

ORIGINAL

**JOHNSON UTILITIES COMPA.**



0000021257

5230 East Shea Boulevard \* Scottsdale, Arizona 85251  
PH: (480) 998-3300; FAX: (480) 483-7908

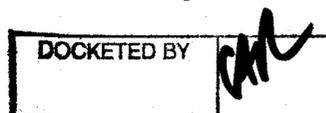
Ernest Johnson, Director  
Utilities Division  
Arizona Corporation Commission  
1200 W. Washington Street  
Phoenix, Arizona 85007

June 9, 2005

RE: Johnson Utilities Company: Procedural Order  
Docket No. WS-02987A-04-0288

Arizona Corporation Commission  
**DOCKETED**

JUN - 9 2005



Dear Mr. Johnson:

Pursuant to the Procedural Order Dated June 2<sup>nd</sup>, 2005, Johnson Utilities is submitting the ADEQ Approval of Construction for the Morning Sun Farms Well No. 1. The ADEQ approval was issued June 03, 2005 and has been attached hereto as Attachment 1. It is our understanding that with the submittal of this Approval of Construction, Staff's concern regarding Johnson's water production capacity should be satisfied.

In addition, we have attached copies of Johnson Utilities' ADEQ applications for Approval to Construct Crestfield Well #1 and Crestfield Well #2. Johnson Utilities submitted these additional well applications in an effort to anticipate future growth within the existing and proposed CC&N area. Crestfield Well #1 and Crestfield Well #2 were designed to add 1000 gpm each to Johnson Utilities PWS No. 11-128. Existing pumping recordings in the immediate area support this design. The ADEQ applications were made May 26, 2005, and have been attached hereto as Attachment 2 and Attachment 3 respectfully.

Additional ADEQ well applications will be provided to the Commission in the future. Should you have any questions or concerns, please do not hesitate to contact me. Thank you for your time and consideration in this matter.

Sincerely,  
Johnson Utilities, LLC

Daniel Hodges

Enclosure

Cc: Brian Tompsett, Johnson Utilities (w/out enc.)  
Steve Olea, Assistant Director (w/enc.)  
Brian Bozzo, Compliance Manager (w/enc.)  
Christopher Kempley, Chief Counsel (w/enc.)  
Docket Control (w/enc.)

AZ CORP COMMISSION  
DOCUMENT CONTROL

2005 JUN - 9 P 1: 27

RECEIVED

# ATTACHMENT 1



Janet Napolitano  
Governor

# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007  
(602) 771-2300 • azdeq.gov



Stephen A. Owens  
Director

## APPROVAL OF CONSTRUCTION

**Project Description:** Replacing existing well with new well with ADWR #55-201429 (also known as Morning Sun Farms Well No. 1) and connecting it to existing main as per approved plans and specifications.

**Location:** Town of Maricopa, Pinal County

**Project Owner:** Johnson Utilities Company

Address: 5230 E. Shea Blvd., Suite 220, Scottsdale, Arizona 85254

The Arizona Department of Environmental Quality (ADEQ) hereby issues an Approval of Construction for the above-described facility based on the following provisions of Arizona Administrative Code (A.A.C.) R18-5-507 et seq.

On April 29, 2005, ADEQ issued a Certificate of Approval to Construct for the referenced project.

On May 18, 2005, Gregory H. Brown, P.E., certified the following:

- a final construction inspection was conducted on May 18, 2005;
- the referenced project was constructed according to the approved plans and specifications and ADEQ's Certificate of Approval to Construct;

Microbiological sample was collected on March 2, 2005, and analyzed on the same day by Legend Technical Services, Inc., ADHS License No. AZ0004. The sample results were negative for total coliforms and E. coli bacteria.

This Approval of Construction authorizes the owner to begin operating the above-described facilities as represented in the approved plan on file with the ADEQ. Be advised that A.A.C. R18-5-124 requires the owner of a public water system to maintain and operate all water production, treatment and distribution facilities in accordance with ADEQ Safe Drinking Water Rules.

jd1

PWS No.: 11-128  
LTP No.: 36549

  
Kwame A. Akyra, P.E., Acting Manager Date Approved 6/03/05  
Technical Engineering Unit  
Drinking Water Section

c: TEU File No.: 20050258  
Pinal County Health Department  
Pinal County Planning & Zoning Department  
AZ Corporation Commission  
Engineer

Northern Regional Office  
1515 East Cedar Avenue • Suite F • Flagstaff, AZ 86004  
(928) 779-0313

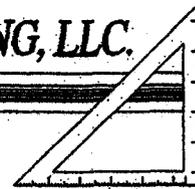
Southern Regional Office  
400 West Congress Street • Suite 433 • Tucson, AZ 85701  
(520) 628-6733

# ATTACHMENT 2



# SPECIFIC ENGINEERING, LLC.

6230 E. SHEA BOULEVARD SUITE 220  
SCOTTSDALE, ARIZONA 85254  
Phone: (480) 896-6336  
Fax: (480) 896-6437



## Transmittal

To: ADEQ-Water Division  
1110 W. Washington  
Phoenix, Arizona 85007  
ATTN: Helen Fernandez

Date: May 26, 2005

Job No.: 3009B034

Drawing/Spec Reference: \_\_\_\_\_

Re : Johnson Utility Company-Crestfield Well No. 1

We Transmit:     Herewith     Under Separate Cover     Via Delivery

### Material Format

### Requested Action

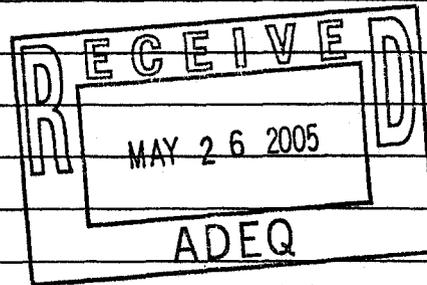
- |   |  |   |   |
|---|--|---|---|
| <input type="checkbox"/> Letter             | <input type="checkbox"/> Shop Drawings                 | <input type="checkbox"/> For Your Approval  | <input type="checkbox"/> Your Review                    |
| <input type="checkbox"/> Memo               | <input type="checkbox"/> Clarification Drawing         | <input type="checkbox"/> For Your Signature | <input type="checkbox"/> Please Comment                 |
| <input checked="" type="checkbox"/> Prints  | <input type="checkbox"/> Modification Drawing          | <input type="checkbox"/> Information        | <input checked="" type="checkbox"/> Make Recommendation |
| <input type="checkbox"/> Sketch             | <input type="checkbox"/> Specifications                | <input type="checkbox"/> Resubmit           | <input type="checkbox"/> Issue Construction Order       |
| <input checked="" type="checkbox"/> Reports | <input type="checkbox"/> Sepias                        | <input type="checkbox"/> As Requested       | <input type="checkbox"/> For Your Use                   |
| <input type="checkbox"/> Mylars             | <input checked="" type="checkbox"/> <u>Application</u> | <input type="checkbox"/> Issue Change Order | <input type="checkbox"/> _____                          |

### Attached to this transmittal:

Application to Construct water facilities

4 sets of prints for review of the Crestfield Well No. 1.

2 copies of the Design report.



Copies To: \_\_\_\_\_

Signed: Grant K. Hinderer

Grant Hinderer

Received By: \_\_\_\_\_

Date: \_\_\_\_\_

**APPLICATION for APPROVAL TO CONSTRUCT DRINKING WATER FACILITIES**

(PLEASE SUBMIT TO THE ADEQ ENGINEERING REVIEW DESK AT 1110 W. WASHINGTON ST., PHOENIX, AZ 85007)

A. PROJECT NAME: Crestfield Well #1

B. PROJECT TYPE (Please check all applicable components for the OVERALL PROJECT):

New Drinking Water Well or Source  
 Water Line and Appurtenances  
 Water Treatment Plant  
 Other: \_\_\_\_\_

C. SYSTEM NAME/PUBLIC WATER SYSTEM NUMBER/OPERATIONAL STATUS:

SYSTEM NAME: Johnson Utility Company SYSTEM NUMBER 11128  
 New System  Extension to Existing System

D. PROJECT LOCATION (Please provide approximate center. Information is required to accept application):

LATITUDE 33° 06' 00.2" N LONGITUDE 111° 27' 25.8" W  
 TOWNSHIP 4S RANGE 9E SECTION 7 QUARTER SECTION (CIRCLE ONE) NE SE SW NW  
 COUNTY PINAL

E. PROJECT DESCRIPTION: Replacement Well for Well #

F. PROJECT ENGINEER (PLEASE PRINT):

G. PROJECT OWNER (PLEASE PRINT):

NAME	<u>Specific Engineering LLC</u>	<u>Johnson Utilities Co.</u>
ADDRESS	<u>5230 E. Shea Blvd #220</u>	<u>5230 E. Shea Blvd #200</u>
	<u>Scottsdale, AZ 85254</u>	<u>Scottsdale, AZ 85254</u>
PHONE NO./FAX NO.	<u>480-596-6335 / 480-596-6437</u>	<u>480-598-3300 / 480-483-9908</u>
SIGNATURE/DATE	<u>[Signature] 5/18/05</u>	<u>[Signature]</u>

H. PLAN DOCUMENTS SUBMITTED (PLEASE SEE ADEQ FORM #222, SUBMITTAL GUIDE FOR VARIOUS PROJECT TYPES)  
 NOTE: INCOMPLETE SUBMITTALS WILL NOT BE LOGGED IN.

J. OWNER/AGENT AGREEMENT AND SCHEDULE: AGREEMENT-The undersigned as Project Owner or as acting Agent for the Project Owner hereby a) grants ADEQ permission to enter the site for inspections; b) authorizes the Project Engineer to prepare and submit plan documents to the ADEQ ENGINEERING REVIEW DESK; and c) agrees to construct the sanitary facilities according to the ADEQ Certificate of Approval and the approved plan documents.

CONSTRUCTION SCHEDULE-Estimated start date: July 2005 Estimated completion date: Aug 2005  
Brian P. Tompsett Operations Office [Signature] 5-18-2005  
 TYPE OR PRINT NAME AFFILIATION SIGNATURE DATE

ADEQ COMPLIANCE EVALUATION:	ADEQ FILE NO.:
IN-COMPLIANCE _____	LIT NUMBER: _____
NON-COMPLIANCE _____	
COMMENTS _____	SITE INSPECTION REQUIRED? <input type="checkbox"/> NO <input type="checkbox"/> YES

# **JOHNSON UTILITIES COMPANY**

## **CRESTFIELD WELL NO. 1**

### **CONCEPTUAL DESIGN REPORT**

May 2005

#### **PREPARED FOR:**

**Johnson Utilities, LLC**  
5230 E. Shea Blvd, Suite 220  
Scottsdale, Arizona 85254  
Phone: (480) 998-3300  
Fax: (480) 483-7908

#### **PREPARED BY:**

**Specific Engineering, LLC**  
5230 E. Shea Blvd, Suite 220  
Scottsdale, Arizona 85254  
Phone: (480) 596-6335  
Fax: (480) 596-6437



# CONCEPTUAL DESIGN REPORT - TABLE OF CONTENTS

## LIST OF SECTIONS

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- 3.0 ORIGINAL AGRICULTURAL GROUNDWATER WELL
- 4.0 NEW REPLACEMENT SOURCE GROUNDWATER WELL
- 5.0 NEW 12-INCH TRANSMISSION MAIN
- 6.0 CALCULATIONS

## LIST OF FIGURES

- FIGURE 1 VICINITY MAP (PINAL COUNTY)
- FIGURE 2 LOCATION MAP (Crestfield Manor)



## **1.0 INTRODUCTION**

This report is intended to document the conceptual design for the proposed water well in the Crestfield Manor development area for the Johnson Utilities Company (the Utility).

Johnson Utilities Company will be the operations manager of the water facility, which is to be operated by a State of Arizona licensed utility operator. The water well is to be connected to the Utility's water distribution system via a 12-inch water line in Cobblestone Drive, adding to the system's storage capacity and ability to service the growing community/service area.

Since the service area for the Utility is continually expanding, this design report only addresses the conceptual design of the water facility's proposed improvements and their capabilities. The specific Utility's water system parameters (i.e., area, population, customers, demand, supply, etc.) of the service area will be addressed through other reports and/or studies such as the Master Water Plan and the various CAAG 208 Water Quality Amendments for Johnson Utilities Service area.

## **2.0 LOCATION**

The proposed Crestfield Well no. 1 is located approximately 18 miles Southeast of the Town of Queen Creek in Pinal County, Arizona. See Figure 1.

The facility is to be constructed in the Northeast Quarter of Section 7, Township 4 South, Range 9 East, Gila and Salt River Meridian, Pinal County, Arizona. The facility's site is a proposed 50 ft x 50 ft (0.057 acre) parcel of land in the Crestfield Manor development that lies adjacent to Cobblestone Drive and Felix Road and approximately 1450 feet south of Heritage Road. See Figure 2.

## **3.0 ORIGINAL AGRICULTURAL GROUNDWATER WELL**

There is an existing water well (registration number 55-622014) that is located in the SE1/4, NE1/4, NE1/4, Section 7, T4S, R9E. This well is to be replaced by a similar replacement well that is to be located at the replacement well site shown below in Section 4.

The original well was completed in the 1973 and has been historically used for agricultural purposes. The well has a vertical turbine pump, with a motor mounted on top of the well casing, and is capable of pumping 1800gpm. The well is 867' deep, has a 20" casing, and has a 12-inch steel discharged pipe that fed irrigation canals.

#### **4.0 NEW REPLACEMENT SOURCE GROUNDWATER WELL**

The new well classifies as a "replacement well" since the distance between the new well and the original well is to be less than 660 feet.

