve the proposed Lake Pleasant 5,000 development. This study will discuss the potable water facilities required to serve the project. Storage, supply, and demands associated with the proposed development will be addressed. It is important to note, that the onsite distribution lines are not addressed within this study.

2.0 Distribution System

2.1 Pressure Zone Description

The proposed Lake Pleasant 5,000 development is anticipated to consist of five pressure zones. The pressure zone boundaries will be set at approximately 120-foot intervals. The anticipated pressure zones for the site are outlined in Table 1 Lake Pleasant 5,000 Pressure Zones. An exhibit showing the pressure zone boundaries is included in Appendix A Pressure Zone Map.

Table 1 Lake Pleasant 5,000 Pressure Zones

Zone	Low Contour	High Contour
P1	2,080	2,200
P2	2,200	2,320
P3	2,320	2,440
P4	2,440	2,560
P5	2,560	2,680

3.0 Projected System Demands

3.1 General

The Lake Pleasant 5,000 development is anticipated to consist of 10,000 dwelling units. The average day demands for the site were determined based on the projected number of residential dwelling units and the projected amount of commercial acreage. The projected population for the residential area was calculated by multiplying the number of dwelling units, by a population density of 3.2 people per dwelling unit (ppdu). The water demand for the site was calculated by multiplying the projected population by the new residential demand factors from the Arizona Department of Water Resources (ADWR) Third Management Plan for the Phoenix Active Management Area (AMA). These factors consist of an interior water demand of 57 gpcd and an exterior water demand of 178 gallons per dwelling unit. In order to maintain these demand factors, it was assumed that the residential turf areas would be limited to 900 ft², as defined by ADWR's Third Management Plan, and that other conservation measures identified in the Third Management Plan would be followed. A commercial demand of 2,000 gallons per acre was also used in these calculations. The demand factors used for this project are summarized in Table 2 Water Demand Factors.

Table 2 Water Demand Factors

Type	Demand	Unit
Residential Interior	57	gpcd
Residential Exterior	178	gal/du/day
Commercial	2,000	gal/acre/day

Peaking factors for the maximum day and peak hour demands were estimated for the proposed Lake Pleasant 5,000 development. A maximum day peaking factor of 1.8 times the average day demand was assumed. While a peak hour peaking factor of 3.0 times the average day demand was assumed. The projected average day, maximum day, and peak hour demands are shown in Table 3 Lake Pleasant 5,000 Water Demands.

Table 3 Lake Pleasant 5,000 Water Demands

Avg Day		Max Day		Peak Hour	
(gpd)	(gpm)	(gpd)	(gpm)	(gpd)	(gpm)
4,204,000	2,919	7,567,200	5,255	12,612,000	8,758

It is important to note that water demands for the irrigation of the proposed golf courses have not been included within these calculations. The golf courses are planned to be irrigated through reclaimed water. Additionally, changes to the number of dwelling units, projected land uses, and varying individual water usage patterns could result in either an increase or decrease in actual water demand.

3.2 Fire Flow Demand

The proposed Lake Pleasant 5,000 water system will be capable of providing sufficient fire flow throughout the development. The required fire flow will depend on the land use in each area, but is anticipated to range from a minimum of 1,000 gpm within the residential areas up to 3,000 gpm within the commercial areas.

4.0 Water Storage

The volume of water storage to be included within the site has been calculated to provide a reliable water system. Sufficient water storage is projected to be stored on site in order to meet the maximum day water demand. The water storage volume projected for the proposed Lake Pleasant 5,000 development is a total of 7.6 million gallons. It is anticipated that this storage would be provided through two 2.30 million gallon tanks and two 1.50 million gallon tanks. The location of the water storage reservoirs throughout the site will be determined at a future time.

Additionally, one 500,000 gallon storage tank is anticipated to be constructed at the well field. This tank will be used to help reduce cycling of the well pumps and to provide temporary storage before boosting the water to the site.