The replacement source groundwater well (see Construction Drawings) is to consist of:

- a 12-inch diameter (950 foot deep) solid wall steel well casing pipe (the bottom 20 to 40 feet of the casing pipe is to be slotted),
- a concrete grout casing seal,
- a concrete well cap,
- a 200 Hp electric motor driven submersible turbine vertical pump (capable of delivering 1,000 gpm against a 477 ft TDH),
- an 8-inch steel column pipe,
- a 12-inch casing head cover, with vent pipe and electrical sleeve,
- an 8-inch steel well head with a plugged side outlet,
- an electrical pump control panel,
- an 8-inch isolation butterfly valve,
- an air release valve,
- an 8-inch mechanical propeller flow meter,
- an 8-inch check valve,
- a water sampling hose bib,
- associated 8-inch discharge piping,
- associated electrical conduits, wiring and components, from the well pump through the booster pumps' control panel,
- telemetry components for centralized control, if and when desired by the Utility.

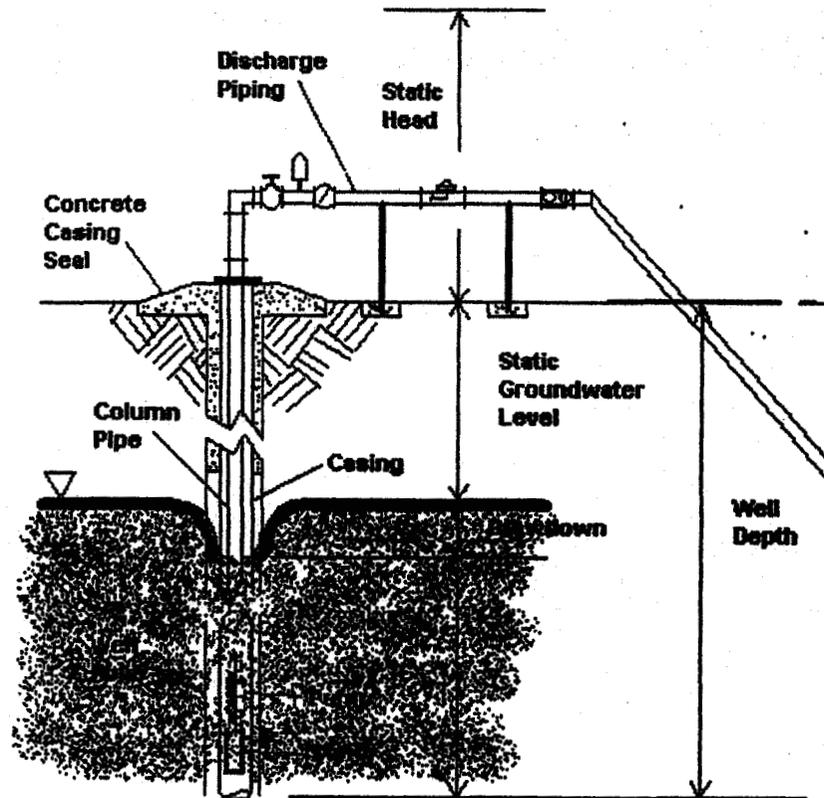
#### **5.0 NEW 12-INCH TRANSMISSION MAIN**

The new Crestfield Well No. 1 will supply water directly to the Johnson Utilities Company water transmission distribution system.

A water supply transmission main will be installed from Crestfield Well No. 1 to the 12-inch water line in Cobblestone Drive. This transmission line is designed by Sunrise Engineering, LLC as a part of the Crestfield Manor development. The installation the 12-inch line from the well to the 12-inch transmission line is part of this plan.

## 6.0 CALCULATIONS

### 6.1 Source Well Calculations



**1000 gpm Source Well**

#### **WELL PUMP DESIGN PARAMETERS (\*initial conditions)**

depth to groundwater = 450 feet (assumed average for Johnson Utility Service area)

well drawdown = 50 feet (assumed)

static head = 18 feet

well/pump/casing depth = 950 feet (assumed)

well casing = 12 inches

column pipe = 8 inches

discharge piping = 8 inches

- pump and motor are to be enlarged in the future as the aquifer water level drops.

## 6.0 CALCULATIONS cont'd

### 6.1 Source Well Calculations cont'd

#### WELL PUMP DESIGN PARAMETERS cont'd

column & discharge piping headloss ( $H_L$ )

(8" pipe, flow  $Q = 1,000$  gpm, velocity  $V = 6.38$  fps)

<u>Item</u>	<u>Qty</u>	<u>K</u>	<u><math>H_L</math></u>
Aquifer contraction	1	0.5	0.32'
8"x4" Tee	1	0.3	0.19'
8" butterfly valve	1	0.2	0.13'
8" check valve	1	2.5	1.58'
8"-90° bend	4	0.7	1.77'
8"-45° bend	2	0.2	0.25'
8" flow meter	1	0.4	0.25'
3/4" taps	2	0.3	0.38'
8" expansion joint	1	0.4	0.25'
12" pipe	1,000 LF		<u>22.00'</u>
<b>Total <math>H_L</math></b>			<b>27.12'</b>

total dynamic head (TDH)

total static head = 550 feet

friction head = 27 feet

**TDH = 577 feet**

#### NET POSITIVE SUCTION HEAD (NPSH) AVAILABLE:

*For safety:*  $NPSH_a > NPSH_r + 2$  feet

\* $NPSH_a = Y - H_L - (P_v / \gamma) = 372$  ft

where: suction head  $Y = 950 - 550 = 400$  ft

pipe headloss from pump to storage tank =  $H_L = 27$  ft

water vapor pressure  $P_v = 49.21$  psf @ 20°C or 68°F

specific weight of water  $\gamma = 62.32$  pcf @ 20°C or 68°F

\* Atmospheric pressure and soil pressure ignored. Velocity head assumed to be in the pump's  $NPSH_r$

**Cavitation will occur when the pressure at any location in a closed system reaches an absolute pressure equal to the saturated vapor pressure of the fluid at the fluid's pumping temperature.**

## 6.0 CALCULATIONS cont'd

### 6.1 Source Well Calculations cont'd

#### WELL PUMP

capacity = 1000 gpm

type = Goulds Pumps Model VIS, 3550 rpm, closed 7.61" impeller

size = 10 IHC

stages = (477 ft) / (196ft per stage) = 2.5 => 3 stages

horsepower = (3 stages) • (62.5 Hp / stage) = 188 Hp => 200 Hp

first stage NPSH required = 63 ft < 422 ft available

pump efficiency = [(field pumping head) • (Capacity) • (100)] / [(3960) • (brake horsepower)]  
 = [(477') • (1000 gpm) • (100)] / [(3960) • (188 Hp)] => 64 % with 3 stages

## Water Vapor Pressure

		Pounds per Square Inch		Feet of Head
40	4.4	0.1217	17.52	0.281
50	10	0.1781	25.65	0.412
60	15.6	0.2563	36.91	0.592
70	21.1	0.3631	52.29	0.815
80	26.7	0.5069	72.99	1.17
86	30	0.6155	88.63	1.42
90	32.2	0.6982	100.5	1.61
100	37.8	0.9492	136.7	2.19
110	43.3	1.275	183.6	2.94
120	48.9	1.692	243.6	3.91
130	54.4	2.223	320.1	5.14
140	60	2.889	416.0	6.68
150	65.6	3.718	535.4	8.56
160	71.1	4.741	682.7	10.95
170	76.7	5.992	862.8	13.84

## 6.0 CALCULATIONS (cont'd)

6.1 Source Well Calculations cont'd

## Density & Specific Weight of Water at Various Temperatures

		Density ( $\rho$ ) grams per cubic centimeter	
0 (solid)	32	0.9150	57.12
0 (liquid)	32	0.9997	62.41
4	39.2	1.0000	62.43
5	41	1.0000	62.43
10	50	0.9997	62.41
15	59	0.9992	62.38
16	60.8	0.9991	62.37
17	62.6	0.9989	62.36
18	64.4	0.9988	62.35
19	66.2	0.9985	62.33
21	69.8	0.9981	62.31
22	71.6	0.9978	62.29
23	73.4	0.9976	62.28
24	75.2	0.9974	62.27
25	77	0.9972	62.25
30	86	0.9957	62.16
35	95	0.9941	62.06
40	104	0.9923	61.94
45	113	0.9903	61.82
50	122	0.9881	61.68
60	140	0.9832	61.38
70	158	0.9777	61.04
80	176	0.9719	60.67
90	194	0.9651	60.25
100 (liquid)	212	0.9581	59.81
100 (gas)	212	0.0006	0.04

### 6.0 CALCULATIONS (cont'd)

6.2 Serviceable Development Calculations

## **SOURCE WATER WELL & WATER STORAGE TANK CAPACITY**

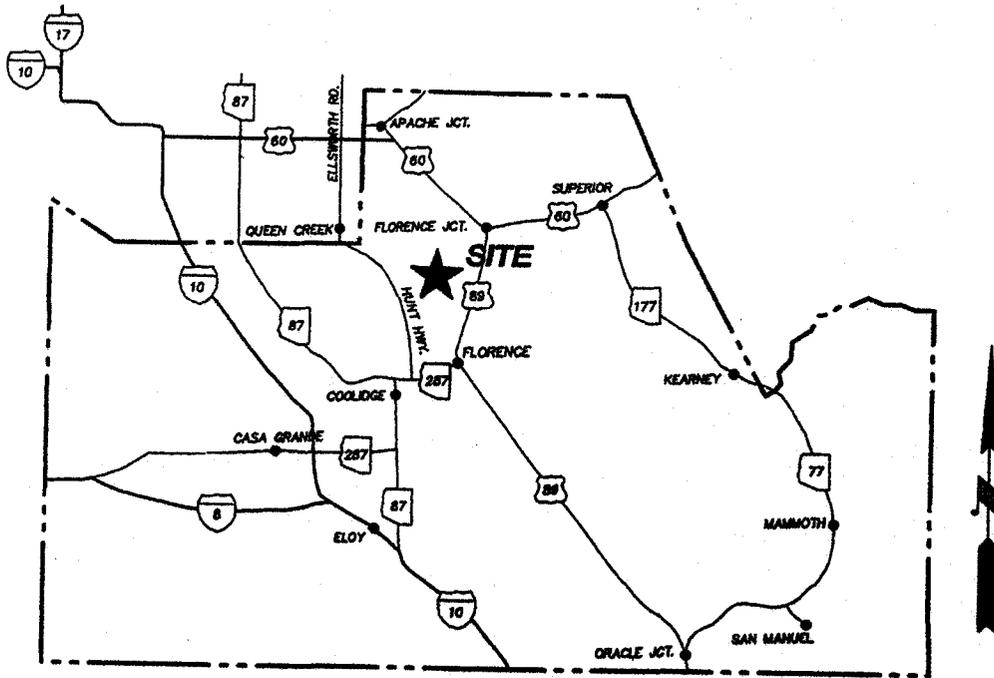
### **Average Daily Residential Demand**

Source Well Flow  $Q_{sw} = 1000 \text{ gpm}$  or  $1,440,000 \text{ gpd}$

Serviceable population =  $1,440,000 \text{ gpd} / 100 \text{ gpdpc} = 14,400 \text{ people}$

Serviceable residences =  $14,400 / 2.6 = 5,538 \text{ residences}$

The storage tanks at Circle Cross water plant, San Tan water storage tank, and the main water plant at Johnson Ranch supply the fire flow for this area.



# VICINITY MAP

N.T.S.

FIGURE 1

S:\Specifics Engineering\3009\B034\acad\Cut-shits\EXHIBITS\FIGURE1.dwg Plotted: May 24, 2005

CRESTFIELD WELL #1	DRAWN TEAM	 <b>SPECIFIC ENGINEERING, LLC.</b> <small>5630 E. SHCA BOULEVARD SUITE 220          SCOTTSDALE, ARIZONA 85254          Phone (480) 568-4335          Fax (480) 568-6437</small>
	DATE MAY 2005	
VICINITY MAP	SCALE NTS	





**ENGINEERS' WATER NOTES:**

(Monteapo County Standards)

1. ALL MATERIALS AND PRODUCTS USED IN WATER SYSTEM, INCLUDING SURFACE COATINGS AND PAINTS, SHALL CONFORM TO NSF STANDARD 61 AS PER A.A.C. R18-1-119. ALL PRODUCTS ADDED DIRECTLY TO DRINKING WATER SHALL CONFORM WITH NSF STANDARD 60. CONSTRUCTION MATERIALS USED IN WATER SYSTEMS SHALL BE LEAD-FREE PER A.A.C. R18-5-504 AND R1-1-101.
2. ALL 3/4" INCH THROUGH 2" INCH COPPER WATER SERVICE LINES SHALL BE IN CONFORMANCE WITH MAG STANDARD SPECIFICATION 754.
3. ALL 3" INCH AND SMALLER PRESSURE PVC (POLYVINYL CHLORIDE) WATER PIPE & FITTINGS SHALL BE SCHEDULE 80 TYPE I GRADE I PPS PVC IN CONFORMANCE WITH ASTM STANDARD D-1785 (LATEST REVISION).
4. ALL 4" INCH THROUGH 12" INCH PVC (POLYVINYL CHLORIDE) WATER MAINS SHALL BE DRIB OPS PRESSURE CLASS 150 PVC PRESSURE PIPE IN CONFORMANCE WITH AWWA STANDARD C900 (LATEST REVISION).
5. ALL 14" INCH THROUGH 24" INCH PVC (POLYVINYL CHLORIDE) WATER MAINS SHALL BE DR25 OPS PRESSURE CLASS 165 PVC PRESSURE PIPE IN CONFORMANCE WITH AWWA STANDARD C905 (LATEST REVISION).
6. ALL 4" INCH THROUGH 24" INCH IRON WATER MAINS SHALL BE PRESSURE CLASS 50 DUCTILE IRON PIPE WITH A CEMENT INTERIOR LINING IN CONFORMANCE WITH MAG STANDARD SPECIFICATION 750.
7. ALL 4" INCH THROUGH 24" INCH WATER MAIN FITTINGS SHALL BE CEMENT LINED DUCTILE IRON OR GRAY IRON IN CONFORMANCE WITH MAG STANDARD SPECIFICATION 750.
8. ALL BELOW GROUND IRON PIPES AND FITTINGS SHALL HAVE AN EXTERIOR PETROLEUM ASPHALTIC COATING (1 MIL THICK) AND BE ENCASED WITH A POLYETHYLENE ENCASMENT IN CONFORMANCE WITH AWWA STANDARD C105. ALL ABOVE GROUND PIPES AND FITTINGS SHALL HAVE AN EXTERIOR COATING EQUIVALENT WITH AWWA STANDARD C218.
9. ALL PVC WATER MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THESE PLANS WITH AWWA STANDARD C905 (LATEST REVISION) WITH THE PRE-MANUFACTURER'S RECOMMENDATIONS AND WITH MAG STANDARD SPECIFICATIONS 601, 602, 610, 630, AND 631.
10. ALL DRP WATER MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THESE PLANS WITH AWWA STANDARD C900 (LATEST REVISION) WITH THE PRE-MANUFACTURER'S RECOMMENDATIONS AND WITH MAG STANDARD SPECIFICATIONS 601, 602, 610, 630, AND 631.
11. THE CONSTRUCTION INSPECTOR IS AN AGENT OF THE CONTRACTING PARTY THAT HAS BEEN RETAINED TO ASSURE THAT THE WORK COVERED BY THESE PLANS IS PERFORMED CORRECTLY AND COMPLES WITH THESE PLANS AND ANY APPLICABLE SPECIFICATIONS.
12. ALL 4" INCH THROUGH 16" INCH WATER MAIN FITTINGS, WATER VALVES, FIRE HYDRANTS, TAPPING SLEEVES AND DEAD ENDS SHALL HAVE APPROVED THRUST RESTRAINT PROVIDED. SEE SITE SOILS REPORT FOR ALLOWABLE SOIL BEARING PRESSURE. ANY THRUST BLOCKING SHALL BE IN CONFORMANCE WITH MAG STANDARD DETAILS 301, 360, 380 AND 381. AS AN ALTERNATE TO THRUST BLOCKING, PIPE JOINTS MAY BE RESTRAINED WITH APPROVED JOINT RESTRAINTS FOR THE REQUIRED THRUST RESISTANCE DEVELOPMENT LENGTH. THE CONTRACTOR SHALL SUBMIT THRUST BLOCKING CALCULATIONS AND/OR JOINT THRUST RESTRAINT CALCULATIONS TO THE CONSTRUCTION INSPECTOR FOR APPROVAL. THE CONSTRUCTION INSPECTOR IS TO INSPECT AND APPROVE ALL THRUST BLOCKING AND/OR JOINT RESTRAINTS PRIOR TO THE CONTRACTOR BACKFILLING THE WATER MAIN TRENCH. FAILURE OF THE CONTRACTOR TO HAVE THE THRUST BLOCKING AND/OR JOINT RESTRAINTS INSPECTED AND APPROVED BY THE CONSTRUCTION INSPECTOR MAY BE CAUSE FOR THE CONTRACTOR TO EXPOSE ANY WATER MAIN INSTALLATION FOR INSPECTION AT NO ADDITIONAL COST TO THE CONTRACTING PARTY.
13. IN THE PRESENCE OF THE CONSTRUCTION INSPECTOR, THE CONTRACTOR SHALL PERFORM PRESSURE LEAKAGE TESTS (AND MAINTAIN RECORDS OF THE RESULTS) ON THE TOTAL LENGTH (TRENCH AND MAIN) OF STEEL INSTALLED IN ACCORDANCE WITH THESE PLANS AND WITH A STANDARD SPECIFICATION 610(A). FIELD TESTS ARE REQUIRED TEST PRESSURES: CLASS 150 PVC SHALL BE TESTED AT 200 PSI. CLASS 165 PVC SHALL BE TESTED AT 215 PSI. CLASS 360 DRP SHALL BE TESTED AT THE SAME PRESSURE AS THE PVC PIPE TO WHICH IT IS JOINED (150 PSI MINIMUM). PIPE SEGMENTS NOT PASSING THE PRESSURE TEST ARE TO BE CORRECTED AT NO ADDITIONAL COST TO THE CONTRACTING PARTY. FAILURE OF THE CONTRACTOR TO MAINTAIN TEST RECORDS MAY BE CAUSE FOR ANY/ALL WATER PIPE TO BE RETESTED AT NO ADDITIONAL COST TO THE CONTRACTING PARTY.
14. ALL NEW WATER PIPES AND APPURTENANCES, SHALL BE DISINFECTED AND SHALL BE BACTERIOLOGICALLY TESTED BY AN INDEPENDENT TESTING LABORATORY. BACTERIOLOGICAL TEST RESULTS ARE TO BE NEGATIVE PRIOR TO PLACEMENT OF ANY WATER LINES INTO SERVICE. ALL WATER MAINS ARE TO BE FLUSHED PRIOR TO DISINFECTING. ALL WATER LINES (1000') SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651 (LATEST REVISION), MAG STANDARD SPECIFICATION 611 AND ADOE ENGINEERING BULLETIN NUMBER 6.
15. ALL 12" INCH OR GREATER WATER MAINS ARE TO HAVE A MINIMUM OF 60 INCHES OF COVER AS MEASURED FROM FINISH GRADE ABOVE. THE WATER MAIN UNLESS NOTED OTHERWISE IN THESE PLANS, ALL WATER MAINS LESS THAN 12" INCH ARE TO HAVE A MINIMUM OF 48 INCHES OF COVER UNLESS NOTED OTHERWISE.
16. PERMISSIBLE DEFLECTION AT PIPE JOINTS SHALL BE ONE DEGREE LESS THAN THE PIPE MANUFACTURER'S RECOMMENDATION. IRON BEND FITTINGS SHALL BE INSTALLED WHERE THIS REQUIREMENT CAN NOT BE MET.
17. THE CONTRACTOR SHALL VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ANY EXISTING WATER MAIN, WHERE A CONNECTION IS CALLED FOR IN THESE PLANS, PRIOR TO THE COMMENCEMENT OF WATER CONSTRUCTION WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY LOCATION DISCREPANCIES THAT COULD AFFECT THE INSTALLATION OF THE NEW WATER LINES. EXISTING DEAD-END WATER MAINS SHALL BE THOROUGHLY FLUSHED BEFORE THE LINES ARE MADE WITH NEW WATER MAINS THAT ARE BEING INSTALLED BY THIS PROJECT.
18. ALL WATER LINE TAPS INTO EXISTING AND/OR NEW WATER MAINS SHALL BE MET TAPS INSTALLED BY THE CONTRACTING PARTY. ALL TAP COCKS/CONNECTIONS ARE TO BE REMOVED AND PRESENTED TO THE CONSTRUCTION INSPECTOR PRIOR TO DRILLING OR TAPPING. THE WATER MAIN SHALL BE PERMITTED TO BE RELOADED AND BE WATER PRESSURIZED TO A MINIMUM OF 100 PSI. NORMAL OPERATION SYSTEM PRESSURE, WHICH EVER IS GREATER, DRILLING/TAPPING EQUIPMENT SHALL HAVE APPROVED PURGE OPENINGS AND DISCHARGE HOSE TAPS MADE INTO MAINS SHALL BE MORE THAN 12 INCHES FROM THE PIPE JOINTS. MULTIPLE TAPS SHALL BE AT LEAST 30 INCHES APART.
20. THE LOCATION OF AIR RELEASE VALVE ASSEMBLIES SHOWN IN THESE PLANS IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF HIGH POINTS IN THE INSTALLED WATER MAIN AND THEN INSTALL AIR RELEASE VALVES AT ALL HIGH POINTS. AIR RELEASE VALVE ASSEMBLIES SHALL NOT BE INSTALLED IN STREETS, DRIVEWAYS, DRAINAGEWAYS NOR SIDEWALKS.

**WATER AND SEWER SEPARATION NOTES:**

1. A WATER MAIN SHALL NOT BE PLACED WITHIN 6 FEET, HORIZONTAL DISTANCE, AND BELOW 2 FEET, A VERTICAL DISTANCE, ABOVE THE TOP OF A SEWER MAIN UNLESS EXTRA PROTECTION IS PROVIDED. EXTRA PROTECTION SHALL CONSIST OF CONSTRUCTING THE SEWER MAIN WITH MECHANICAL JOINT DUCTILE IRON PIPE OR WITH SLIP-JOINT DUCTILE IRON PIPE IF JOINT RESTRAINT IS PROVIDED. ALTERNATE EXTRA PROTECTION SHALL CONSIST OF ENCASEMENT BOTH IN THE WATER AND SEWER MAINS IN AT LEAST 6 INCHES OF CONCRETE FOR AT LEAST 10 FEET BEYOND THE AREA COVERED BY THIS SUBSECTION (C)(X)(A). B. WITHIN 2 FEET HORIZONTALLY AND 2 FEET BELOW THE SEWER MAIN.
2. NO WATER PIPE SHALL PASS THROUGH OR COME INTO CONTACT WITH ANY PART OF A SEWER MANHOLE. THE MINIMUM HORIZONTAL SEPARATION BETWEEN WATER MAINS AND MANHOLES SHALL BE 6 FEET, MEASURED FROM THE CENTER OF THE MANHOLE.
3. THE MINIMUM SEPARATION BETWEEN FORCE MAINS OR PRESSURE SEWERS AND WATER MAINS SHALL BE 2 FEET VERTICALLY AND 6 FEET HORIZONTALLY UNDER ALL CONDITIONS. WHERE A SEWER FORCE MAIN CROSS, PIPE OR LINES ARE INSTALLED UNDER A WATER LINE, THE SEWER CROSS, PIPE OR MECHANICAL JOINT DUCTILE IRON PIPE FOR TO FEET ON EITHER SIDE OF THE WATER MAIN.
4. THE SEPARATION REQUIREMENTS DO NOT APPLY TO BUILDING, PLUMBING OR INDIVIDUAL HOUSE SERVICE CONNECTIONS, SEWER MAINS (GRAVITY), PRESSURE, AND FORCE MAINS SHALL BE KEPT A MINIMUM OF 50 FEET FROM WELLS UNLESS THE FOLLOWING CONDITIONS ARE MET: a. WATER MAIN PIPE PRESSURE TESTED IN PLACE OF 50 PSI WITHOUT EXCESSIVE LEAKAGE. IS USED FOR GRAVITY SERVICES AT DISTANCES GREATER THAN 20 FEET FROM WATER WELLS. b. WATER MAIN PIPE PRESSURE TESTED IN PLACE OF 150 PSI WITHOUT EXCESSIVE LEAKAGE. IS USED FOR PRESSURE SERVICES AND FORCE MAINS AT DISTANCES GREATER THAN 20 FEET FROM WATER WELLS. c. EXCESSIVE LEAKAGE MEANS ANY AMOUNT OF LEAKAGE WHICH IS GREATER THAN 10 GALLONS PER HOUR UNDER THE AWWA STANDARD APPLICABLE TO THE PARTICULAR PIPE MATERIAL OR VALVE TYPE.