4.1 Booster Pump Capacity

The onsite booster pump capacity has been calculated for the proposed Lake Pleasant 5,000 development. Sufficient booster pumping capacity will be provided in order to meet the peak hour water system demands, while maintaining one backup booster pump. A peak hour demand of 8,758 gpm has been calculated for the development as described in Section 3.0, Projected System Demands. It is anticipated, that 10,350 gpm of booster capacity will be provided for the onsite water distribution system. Due to the amount of elevation change throughout the site, it may be possible to reduce the amount of booster pump capacity by supplying a portion of the site through gravity.

In addition to the booster pump capacity for the on site distribution system, it will also be necessary to construct a booster pump station to bring the water supply from the Central Arizona Project canal (CAP) to the Circle City Water Company, and another booster station to bring the water supply from the Circle City Water Company to the project site. It is anticipated that each of these stations will be capable of meeting the maximum day demand of 5,255 gpm, while maintaining one backup booster pump. Each of these booster stations is projected to have a capacity of 6,650 gpm. A greater discussion of the water supply for the project is provided in Section 5.0, Water Supply.

5.0 Water Supply

The water supply for the proposed Lake Pleasant 5,000 development is anticipated to come from a combination of groundwater wells and (CAP) surface water supply. It is anticipated that sufficient groundwater wells will be provided to meet the average day demand of 2,919 gpm. In addition, surface water supplies will be provided to meet the total maximum day demand of 5,255 gpm. The groundwater wells will serve as a back up supply for the development.

The Circle City Water Company service area will be expanded to include a well field. This well field is anticipated to be located in a portion of Section 28 of Township 6 North, Range 3 West. The groundwater wells to supply this project are anticipated to be located within the proposed well field as well as the existing Circle City Water Company service area. Assuming that each well will produce 320 gpm, 11 wells will be required to meet the average day demand of the project, while maintaining one backup well. The actual number of groundwater wells will depend on the production capacity of each well.

It will be necessary to construct booster stations and transmission mains in order to convey the water from the CAP to the Circle City Water Company service area, and from the Circle City Water Company to the project site. Two 24-inch transmission mains are anticipated to be required. Details on these transmission mains are summarized in Table 4 Transmission Main Details. An exhibit showing the location of the Circle City Water Company, the proposed well field, conceptual alignments of the proposed transmission mains, and project site is provided in Appendix B Proposed Transmission Mains.

Table 4 Transmission Main Details

Start	End	Length (ft)	Diam (in)	Start Elev	End Elev
CAP	Circle City Water Co	44,000	24	1,550	1,910
Circle City Water Co	Lake Pleasant 5,000	47,000	24	1,910	2,300

6.0 Circle City Water System Interconnect

As part of the improvements for the Lake Pleasant 5,000 development, it is anticipated that an interconnection will be made to the existing Circle City water system. The interconnection will provide additional flow and storage to the existing Circle City water system, increasing the reliability of the system. A proposed alignment for the Lake Pleasant 5,000/Circle City interconnection is shown in Appendix C Lake Pleasant 5,000/Circle City Interconnection Exhibit.

7.0 Opinion of Probable Costs

An engineer's opinion of probable costs has been developed for this project. These costs are based on the engineer's experience with the construction industry, and should be used for planning purposes only. The costs have been developed for the wells, tanks, transmission lines, and booster stations, the onsite distribution lines have not been included as part of this analysis.