**JOHNSON UTILITIES' WATER NOTES:**

1. THE CONTRACTOR SHALL NOTIFY JOHNSON UTILITIES A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO ANY CONSTRUCTION TO SCHEDULE A PRECONSTRUCTION CONFERENCE. WORK SHALL NOT COMMENCE UNTIL A NOTICE TO PROCEED HAS BEEN ISSUED BY JOHNSON UTILITIES AND THE CERTIFICATION OF APPROVAL TO CONSTRUCTION HAS BEEN RECEIVED BY THE UTILITY FROM THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY. ANY PIPE INSTALLED PRIOR TO THE NOTICE TO PROCEED SHALL BE REMOVED BY THE CONTRACTOR AT THE CONTRACTOR'S OWN EXPENSE.
2. ALL AGREEMENTS MUST BE EXECUTED BEFORE ANY WATER LINE CONSTRUCTION.
3. WATER MAINS ARE TO BE INSTALLED AFTER SEWER INSTALLATION AND WHEN ROUGH GRADE IS TO WITHIN 6 INCHES OF FINAL GRADE. A REGISTERED ENGINEER OR A REGISTERED LAND SURVEYOR MUST CERTIFY TO JOHNSON UTILITIES THAT THE ROUGH GRADE IS WITHIN 6 INCHES OF FINAL GRADE PRIOR TO THE UTILITY ISSUING A NOTICE TO PROCEED.
4. THE CONTRACTOR IS REQUIRED TO NOTIFY ALL WATER USERS THAT COULD BE AFFECTED BY A POSSIBLE SERVICE INTERRUPTION OR INCONVENIENCE DURING CONSTRUCTION AND IS REQUIRED TO PROVIDE EACH NOTIFIED WATER USER WITH A PHONE NUMBER AT WHICH THE CONTRACTOR CAN BE REACHED IN THE EVENT OF A CUSTOMER INQUIRY.
5. IF NEW CONSTRUCTION REQUIRES THE WATER TO BE SHUT OFF TO MAKE THE LINES TO THE EXISTING SYSTEM, THE CONTRACTOR SHALL PROVIDE AT LEAST 48 HOURS PRIOR TO THE START OF SUCH LINES HAVE BEEN NOTIFIED BY THE CONTRACTOR OF THE SCHEDULE. THE UTILITY APPROVED TURN OFF INDICES SHALL BE GIVEN OUT A MINIMUM OF FOUR (4) HOURS BEFORE THE WATER IS TO BE TURNED OFF. NO CONNECTION TO THE EXISTING JOHNSON UTILITIES SYSTEM WILL BE PERMITTED ON ANY WORKDAY AFTER 10:30 A.M. OR ON ANY SUNDAY OR HOLIDAY, UNLESS PRIOR APPROVAL HAS BEEN OBTAINED FROM JOHNSON UTILITIES. THE LINES TO EXISTING WATER ARE REPORTED NEAR THE UTILITY BACTERIAL RESULTS FOR NEW WATER MAINS ARE REPORTED NEAR THE UTILITY BACTERIAL RESULTS FOR NEW JOHNSON UTILITIES WITH A BACK FLOW PREVENTION PROGRAM A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO COMMENCING ANY WATER LINE CONSTRUCTION.
7. ALL WATER MAINS ARE TO BE INSPECTED BY JOHNSON UTILITIES BEFORE BACKFILL FINAL ACCEPTANCE WILL NOT BE GRANTED WITHOUT A SIGNED RELEASE FROM THE JOHNSON UTILITIES CONSTRUCTION INSPECTOR STATING THAT THE INSPECTION HAD BEEN PERFORMED AND THAT THE WORK WAS ACCEPTABLE.
8. THE DEVELOPER/CONTRACTOR IS TO PAY FOR ALL WATER CONSTRUCTION INSPECTION FEES. ALL FEES ARE TO BE PAID IN FULL BEFORE THE ACCEPTANCE OF ANY NEW WATER SYSTEM BY JOHNSON UTILITIES.
9. THE CONTRACTOR SHALL NOTIFY JOHNSON UTILITIES FOUR (4) DAYS IN ADVANCE FOR SCHEDULING WATER MAIN TESTING.
10. AFTER THE PAVING & CURBS HAVE BEEN INSTALLED, THE JOHNSON UTILITIES CONSTRUCTION INSPECTOR WILL CHECK VALVE RISERS AND FINE HYDRANTS FOR OPERATION. THE VALVE INSTALLATION CERTIFICATION, THE REPLACEMENT BY THE CONTRACTOR.
11. FINAL ACCEPTANCE WILL NOT BE GRANTED UNTIL THE PIPE CERTIFICATION, BACTERIAL CERTIFICATION, THE VALVE INSTALLATION CERTIFICATION, THE PASSING OF MICROBIOLOGICAL TESTS AND THE A.D.E.D. CERTIFICATION OF APPROVAL. "AS BUILT" PLANS ARE TO BE PROVIDED TO JOHNSON UTILITIES BY THE CONTRACTOR BEFORE ACCEPTANCE BY JOHNSON UTILITIES (THREE (3) COPIES ARE REQUIRED BY THE UTILITY).
12. ALL CONSTRUCTION WATER WILL BE METERED WITH AN APPROPRIATE SIZE WATER METER AND BACKFLOW PREVENTER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE WATER METER AND BACKFLOW PREVENTER. THE CONTRACTOR SHALL CHECK WITH JOHNSON UTILITIES FOR AVAILABILITY OF THESE ITEMS.
13. THE CONTRACTOR SHALL HAVE ALL WATER VALVES IDENTIFIED AND LOCATED PRIOR TO PAVING AND SHALL HAVE ALL VALVE BOXES SET TO FINAL GRADE PRIOR TO PAVING.
14. ALL CURB STOPS SHALL BE LOCATED AND PROTECTED DURING ALL PHASES OF CONSTRUCTION.
15. WATER SERVICES ARE TO REMAIN MARKED DURING CONSTRUCTION. NO SERVICES ARE TO BE INSTALLED IN DRIVEWAYS OR APPOINS TO DRIVEWAYS ANY RELOCATION OF SERVICES ARE TO BE BY THE FUTURE LOT OWNER, INCLUDING HEIGHT ADJUSTMENTS, INDIVIDUAL LOT DEVELOPERS OR BUILDERS WILL BE REQUIRED TO INSTALL A CUTOFF VALVE WITHIN 18 INCHES OF THE METER ON THE CUSTOMER'S SIDE IN ACCORDANCE WITH THE JOHNSON UTILITIES STANDARDS 16. THE PAVING CONTRACTOR IS TO MARK THE TOP OF CURBS WITH "W" AT ALL SERVICE LOCATIONS.
17. NO WATER BOXES NOR LIDS SHALL BE INSTALLED WITHIN CONCRETE PAVED DRIVEWAYS OR SIDEWALKS.
18. DURING INSTALLATION OF DRAINAGE CROSSINGS, JOHNSON UTILITIES RESERVES THE RIGHT TO HAVE THE CONTRACTOR MAKE MODIFICATIONS OF CROSSINGS AS JOHNSON UTILITIES DEEMS NECESSARY.
19. ALL INSTALLED MANHOLE VALVES ARE TO BE AWWA C900 OR AWWA C909 AND JOHNSON UTILITIES APPROVED.

**PINAL COUNTY NOTES:**

1. DEVELOPER SHALL OBTAIN A PINAL COUNTY RIGHT OF WAY USE PERMIT PRIOR TO ANY WORK BEING PERFORMED WITHIN THE COUNTY RIGHT OF WAY.
2. TRAFFIC CONTROL AND BARRICADING SHALL BE ACCORDING TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES OR PINAL COUNTY REQUIREMENTS. CONTRACTOR TO SUPPLY LIGHTED BARRICADES AT 50' INTERVALS WITH OPEN TRENCH SIGNALS.
3. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THESE PLANS SHALL BE IN ACCORDANCE WITH THE MAG STANDARD SPECIFICATIONS AND DETAILS.
4. NO TRENCH TO BE LEFT OPEN/UNCOVERED AFTER WORKING HOURS.
5. CONTRACTOR IS RESPONSIBLE FOR BLUE STAKE MARKING DAILY AS CONSTRUCTION IS IN PROGRESS.

**SPECIFIC ENGINEERING, LLC.**  
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 FAX: (480) 596-8437

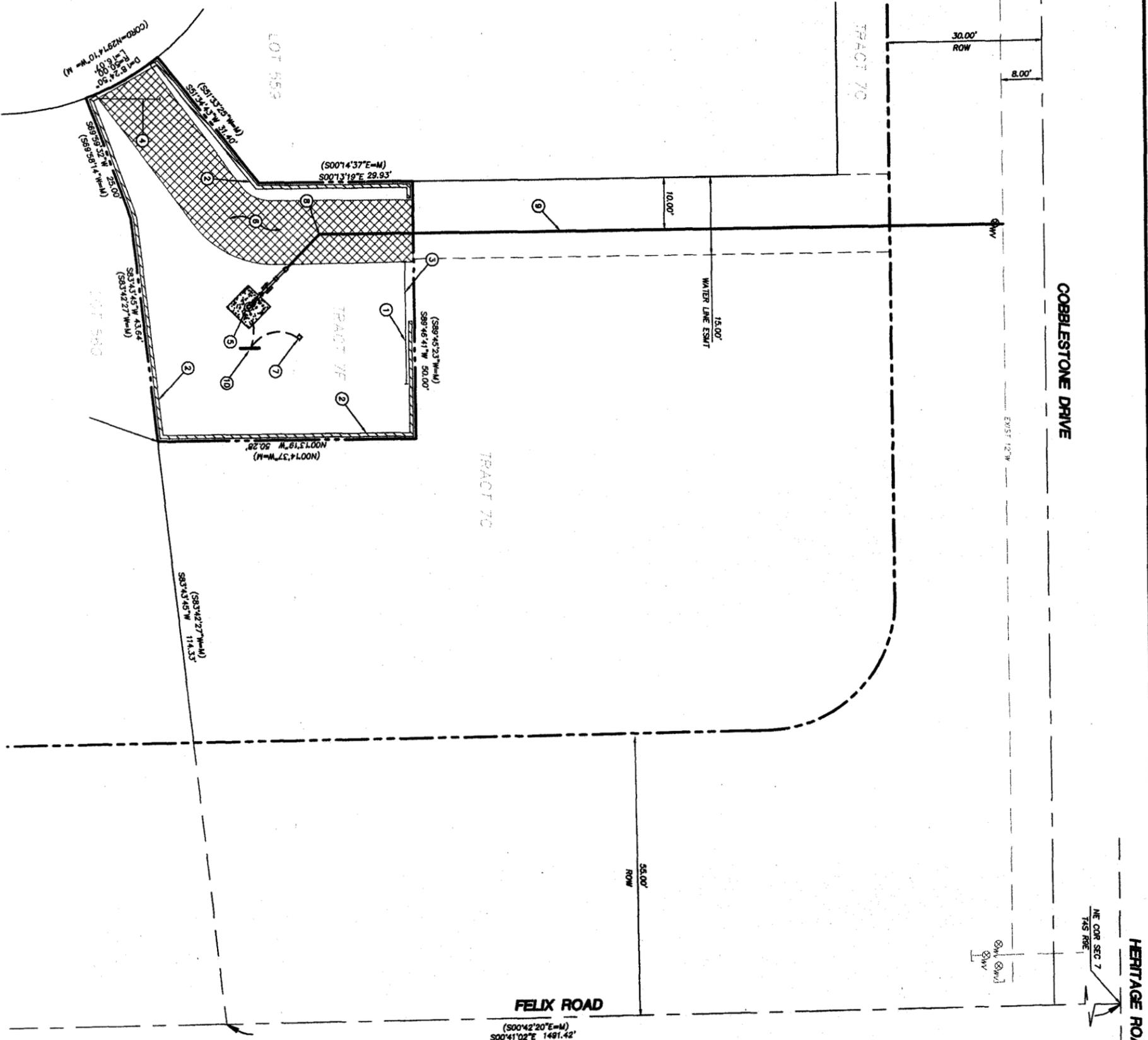
REVISIONS	
NO.	DESCRIPTION

PROJECT: CRESTFIELD #1
DATE: MAY 2005
SCALE: AS SHOWN
FILE NAME: 3009B034

CLIENT/PROJECT: **CRESTFIELD WELL #1**

TITLE: **WATER NOTES/DETAILS**





HERITAGE ROAD  
NE COR SEC 7  
T4S R6E

FELIX ROAD  
(S00°42'20"E=1491.42'  
S00°41'02"E 1491.42'



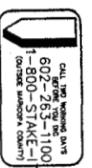
**LEGEND**  
MEASURED IN PARENTHESES

**CONSTRUCTION NOTES**

- 1 INSTALL 24" SLIDING GATE
- 2 INSTALL 8" CMU WALLS
- 3 INSTALL SIGN ON FENCE GATE
- 4 INSTALL 12" SWING GATE
- 5 INSTALL WELL
- 6 INSTALL GRISHED ROCK OR APPROVED EQUAL
- 7 INSTALL YARD LIGHT
- 8 INSTALL 45° ROUN BEND W/TRUST BLOCKING SEE SHEET 8
- 9 INSTALL 6000 PVC PIPE
- 10 INSTALL WELL ELECTRICAL SERVICE PANEL

**NOTES**

1. ALL SITE ELECTRICAL WORK IS TO BE PERFORMED BY LICENSED ELECTRICIANS INSTALLED PER EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
2. WATER MAIN SHALL HAVE THRUST BLOCKING OR JOINT RESTRAINTS FOR THE ENTIRE THRUST RESTRAINT LENGTH AS REQUIRED AT ALL FITTINGS FOR 150 PSI TEST PRESSURE



CLIENT/PROJECT <b>CRESTFIELD WELL #1</b>	TITLE <b>SITE PLAN</b>	SHEET <b>4 OF 9</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>DATE</th> <th>APP.</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>                     DRAWN BY: [ ]                      CHECKED BY: [ ]                      DATE: MAY 2005                      SCALE: [ ]                      PROJECT: CRESTFIELD #1                      FILE NAME: 3009B034                 </p>	REVISIONS				NO.	DATE	APP.	DESCRIPTION																				
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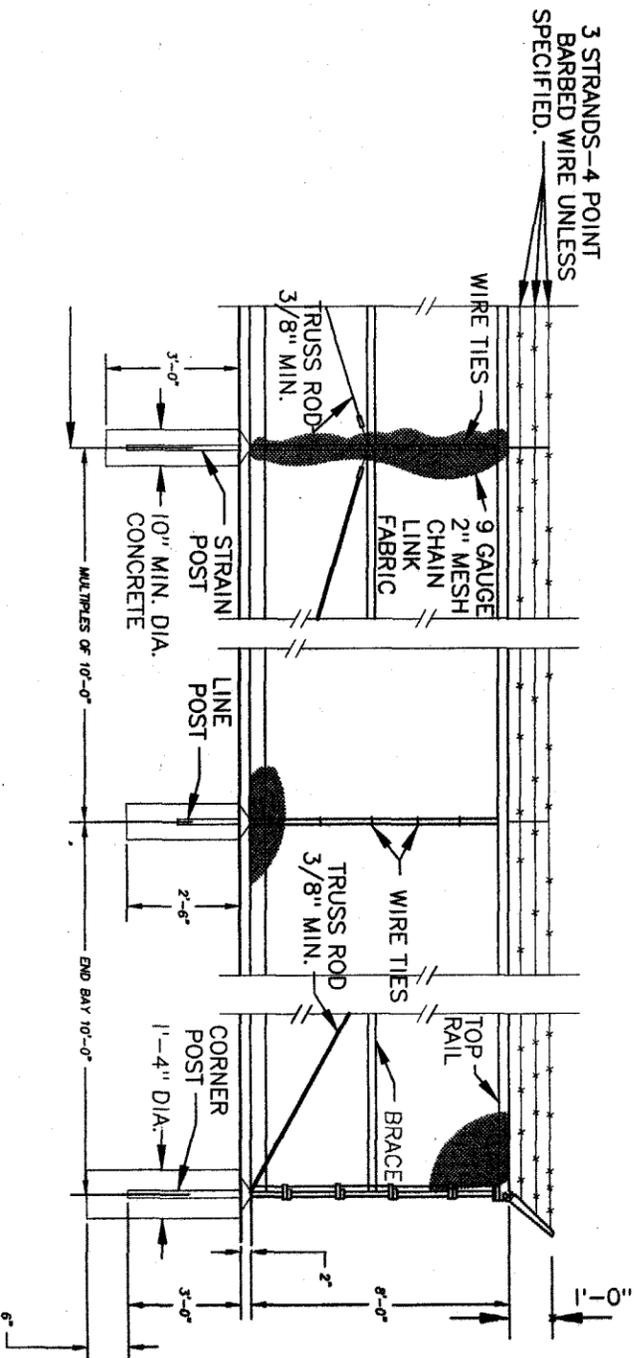
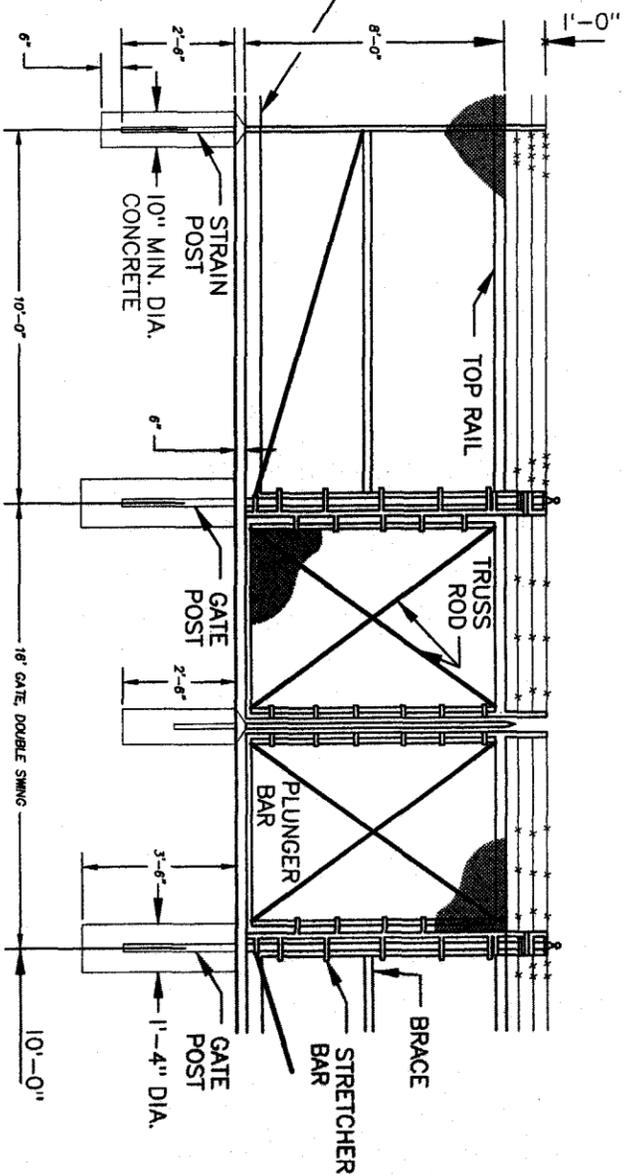




1. ALL CONCRETE SHALL BE CLASS 'C' PER SECT. 725.
2. FITTINGS NOT SPECIFICALLY DETAILED SHALL BE APPROVED HEAVY DUTY DESIGN.
3. STRAIN POSTS SHALL BE SPACED AT 500' MAXIMUM INTERVALS.
4. BOTH CORNER AND STRAIN POST SHALL HAVE STRAIN PANELS.
5. ALL POSTS SHALL BE CAPPED.

**NOTES**

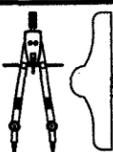
NO. 7 COILED SPRING REINFORCED WIRE TIE WITH 12 GAUGE WIRE OR HOG RING FASTENERS. 1'-6" C TO C.



8' CHAIN LINK FENCE & GATE  
OR 8' CMU WALL W/24' SLIDE GATE & 12' SWING GATE

MEMBER	SIZE	WT. PER LF.
1. CORNER POST	2 1/2" I.D. STD. PIPE SCHEDULE 40	5.79
2. LINE POST	1 1/2" I.D. STD. PIPE SCHEDULE 40	2.72
3. STRAIN POST	2 1/2" I.D. STD. PIPE SCHEDULE 40	5.79
4. BRACE	1 1/4" I.D. STD. PIPE SCHEDULE 40	2.27
5. STRETCH BAR	1/4" X 3/4" FLAT	
6. GATE POST	3 1/2" I.D. STD. PIPE SCHEDULE 40	9.11
7. TOP RAIL	1 1/4" I.D. STD. PIPE SCHEDULE 40	2.27

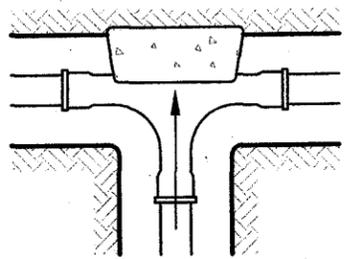
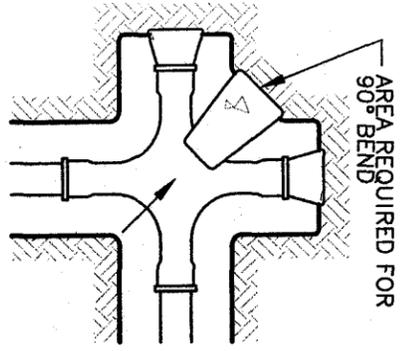
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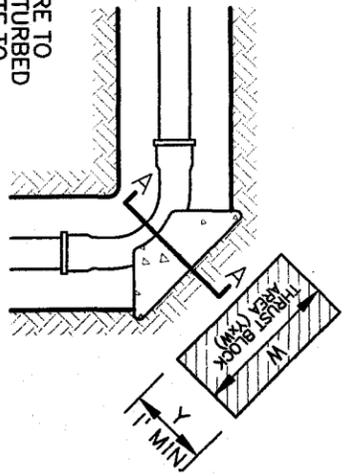
**SPECIFIC ENGINEERING, LLC.**  
 5230 E. SHEA BOULEVARD SUITE 220  
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 Phone: (480) 595-6335  
 FAX: (480) 595-6437

CLIENT/PROJECT  
**CRESTFIELD WELL #1**  
 SHEET  
 8 OF 9

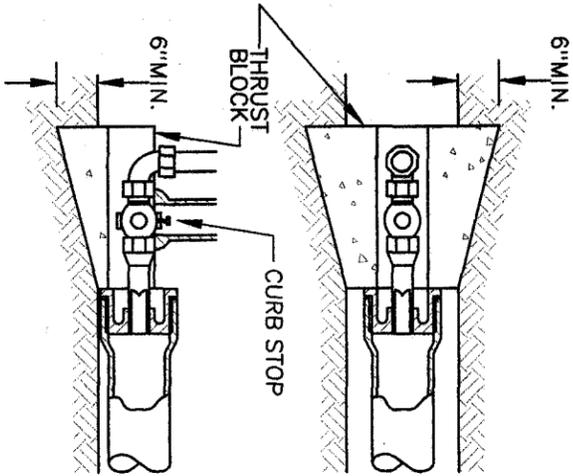
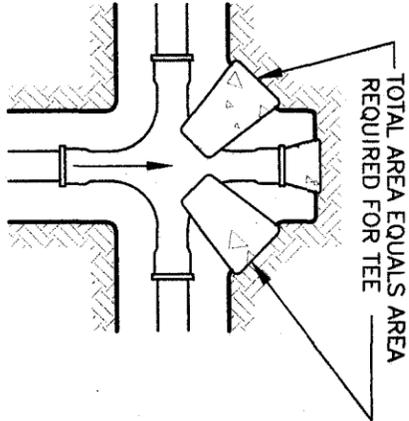
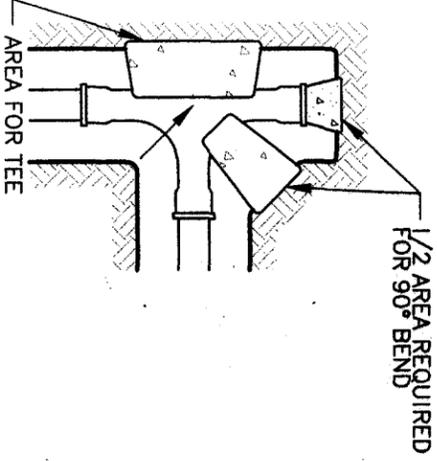
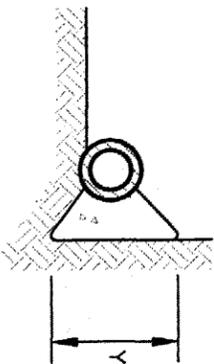
FENCE DETAILS



NOTE: THRUST BLOCKS ARE TO EXTEND TO UNDISTURBED GROUND. CONCRETE TO BE CLASS C, SECT. 725.



SECTION A-A



PIPE SIZE	MINIMUM THRUST BLOCK AREA REQUIRED (YxW)	
	WATER PIPE	45° & 22 1/2° BENDS
4" & LESS	TEE, DEAD END, 90° BEND	3 SQ. FEET
6"	3 SQ. FEET	3 SQ. FEET
8"	4 SQ. FEET	3 SQ. FEET
10"	6 SQ. FEET	3 SQ. FEET
12"	9 SQ. FEET	5 SQ. FEET
16"	13 SQ. FEET	7 SQ. FEET
	23 SQ. FEET	12 SQ. FEET

- NOTES:
- TABLE IS BASED ON 3000 LBS./SQ. FT. SOIL. IF CONDITIONS ARE FOUND TO INDICATE SOIL BEARING IS LESS, THE AREAS SHALL BE INCREASED ACCORDINGLY.
  - AREAS FOR PIPE LARGER THAN 18" SHALL BE CALCULATED FOR EACH PROJECT.
  - FORM ALL NON-BEARING VERTICAL SURFACES.

\*AS AN ALTERNATE THRUST RESTRAINT, PIPE JOINTS MAY BE RESTRAINED FOR THE REQUIRED THRUST RESISTANCE DEVELOPMENT LENGTH USING SMITH BLAIR 982 OR SMITH BLAIR 981 PIPE JOINT RESTRAINTS OR APPROVED EQUALS. THE PROPOSED JOINT RESTRAINT AND THE REQUIRED THRUST RESISTANCE DEVELOPMENT LENGTH CALCULATIONS SHALL BE SUBMITTED TO THE UTILITY'S ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION OF THE WATER MAIN.

TYPICAL LOCATION OF THRUST BLOCKS

REVISIONS			
NO.	DATE	APP.	DESCRIPTION



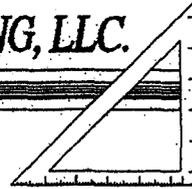
**SPECIFIC ENGINEERING, LLC.**  
 5230 E. SHEA BOULEVARD SUITE 220  
 SCOTTSDALE, ARIZONA 85254  
 Phone: (480) 595-6335  
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# ATTACHMENT 3



# SPECIFIC ENGINEERING, LLC.

8230 E. SHEA BOULEVARD SUITE 220  
SCOTTSDALE, ARIZONA 85254  
Phone: (480) 896-6336  
FAX: (480) 896-6437



Transmittal

To: ADEQ-Water Division  
1110 W. Washington  
Phoenix, Arizona 85007  
ATTN: Helen Fernandez

Date: May 26, 2005

Job No.: 3009B034

Drawing/Spec Reference: \_\_\_\_\_

Re: Johnson Utility Company-Crestfield Well No. 2

We Transmit:     Herewith     Under Separate Cover     Via Delivery

### Material Format

### Requested Action

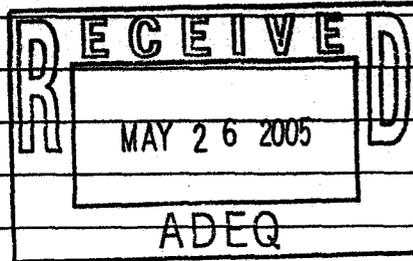
- |   |   |   |   |
|---|---|---|---|
| <input type="checkbox"/> Letter             | <input type="checkbox"/> Shop Drawings          | <input type="checkbox"/> For Your Approval  | <input type="checkbox"/> Your Review              |
| <input type="checkbox"/> Memo               | <input type="checkbox"/> Clarification Drawing  | <input type="checkbox"/> For Your Signature | <input type="checkbox"/> Please Comment           |
| <input checked="" type="checkbox"/> Prints  | <input type="checkbox"/> Modification Drawing   | Information                                 | <input type="checkbox"/> Make Recommendation      |
| <input type="checkbox"/> Sketch             | <input type="checkbox"/> Specifications         | <input type="checkbox"/> Resubmit           | <input type="checkbox"/> Issue Construction Order |
| <input checked="" type="checkbox"/> Reports | Sepias  | As Requested                                | For Your Use                                      |
| <input type="checkbox"/> Mylars             | <input checked="" type="checkbox"/> Application | <input type="checkbox"/> Issue Change Order | <input type="checkbox"/> _____                    |

### Attached to this transmittal:

Application to Construct water facilities

4 sets of prints for review of the Crestfield Well No. 2.