Opinion of Probable Cost for Pipes, Wells, Tanks & Booster Station
10,000 Units

Description	Average Unit Cost	Unit	QTY	Total
Well Drilling	\$ 175,000	EA	11	\$ 1,925,000
Well Equipping (pump & motor, well head and column pipe, discharge piping and valves, etc.)	\$ 110,000	EA	11	\$ 1,210,000
6-Foot Block Wall	\$ 100	LF	9,075	\$ 907,500
Well Site Foundation Pads	\$ 7,250	EA	11	\$ 79,750
Well Electrical	\$ 55,000	EA	11	\$ 605,000
Well Controls	\$ 45,000	EA	11	\$ 495,000
Well Generator	\$ 50,000	EA	2	\$ 100,000
Well(s) Subtotal				\$ 5,322,250
CAP Water Treatment (1.0 MGD per unit)	\$ 500,000	EA	8	\$ 4,000,000
Booster Station (6,650 gpm), Complete with Hydropneumatic Tank and Appurtenances	\$ 473,813	LS	1	\$ 473,813
Transmission Line Complete (24-inch, DIP)	\$ 83	LF	44,000	\$ 3,652,000
CAP Treatment Subtotal				\$ 8,125,813
Tank (1.5 MG)	\$ 432,000	EA	2	\$ 864,000
Tank (2.3 MG)	\$ 580,000	EA	2	\$ 1,160,000
Tank (0.5 MG)	\$ 192,000	EA	1	\$ 192,000
Site Improvements (Grading, pads, excavation)	\$ 425,000	EA	2.5	\$ 1,062,500
8-Foot Block Wall	\$ 175	LF	4,400	\$ 770,000
Tank Site Piping, Valves, Meters, etc.	\$ 318,750	EA	2.5	\$ 796,875
Tank Site Electrical	\$ 312,500	EA	2.5	\$ 781,250
Tank Site Controls	\$ 156,250	EA	2.5	\$ 390,625
Tank Site Generator	\$ 218,750	EA	2.5	\$ 546,875
Tank(s) Subtotal				\$ 6,564,125
Transmission Line Complete (8-inch, DIP)	\$ 40	LF	5,280	\$ 211,200
Transmission Line Complete (24-inch, DIP)	\$ 83	LF	47,000	\$ 3,901,000
Transmission Line Subtotal				\$ 4,112,200
Booster Station (6,650 gpm), Complete with Hydropneumatic Tank and Appurtenances	\$ 473,813	LS	1	\$ 473,813
Booster Station (10,500 gpm), Complete with Hydropneumatic Tank and Appurtenances	\$ 748,125	LS	1	\$ 748,125
Subtotal				\$ 25,346,325
Contingency (15%)				\$ 3,801,949
Bonding				<i>Excluded</i>
Tax (6.3%)				\$ 1,836,341
Adjusted Total				\$ 30,984,615

*Since ENGINEER has no control over the cost of labor, materials, equipment or services furnished by others or over the Contractor(s)' method of determining prices, or over the competitive bidding or market conditions, its opinions of probable Project Cost and Construction Cost provided herein are to be made on the basis of its experience and qualifications and represents its best judgment as an experienced and qualified professional engineer, familiar with the construction industry; but ENGINEER cannot and does not guarantee that proposals, bids or actual Project or Construction Cost will not vary from its opinion of probable cost. If prior to the Bidding or Negotiating Phase, OWNER wishes greater assurance as to Project Cost, it shall employ an independent cost estimator.

**Price excludes engineering, right-of-way acquisition, legal, or other non-construction related costs

References

Division of Environmental Health Services, Bureau of Water Quality Control. Engineering Bulletin #10: Guidelines for the Construction of Water Systems, May 1978.

Ysusi, Mark A. "Water Distribution System Design." Hydraulic Design Handbook. Editor in Chief: Larry W. Mays. New York: McGraw-Hill, 1999