2 copies of the Design report.



Copies To: \_\_\_\_\_

Signed: Grant K. Hinderer

Grant Hinderer

Received By: \_\_\_\_\_

Date: \_\_\_\_\_

**APPLICATION for APPROVAL TO CONSTRUCT DRINKING WATER FACILITIES**

(PLEASE SUBMIT TO THE ADEQ ENGINEERING REVIEW DESK AT 1110 W. WASHINGTON ST., PHOENIX, AZ 85007)

A. PROJECT NAME: Crestfield Well # 2

B. PROJECT TYPE (Please check all applicable components for the OVERALL PROJECT):

New Drinking Water Well or Source  
 Water Line and Appurtances  
 Water Treatment Plant  
 Other: \_\_\_\_\_

C. SYSTEM NAME/PUBLIC WATER SYSTEM NUMBER/OPERATIONAL STATUS:

SYSTEM NAME: Johnson Utilities Co SYSTEM NUMBER 11128  
 New System  Extension to Existing System

D. PROJECT LOCATION (Please provide approximate center. Information is required to accept application):

LATITUDE 33° 06' 13.2" N LONGITUDE 111° 27' 36.9" W  
 TOWNSHIP 45 RANGE 9E SECTION 7 QUARTER SECTION (CIRCLE) NE SE SW NW  
 COUNTY Pinal County

E. PROJECT DESCRIPTION: Crestfield Well # 2, Replacement Well for Well #

F. PROJECT ENGINEER (PLEASE PRINT):

G. PROJECT OWNER (PLEASE PRINT):

NAME	<u>Specific Engineering, LLC</u>	<u>Johnson Utilities Company</u>
ADDRESS	<u>5230 E. Shea Blvd, Ste 220 Scottsdale, Ariz 85254</u>	<u>5230 E. Shea Blvd, Ste 200 Scottsdale, Ariz 85254</u>
PHONE NO./FAX NO.		
SIGNATURE/DATE	<u>[Signature]</u> <u>5/18/05</u>	<u>[Signature]</u>

H. PLAN DOCUMENTS SUBMITTED (PLEASE SEE ADEQ FORM #222, SUBMITTAL GUIDE FOR VARIOUS PROJECT TYPES)  
 NOTE: INCOMPLETE SUBMITTALS WILL NOT BE LOGGED IN.

J. OWNER/AGENT AGREEMENT AND SCHEDULE: AGREEMENT-The undersigned as Project Owner or as acting Agent for the Project Owner hereby a) grants ADEQ permission to enter the site for inspections; b) authorizes the Project Engineer to prepare and submit plan documents to the ADEQ ENGINEERING REVIEW DESK; and c) agrees to construct the sanitary facilities according to the ADEQ Certificate of Approval and the approved plan documents.

CONSTRUCTION SCHEDULE-Estimated start date: July 15, 2005 Estimated completion date: May 15, 2005  
Brian P. Tompsett TYPE OR PRINT NAME OPERATION OFFICER AFFILIATION [Signature] SIGNATURE 5.18.2005 DATE

ADEQ COMPLIANCE EVALUATION:	ADEQ FILE NO: _____
IN-COMPLIANCE: _____	LIF NUMBER: _____
NON-COMPLIANCE: _____	
COMMENTS: _____	SITE INSPECTION REQUIRED? <input type="checkbox"/> NO <input type="checkbox"/> YES

# CONCEPTUAL DESIGN REPORT - TABLE OF CONTENTS

## LIST OF SECTIONS

- 1.0 INTRODUCTION
- 2.0 LOCATION
- 3.0 ORIGINAL AGRICULTURAL GROUNDWATER WELL
- 4.0 NEW REPLACEMENT SOURCE GROUNDWATER WELL
- 5.0 NEW 12-INCH TRANSMISSION MAIN
- 6.0 CALCULATIONS

## LIST OF FIGURES

- FIGURE 1 VICINITY MAP (PINAL COUNTY)
- FIGURE 2 LOCATION MAP (Crestfield Manor)



## **1.0 INTRODUCTION**

This report is intended to document the conceptual design for the proposed water well in the Crestfield Manor development area for the Johnson Utilities Company (the Utility).

Johnson Utilities Company will be the operations manager of the water facility, which is to be operated by a State of Arizona licensed utility operator. The water well is to be connected to the Utility's water distribution system via a 12-inch water line in Heritage Road, adding to the system's storage capacity and ability to service the growing community/service area.

Since the service area for the Utility is continually expanding, this design report only addresses the conceptual design of the water facility's proposed improvements and their capabilities. The specific Utility's water system parameters (i.e., area, population, customers, demand, supply, etc.) of the service area will be addressed through other reports and/or studies such as the Master Water Plan and the various CAAG 208 Water Quality Amendments for Johnson Utilities Service area.

## **2.0 LOCATION**

The proposed Crestfield Well No. 2 is located approximately 18 miles Southeast of the Town of Queen Creek in Pinal County, Arizona. See Figure 1.

The facility is to be constructed in the Northeast Quarter of Section 7, Township 4 South, Range 9 East, Gila and Salt River Meridian, Pinal County, Arizona. The facility's site is a proposed 50 ft x 50 ft (0.057 acre) parcel of land in the Crestfield Manor development that lies adjacent to Heritage Road and approximately 564 feet west of Felix Road. See Figure 2.

## **3.0 ORIGINAL AGRICULTURAL GROUNDWATER WELL**

There is an existing water well (registration number 55-622013) that is located in the NE1/4, NE1/4, NE1/4, Section 7, T4S, R9E. This well is to be replaced by a similar replacement well that is to be located at the replacement well site shown below in Section 4.

The original well was completed in the 1944 and has been historically used for agricultural purposes. The well has a vertical turbine pump, with a motor mounted on top of the well casing, and is capable of pumping 1100gpm. The well is 760' deep, has a 20" casing to 300 feet, and 18" to 760, and has a 12-inch steel discharged pipe that fed irrigation canals.

#### **4.0 NEW REPLACEMENT SOURCE GROUNDWATER WELL**

The new well classifies as a "replacement well" since the distance between the new well and the original well is to be less than 660 feet.

The replacement source groundwater well (see Construction Drawings) is to consist of:

- a 12-inch diameter (950 foot deep) solid wall steel well casing pipe (the bottom 20 to 40 feet of the casing pipe is to be slotted),
- a concrete grout casing seal,
- a concrete well cap,
- a 200 Hp electric motor driven submersible turbine vertical pump (capable of delivering 1,000 gpm against a 477 ft TDH),
- an 8-inch steel column pipe,
- a 12-inch casing head cover, with vent pipe and electrical sleeve,
- an 8-inch steel well head with a plugged side outlet,
- an electrical pump control panel,
- an 8-inch isolation butterfly valve,
- an air release valve,
- an 8-inch mechanical propeller flow meter,
- an 8-inch check valve,
- a water sampling hose bib,
- associated 8-inch discharge piping,
- associated electrical conduits, wiring and components, from the well pump through the booster pumps' control panel,
- telemetry components for centralized control, if and when desired by the Utility.

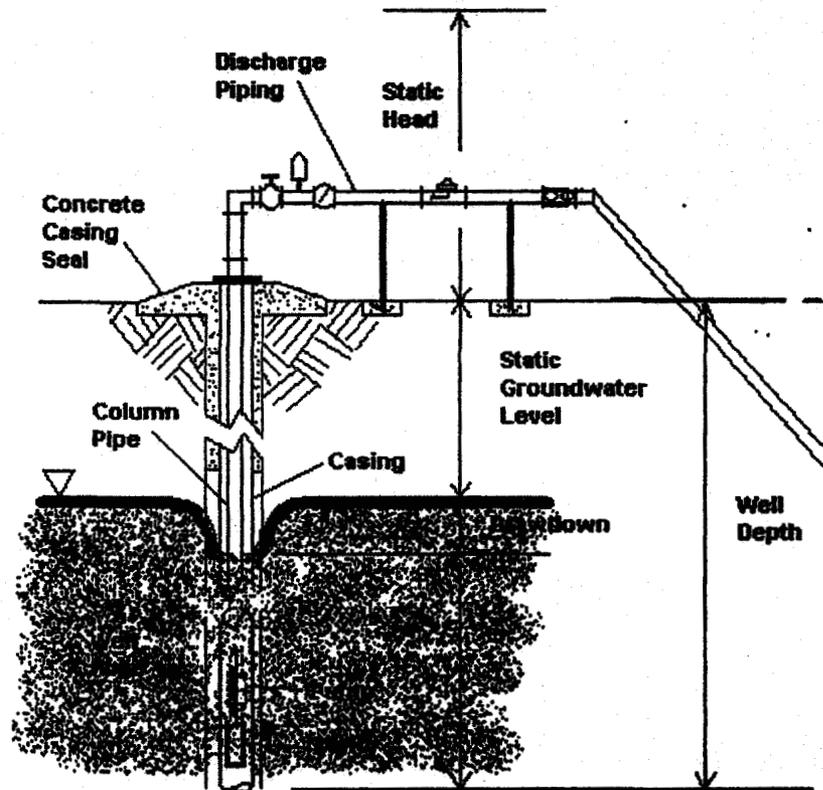
#### **5.0 NEW 12-INCH TRANSMISSION MAIN**

The new Crestfield Well No. 2 will supply water directly to the Johnson Utilities Company water transmission distribution system.

A water supply transmission main will be installed from Crestfield well site no. 2 to the 12-inch water line in Heritage Road. This transmission line was designed by Can Am Engineering and installed by Johnson Utilities Company contractors as a part of the Johnson Utilities infrastructure. This plan will install the 12-inch line from the well to the 12-inch transmission line.

## 6.0 CALCULATIONS

### 6.1 Source Well Calculations



**1000 gpm Source Well**

#### **WELL PUMP DESIGN PARAMETERS (\*initial conditions)**

depth to groundwater = 450 feet (assumed average for Johnson Utility Service area)

well drawdown = 50 feet (assumed)

static head = 18 feet

well/pump/casing depth = 950 feet (assumed)

well casing = 12 inches

column pipe = 8 inches

discharge piping = 8 inches

- pump and motor are to be enlarged in the future as the aquifer water level drops.

## 6.0 CALCULATIONS cont'd

### 6.1 Source Well Calculations cont'd

#### WELL PUMP DESIGN PARAMETERS cont'd

column & discharge piping headloss ( $H_L$ )

(8" pipe, flow  $Q = 1,000$  gpm, velocity  $V = 6.38$  fps)

<u>Item</u>	<u>Qty</u>	<u>K</u>	<u><math>H_L</math></u>
Aquifer contraction	1	0.5	0.32'
8"x4" Tee	1	0.3	0.19'
8" butterfly valve	1	0.2	0.13'
8" check valve	1	2.5	1.58'
8"-90° bend	4	0.7	1.77'
8"-45° bend	2	0.2	0.25'
8" flow meter	1		0.25'
¾" taps	2	0.3	0.38'
8" expansion joint	1	0.4	0.25'
12" pipe	1,000 LF		<u>22.00'</u>
<b>Total <math>H_L</math></b>			<b>27.12'</b>

total dynamic head (TDH)

total static head = 450 feet

friction head = 27 feet

**TDH = 477 feet**

#### NET POSITIVE SUCTION HEAD (NPSH) AVAILABLE:

*For safety:*  $NPSH_a > NPSH_r + 2$  feet

\* $NPSH_a = Y - H_L - (P_v / \gamma) = 422$  ft

where: suction head  $Y = 950 - (450 + 50) = 450$  ft

pipe headloss from pump to storage tank =  $H_L = 27$  ft

water vapor pressure  $P_v = 49.21$  psf @ 20°C or 68°F

specific weight of water  $\gamma = 62.32$  pcf @ 20°C or 68°F

\* Atmospheric pressure and soil pressure ignored. Velocity head assumed to be in the pump's  $NPSH_r$

**Cavitation** will occur when the pressure at any location in a closed system reaches an absolute pressure equal to the saturated vapor pressure of the fluid at the fluid's pumping temperature.

## 6.0 CALCULATIONS cont'd

### 6.1 Source Well Calculations cont'd

#### WELL PUMP

capacity = 1000 gpm

type = Goulds Pumps Model VIS, 3550 rpm, closed 7.61" impeller

size = 10 IHC

stages = (477 ft) / (196ft per stage) = 2.5 => 3 stages

horsepower = (3 stages) • (62.5 Hp / stage) = 188 Hp => 200 Hp

first stage NPSH required = 63 ft < 422 ft available

pump efficiency =  $\frac{[(\text{field pumping head}) \cdot (\text{Capacity}) \cdot (100)]}{[(3960) \cdot (\text{brake horsepower})]}$   
 =  $\frac{[(477') \cdot (1000 \text{ gpm}) \cdot (100)]}{[(3960) \cdot (188 \text{ Hp})]} \Rightarrow 64 \% \text{ with 3 stages}$

## Water Vapor Pressure

		Pounds per Square Inch		Feet of Head
40	4.4	0.1217	17.52	0.281
50	10	0.1781	25.65	0.412
60	15.6	0.2563	36.91	0.592
70	21.1	0.3631	52.29	0.815
80	26.7	0.5069	72.99	1.17
86	30	0.6155	88.63	1.42
90	32.2	0.6982	100.5	1.61
100	37.8	0.9492	136.7	2.19
110	43.3	1.275	183.6	2.94
120	48.9	1.692	243.6	3.91
130	54.4	2.223	320.1	5.14
140	60	2.889	416.0	6.68
150	65.6	3.718	535.4	8.56
160	71.1	4.741	682.7	10.95
170	76.7	5.992	862.8	13.84

## 6.0 CALCULATIONS (cont'd)

### 6.1 Source Well Calculations cont'd

## Density & Specific Weight of Water at Various Temperatures

		Density ( $\rho$ ) grams per cubic centimeter	
0 (solid)	32	0.9150	57.12
0 (liquid)	32	0.9997	62.41
4	39.2	1.0000	62.43
5	41	1.0000	62.43
10	50	0.9997	62.41
15	59	0.9992	62.38
16	60.8	0.9991	62.37
17	62.6	0.9989	62.36
18	64.4	0.9988	62.35
19	66.2	0.9985	62.33
21	69.8	0.9981	62.31
22	71.6	0.9978	62.29
23	73.4	0.9976	62.28
24	75.2	0.9974	62.27
25	77	0.9972	62.25
30	86	0.9957	62.16
35	95	0.9941	62.06
40	104	0.9923	61.94
45	113	0.9903	61.82
50	122	0.9881	61.68
60	140	0.9832	61.38
70	158	0.9777	61.04
80	176	0.9719	60.67
90	194	0.9651	60.25
100 (liquid)	212	0.9581	59.81
100 (gas)	212	0.0006	0.04

## 6.0 CALCULATIONS (cont'd)

### 6.2 Servicable Development Calculations

#### SOURCE WATER WELL & WATER STORAGE TANK CAPACITY

##### Average Daily Residential Demand

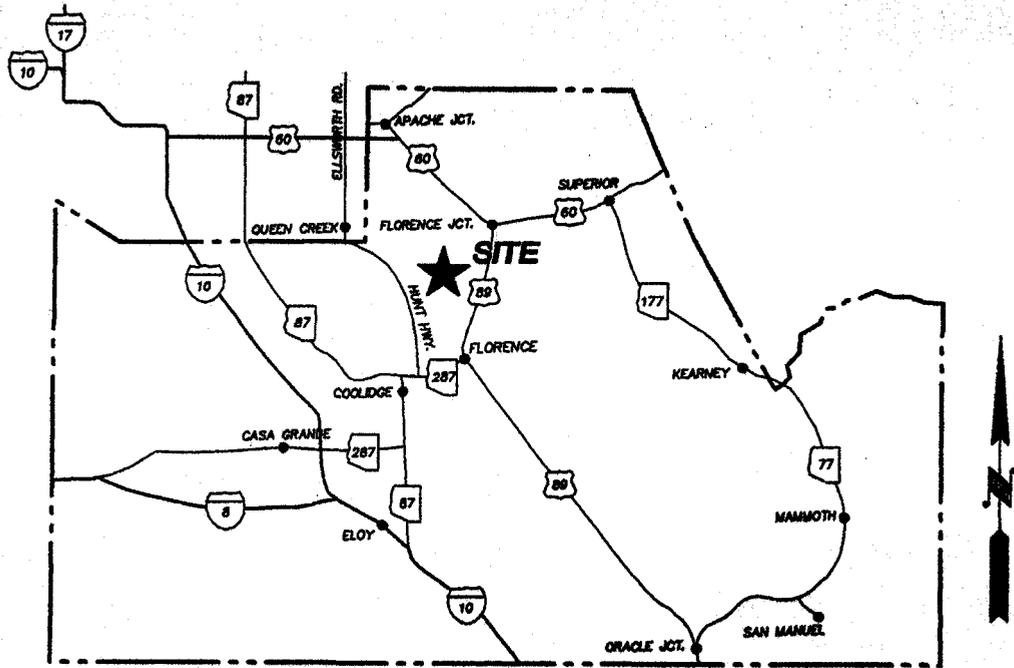
Source Well Flow  $Q_{sw} = 1000 \text{ gpm}$  or 1,440,000 gpd

Servicable population = 1,440,000 gpd / 100 gpdpc = 14,400 people

Servicable residences = 14,400 / 2.6 = **5,538 residences**

The storage tanks at Circle Cross water plant, San Tan water storage tank, and the main water plant at Johnson Ranch supply the fire flow for this area.

S:\Specific Engineering\2009\B0335\acad\Cut-sh\is\EXHIBITS\FIGURE1.dwg Plotted: May 24, 2005



# VICINITY MAP

N.T.S.

FIGURE 1

CRESTFIELD WELL #2

DRAWN TEAM

DATE MAY 2005

VICINITY MAP

SCALE NTS



**SPECIFIC ENGINEERING, LLC.**

8530 E. SHEA BOULEVARD SUITE 220  
SCOTTSDALE, ARIZONA 85264  
Phone (480) 898-6336  
Fax (480) 898-6437



S:\Specific Engineering\3009\6035\acad\Cut-shits\EXHIBITS\FIGURE2.dwg Plotted: May 24, 2005

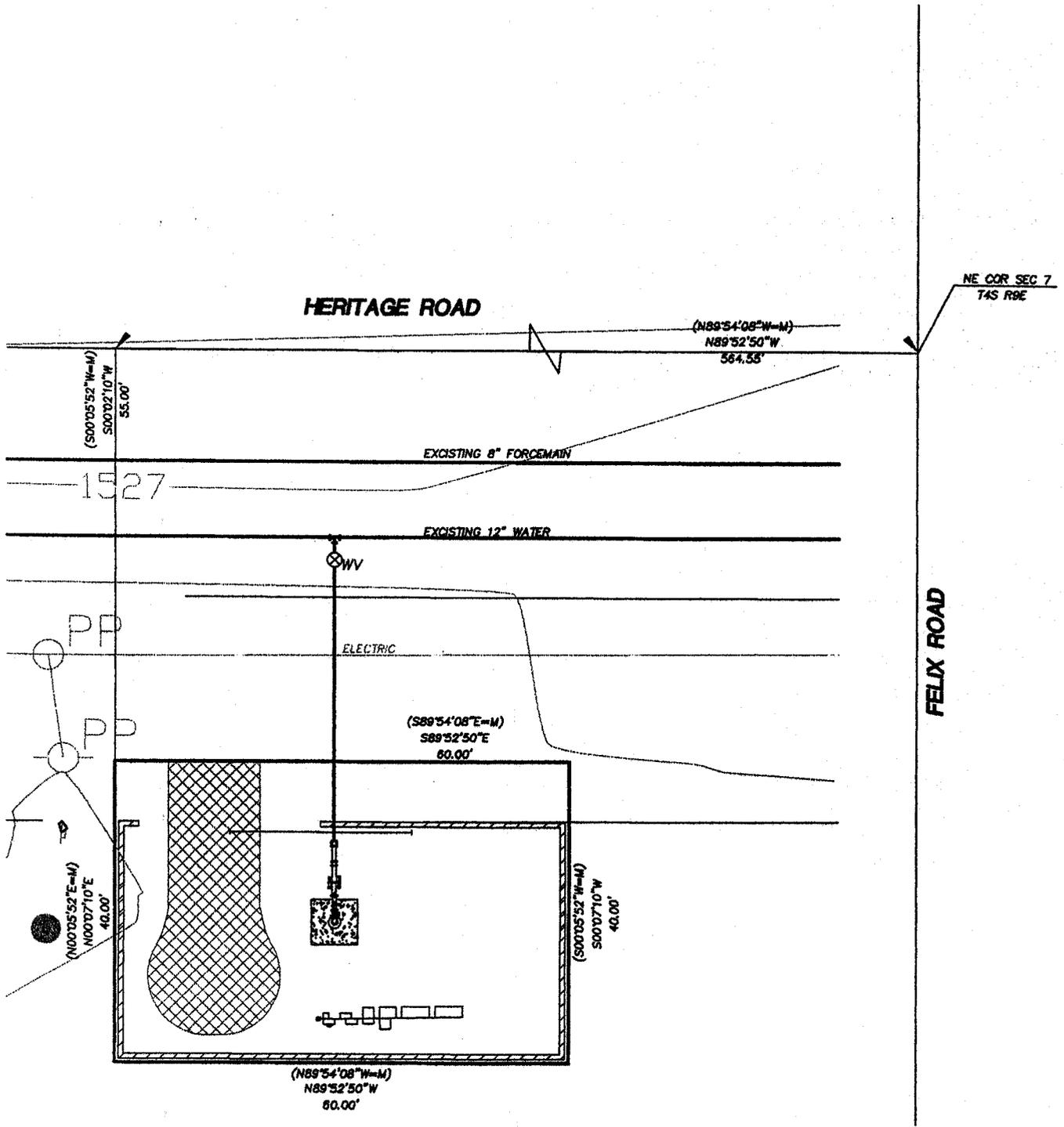


FIGURE 2

CRESTFIELD WELL #2

DRAWN TEAM

DATE MAY 2005

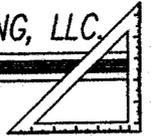
LOCATION MAP

SCALE NTS



SPECIFIC ENGINEERING, LLC

8230 E. SHEA BOULEVARD SUITE 220  
SCOTTSDALE, ARIZONA 85254  
PHONE (480) 586-6335  
FAX (480) 586-6437



**WATER AND SEWER ABBREVIATIONS**

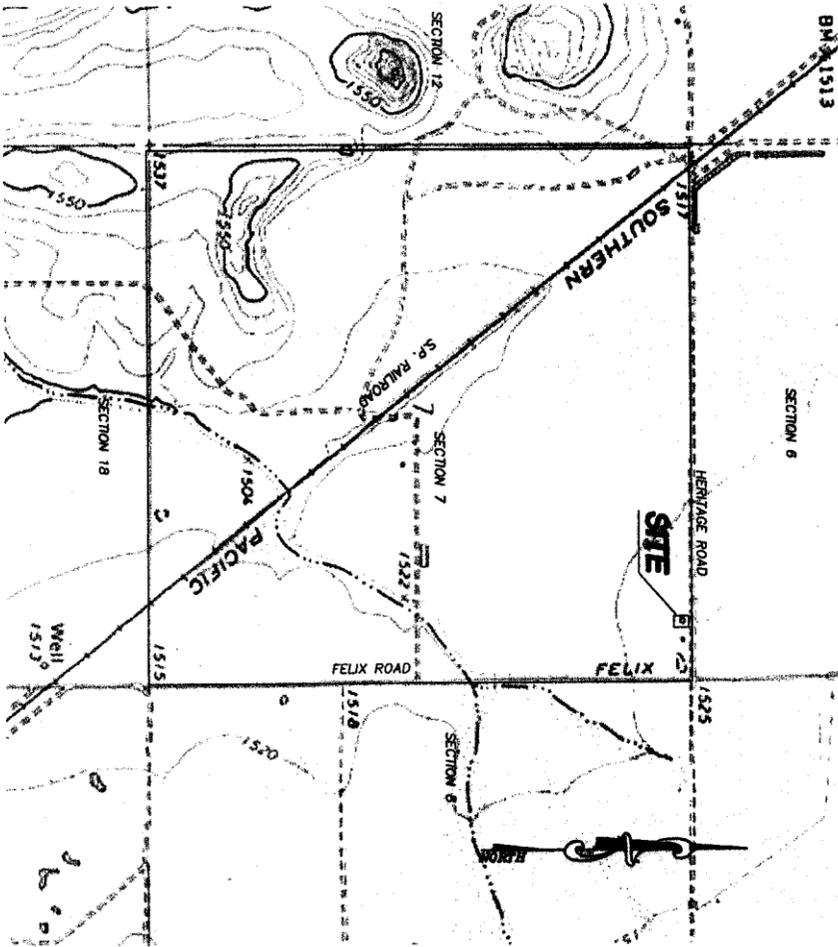
- C CENTER LINE
- M MONUMENT LINE
- PI POINT OF INTERSECTION
- PIV POINT OF VERTICAL INTERSECTION
- LI LEFT
- RI RIGHT
- STA STATION
- Δ Δ DELTA ANGLE
- R/W RIGHT OF WAY
- PUE PUBLIC UTILITY EASEMENT
- DE DRAINAGE EASEMENT
- LE LANDSCAPE EASEMENT
- NA NOT APPLICABLE
- NIS NOT TO SCALE
- ELEV ELEVATION
- PVC POLYVINYL CHLORIDE
- DP DUCTILE IRON PIPE
- B & C BOX AND COVER
- FH FIRE HYDRANT
- WH WATER VALVE
- CO CLEANOUT
- PP POWER POLE
- DVA DRAIN VALVE ASSEMBLY
- ARV AIR RELEASE VALVE
- FM FORCE MAIN

**LEGEND**

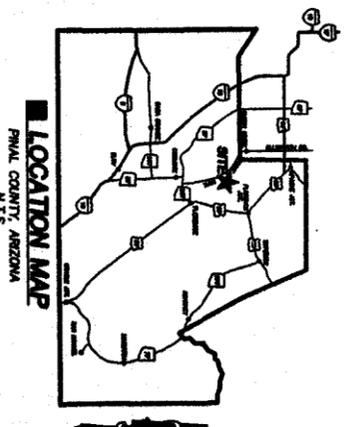
- ⊙ DETAIL LETTER
- ⊙ SHEET NUMBER
- EXISTING CONTOUR
- NEW CONTOUR
- EXISTING EDGE OF PAVEMENT
- NEW EDGE OF PAVEMENT
- NEW GRAVEL BITCH
- FLOWLINE DIRECTION
- NEW FENCE
- NEW SPIRAL RIB PIPE
- NEW UNDERGROUND WATER PIPE
- NEW ABOVEGROUND WATER PIPE
- EXISTING WATER PIPE
- ⊙ SECTION A
- ⊙ SECTION B

**CRESTFIELD WELL #2**

A PORTION OF SECTION 7, TOWNSHIP 4 SOUTH, RANGE 9 EAST,  
GILA AND SALT RIVER MERIDIAN,  
PINAL COUNTY, ARIZONA



VICINITY MAP  
N.T.S.