Appendices

Appendix A Pressure Zone Map

Appendix B Proposed Transmission Mains

Appendix C Lake Pleasant 5,000/Circle City Interconnection Exhibit

Appendix A Pressure Zone Map

Lake Pleasant 5,000 Pressure Zone Boundaries

 Project Site

Pressure Zones

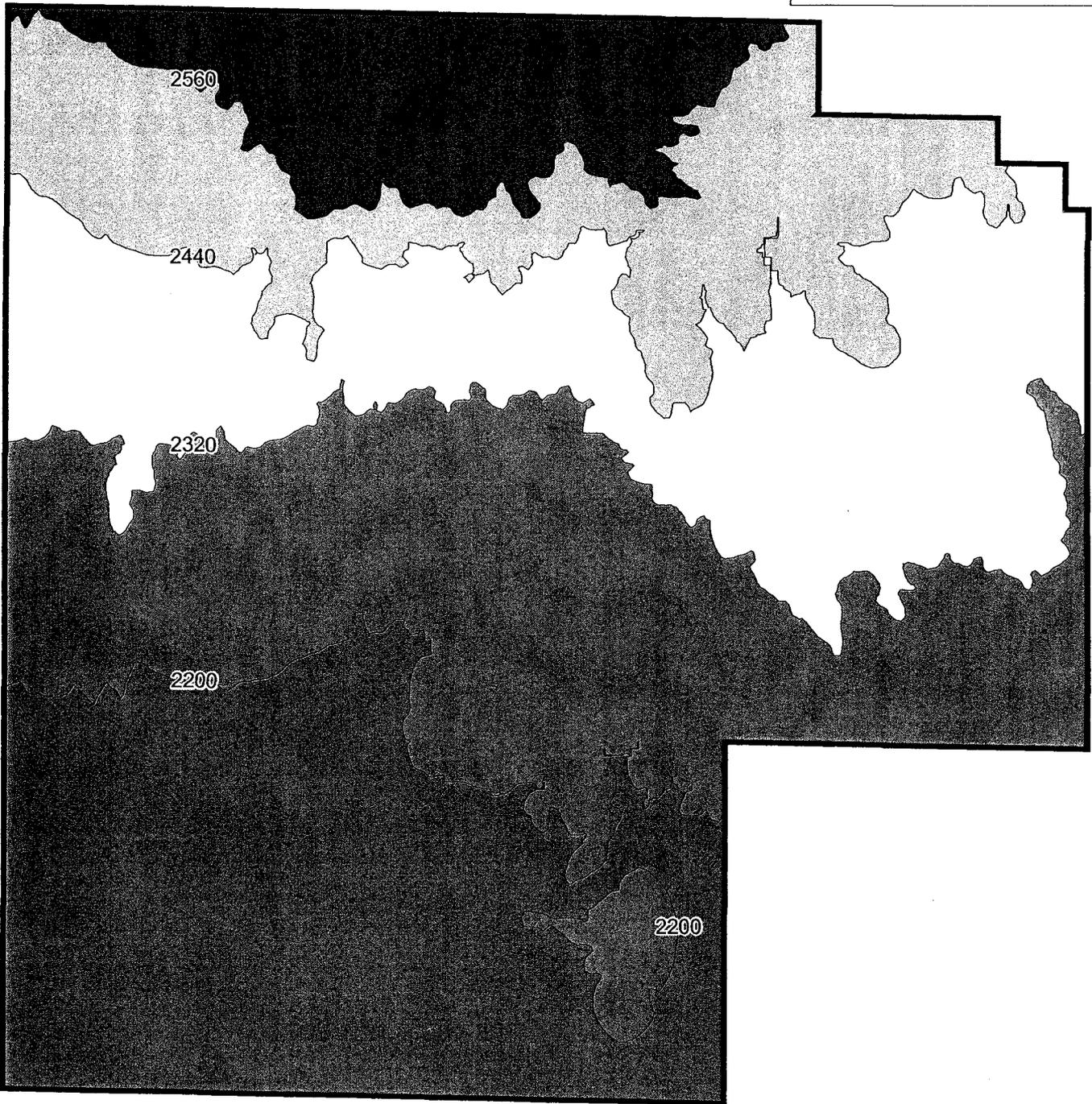
-  1
-  2
-  3
-  4
-  5



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Appendix B Proposed Transmission Mains

Lake Pleasant 5,000 Proposed Transmission Main

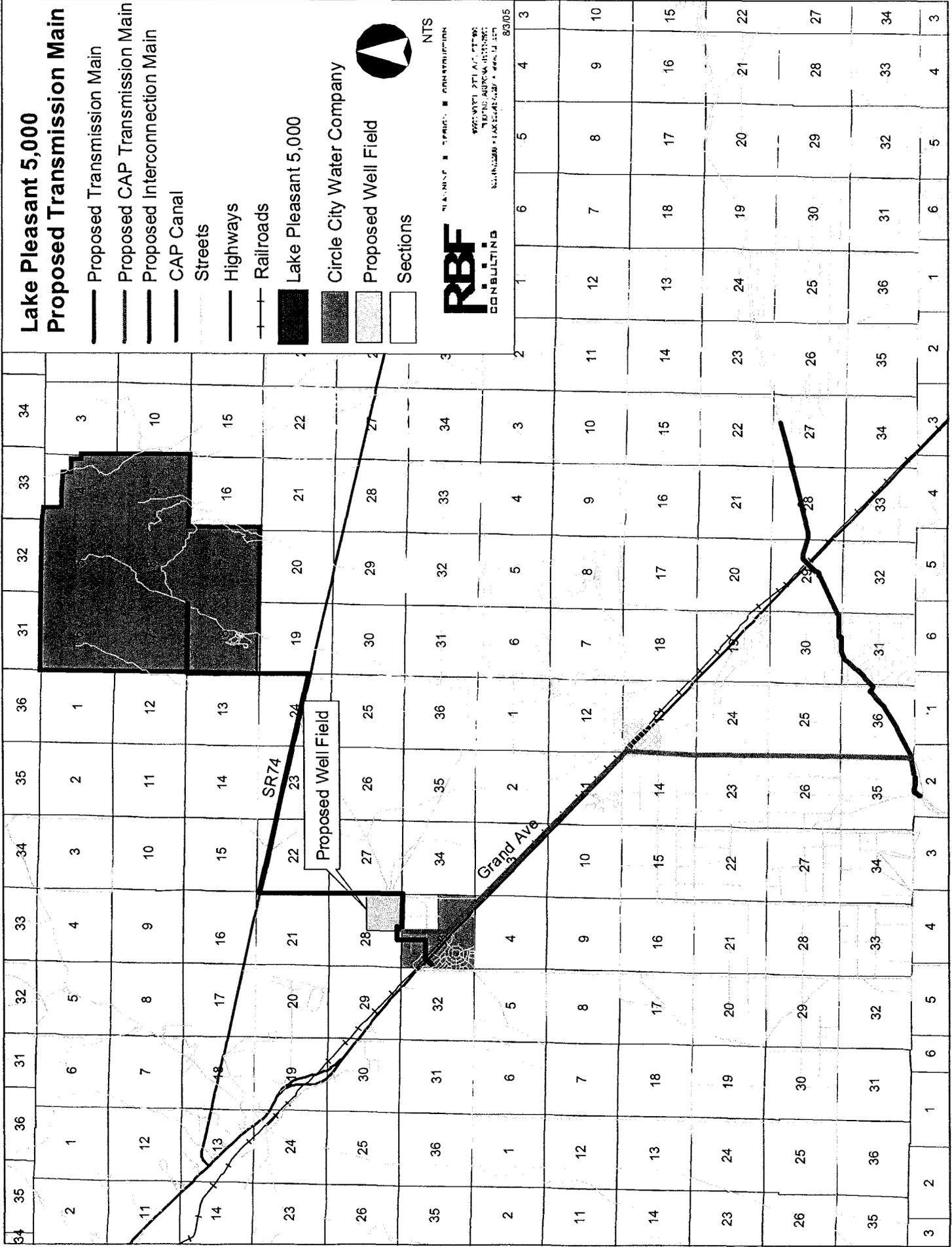
-  Proposed Transmission Main
-  Proposed CAP Transmission Main
-  Proposed Interconnection Main
-  CAP Canal
-  Streets
-  Highways
-  Railroads
-  Lake Pleasant 5,000
-  Circle City Water Company
-  Proposed Well Field
-  Sections



NTS

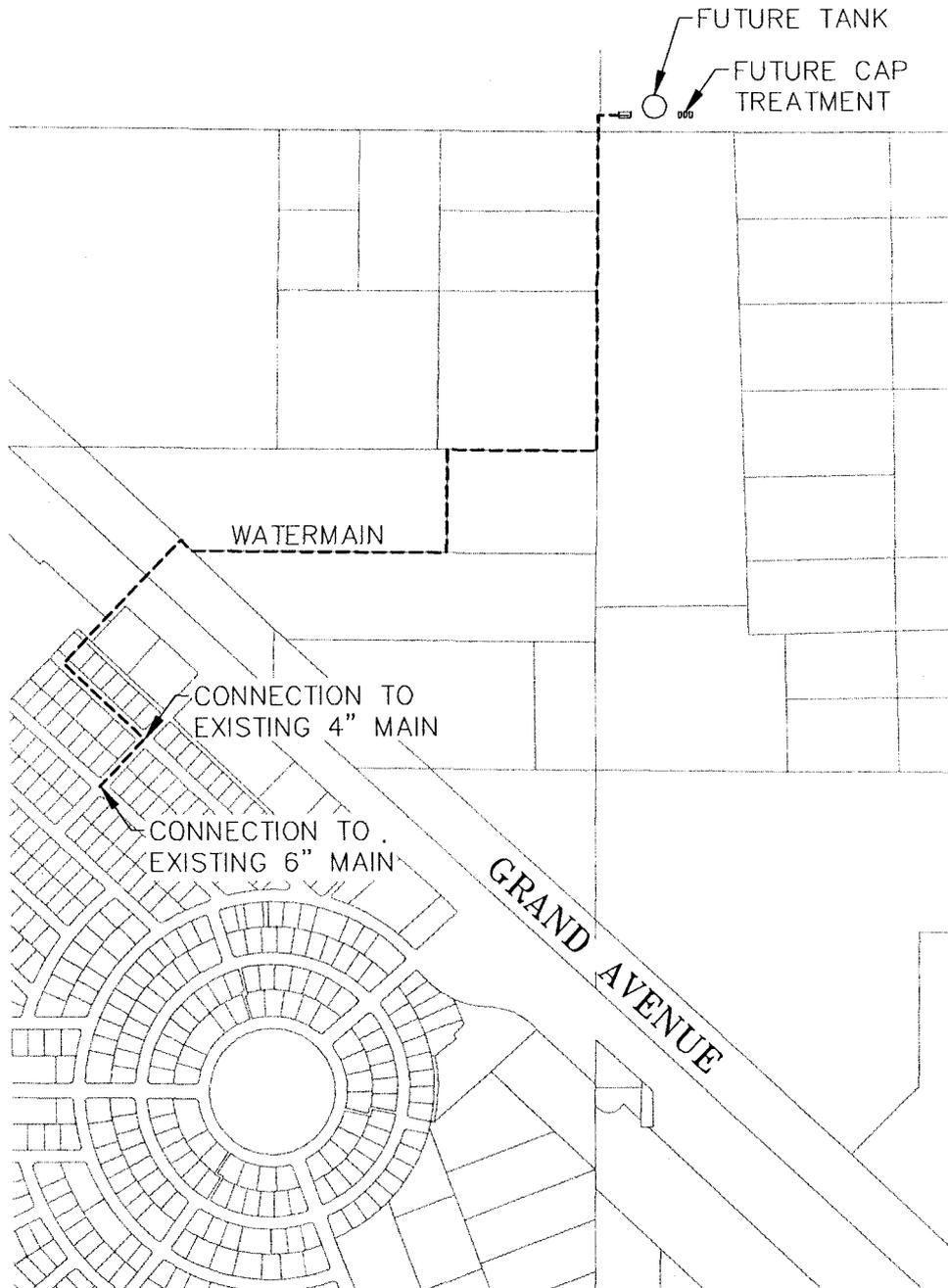


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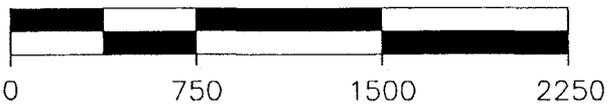


Appendix C Lake Pleasant 5,000/Circle City Interconnection Exhibit

LAKE PLEASANT 5,000/CIRCLE CITY INTERCONNECTION EXHIBIT



SCALE: 1" = 750'



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