LOCATION MAP  
PINAL COUNTY, ARIZONA  
N.T.S.

**INDEX OF SHEETS**

1. COVER SHEET
2. WATER NOTES/DETAILS
3. GENERAL NOTES AND DETAILS
4. SITE PLAN
5. WELL NOTES & DETAILS
6. DETAILS
7. ELECTRIC DETAILS
8. FENCE DETAILS
9. THRUST BLOCK DETAILS

**BENCH MARK**

PINAL COUNTY DEPARTMENT OF  
TRANSPORTATION, ALUMINUM CAP @ NE  
CORNER OF SECTION 7, T4S, R9E  
ELEV. 1515.88

**BASIS OF BEARINGS**

THE EAST LINE OF THE NORTHEAST QUARTER OF  
SECTION 7, T4S, R9E WITH THE HAWKING AV  
SECTION 7 BOUNDARY OF THE NEARBY  
Q1 09 27 45' RECEIVED, SURVEYED ENEC)

**ENGINEER**

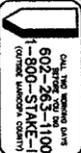
SPECIFIC ENGINEERING, LLC  
5230 East Shea Blvd. Suite 220  
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Ph: (480) 598-6335  
Fax: (480) 598-6437

**OWNER**

JOHNSON UTILITIES COMPANY  
5230 East Shea Blvd. Suite 200  
Scottsdale, Arizona 85254  
(480) 998-1300

**ACCEPTED**

PINAL COUNTY	DATE
AGEO	DATE
JOHNSON UTILITIES COMPANY	DATE



CLIENT/PROJECT <b>CRESTFIELD WELL #2</b>	TITLE <b>COVERT SHEET</b>	REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>APP.</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	DATE	APP.	DESCRIPTION																																									<b>SPECIFIC ENGINEERING, LLC.</b> 5230 E. SHEA BOULEVARD SUITE 220 SCOTTSDALE, ARIZONA 85254 Phone: (480) 598-6335 FAX: (480) 598-6437
NO.	DATE	APP.	DESCRIPTION																																												

**ENGINEER'S WATER NOTES:**

- (Maricopa County Standards)
1. ALL MATERIALS AND PRODUCTS USED IN WATER SYSTEM, INCLUDING SURFACE COATINGS AND PAINTS, SHALL CONFORM TO NSF STANDARD 61 AS PER A.A.C. R18-4-118. ALL PRODUCTS ADDED DIRECTLY TO DRINKING WATER SHALL CONFORM WITH NSF STANDARD 60. CONSTRUCTION MATERIALS USED IN WATER SYSTEMS SHALL BE LEAD-FREE PER A.A.C. R18-4-504 AND R1-1-101.
  2. ALL 3/4 INCH THROUGH 2 INCH COPPER WATER SERVICE LINES SHALL BE IN CONFORMANCE WITH MAG STANDARD SPECIFICATION 754.
  3. ALL 3 INCH AND SMALLER PRESSURE PVC (POLYVINYL CHLORIDE) WATER PIPE & FITTINGS SHALL BE SCHEDULE 80 TR 1 GRADE 1 PPS PVC IN CONFORMANCE WITH ASTM STANDARD D-1778 (LATEST REVISION).
  4. ALL 4 INCH THROUGH 12 INCH PVC (POLYVINYL CHLORIDE) WATER MAINS SHALL BE DR20 C95 PRESSURE CLASS 150 PPS PVC PIPE IN CONFORMANCE WITH AWWA STANDARD C900 (LATEST REVISION). WATER MAINS SHALL BE DR20 C95 PRESSURE CLASS 150 PPS PVC PIPE IN CONFORMANCE WITH AWWA STANDARD C900 (LATEST REVISION).
  5. ALL 14 INCH THROUGH 24 INCH PVC (POLYETHYLENE TEREPHTHALATE) WATER MAINS SHALL BE DR20 C95 PRESSURE CLASS 150 PPS PVC PIPE IN CONFORMANCE WITH AWWA STANDARD C900 (LATEST REVISION).
  6. ALL 4 INCH THROUGH 24 INCH RCP WATER MAINS SHALL BE PRESSURE CLASS 350 DUCTILE IRON PIPE WITH A COMPACT INTERIOR LINING IN CONFORMANCE WITH MAG STANDARD SPECIFICATION 750.
  7. ALL 4 INCH THROUGH 24 INCH WATER MAIN FITTINGS SHALL BE CAST IRON DUCTILE IRON OR GRAY IRON IN CONFORMANCE WITH MAG STANDARD SPECIFICATION 750.
  8. ALL BELOW GROUND RCP PIPES AND FITTINGS SHALL HAVE AN EXTERIOR PETROLEUM ASPHALTIC COATING (1 MIL THICK) AND BE ENCASED WITH A POLYETHYLENE ENCASEMENT IN CONFORMANCE WITH AWWA STANDARD C900. ALL ABOVE GROUND PIPES AND FITTINGS SHALL HAVE AN EXTERIOR COATING EQUIVALENT WITH AWWA STANDARD C900.
  9. ALL PVC WATER MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THESE PLANS WITH AWWA STANDARD C900 (LATEST REVISION). WITH THE PRE MANUFACTURER'S RECOMMENDATIONS AND WITH MAG STANDARD SPECIFICATIONS 601, 602, 610, 620, AND 631.
  10. ALL RCP WATER MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THESE PLANS WITH AWWA STANDARD C900 (LATEST REVISION). WITH THE PRE MANUFACTURER'S RECOMMENDATIONS AND WITH MAG STANDARD SPECIFICATIONS 601, 602, 610, 620, AND 631.
  11. THE CONSTRUCTION INSPECTOR IS AT THE DISCRETION OF THE CONTRACTOR PARTY THAT HAS BEEN RETAINED TO INSURE THAT THE WORK COVERED BY THESE PLANS IS PERFORMED CORRECTLY AND COMPLES WITH THESE PLANS AND ANY APPLICABLE SPECIFICATIONS.
  12. ALL 4 INCH THROUGH 16 INCH WATER MAIN FITTINGS, WATER VALVES, FIRE HYDRANTS, TAPPING STEES AND DEAD ENDS SHALL HAVE APPROVED THRUST RESTRAINT PROVIDED. SEE SITE SOILS REPORT FOR ALLOWABLE SOIL BEARING PRESSURE. ANY THRUST BLOCKING SHALL BE IN CONFORMANCE WITH MAG STANDARD DETAILS 301, 350, 360 AND 381. AS AN ALTERNATE TO THRUST BLOCKING, PIPE JOINTS MAY BE RESTRAINED WITH APPROVED JOINT RESTRAINTS FOR THE REQUIRED THRUST RESISTANCE DEVELOPMENT LENGTH. THE CONTRACTOR SHALL SUBMIT THRUST BLOCKING CALCULATIONS AND/OR JOINT RESTRAINT CALCULATIONS TO THE CONSTRUCTION INSPECTOR FOR APPROVAL. THE CONSTRUCTION INSPECTOR IS TO INSPECT AND APPROVE ALL THRUST BLOCKING AND/OR JOINT RESTRAINTS PRIOR TO THE CONTRACTOR BACKFILLING THE WATER MAIN TRENCH. FAILURE OF THE CONTRACTOR TO HAVE THE THRUST BLOCKING AND/OR JOINT RESTRAINTS INSPECTED AND APPROVED BY THE CONSTRUCTION INSPECTOR MAY BE CAUSE FOR THE CONTRACTOR TO EXPOSE ANY WATER MAIN INSTALLATION FOR INSPECTION AT NO ADDITIONAL COST TO THE CONTRACTING PARTY.
  13. IN THE PRESENCE OF THE CONSTRUCTION INSPECTOR, THE CONTRACTOR SHALL PERFORM PRESSURE LEAKAGE TESTS (AND MAINTAIN RECORDS OF THE RESULTS) ON THE TOTAL LENGTH (100%) OF ALL WATER MAINS INSTALLED IN ACCORDANCE WITH THESE PLANS AND WITH MAG STANDARD SPECIFICATION 810.14. FOLLOWING ARE REQUIRED TEST PRESSURES:
    - CLASS 100 PVC SHALL BE TESTED AT 150 PSI.
    - CLASS 150 PVC SHALL BE TESTED AT 210 PSI.
    - CLASS 165 PVC SHALL BE TESTED AT 210 PSI.
    - CLASS 350 DRP SHALL BE TESTED AT 210 PSI.
    - PVC PIPE TO WHICH IT IS JOINED (150 PSI MINIMUM).
 PIPE SEGMENTS NOT PASSING THE PRESSURE TEST ARE TO BE CORRECTED AT NO ADDITIONAL COST TO THE CONTRACTING PARTY. FAILURE OF THE CONTRACTOR TO MAINTAIN TEST RECORDS MAY BE CAUSE FOR ANY/ALL WATER PIPE TO BE RETESTED AT NO ADDITIONAL COST TO THE CONTRACTING PARTY.
  14. ALL NEW WATER PIPES AND APPURTENANCES SHALL BE DISINFECTED AND SHALL BE BACTERIOLOGICALLY TESTED BY AN INDEPENDENT TESTING LABORATORY. BACTERIOLOGICAL TEST RESULTS ARE TO BE NOTICED PRIOR TO PLACEMENT OF ANY WATER LINES INTO SERVICE. ALL WATER MAINS ARE TO BE FLUSHED FROM DISINFECTION. ALL WATER MAINS (100%) SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C650 (LATEST REVISION) WHICH IS INCORPORATED BY REFERENCE INTO THESE PLANS. ALL WATER MAINS SHALL BE DISINFECTED WITH AWWA C650 (LATEST REVISION) WHICH IS INCORPORATED BY REFERENCE INTO THESE PLANS. ALL WATER MAINS SHALL BE DISINFECTED WITH AWWA C650 (LATEST REVISION) WHICH IS INCORPORATED BY REFERENCE INTO THESE PLANS.
  15. ALL 12 INCH OR GREATER WATER MAINS ARE TO HAVE A MINIMUM OF 60 INCHES OF COVER AS MEASURED FROM FINISH GRADE ABOVE THE WATER MAIN UNLESS NOTED OTHERWISE IN THESE PLANS. ALL WATER MAINS LESS THAN 12 INCH ARE TO HAVE A MINIMUM OF 48 INCHES OF COVER UNLESS NOTED OTHERWISE.
  16. PERMISSIBLE DEFLECTION AT PIPE JOINTS SHALL BE ONE DEGREE LESS THAN THE PIPE MANUFACTURER'S RECOMMENDATION. RCP BEND FITTINGS SHALL BE INSTALLED WHERE THIS REQUIREMENT CAN NOT BE MET.
  17. THE CONTRACTOR SHALL VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ANY EXISTING WATER MAIN, WHERE A CONNECTION IS CALLED FOR IN THESE PLANS, PRIOR TO THE COMMENCEMENT OF WATER CONSTRUCTION WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY LOCATION DISCREPANCIES THAT COULD AFFECT THE INSTALLATION OF THE NEW WATER LINES.
  18. EXISTING DEAD-END WATER MAINS SHALL BE THOROUGHLY FLUSHED BEFORE THE LINES ARE MADE WITH NEW WATER MAINS THAT ARE BEING INSTALLED BY THIS PROJECT.
  19. ALL WATER LINE TAPS INTO EXISTING AND/OR NEW WATER MAINS SHALL BE WET TAPS WITNESSED BY THE CONSTRUCTION INSPECTOR. ALL TAP "COCKIES/DONUTS" ARE TO BE RETRIEVED AND PRESENTED TO THE CONSTRUCTION INSPECTOR. NO DRY DRILLING OR TAPPING OF WATER MAINS SHALL BE PERMITTED. PRIOR TO DRILLING OR TAPPING, THE WATER MAIN SHALL HAVE ALL ENTRAPPED AIR REMOVED AND BE WATER PRESSURIZED TO 40 PSI OR NORMAL OPERATION SYSTEM PRESSURE, WHICHEVER IS GREATER. DRILLING/TAPPING EQUIPMENT SHALL HAVE APPROVED PURGE OPENINGS AND DISCHARGE HOSE. TAPS MADE INTO MAINS SHALL BE MORE THAN 12 INCHES FROM THE PIPE JOINTS. MULTIPLE TAPS SHALL BE AT LEAST 30 INCHES APART.
  20. THE LOCATION OF AIR RELEASE VALVE ASSEMBLIES SHOWN IN THESE PLANS IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF HIGH POINTS IN ALL HIGH POINTS. DRIVEWAYS, VALVE ASSEMBLIES SHALL NOT BE INSTALLED IN STREETS, DRIVEWAYS, DRAINAGEWAYS OR SIDEWALKS.

21. WATER METER BOX REQUIREMENTS (SEE MAG STD DETAILS 310-313 & 320):
  - 3/4 INCH METER USE - #1 METER BOX
  - 1 INCH METER USE - #2 METER BOX
  - 1-1/2 INCH METER USE - #3 METER BOX
  - 2 INCH METER USE - #4 METER BOX
 METER BOXES ARE TO BE SET ON SOLID ROMAN BRICKS 2" X 4" X 12" WITH SERVICE PIPE AT 8 INCHES (MIN) TO 12 INCHES (MAX) BELOW FINISHED GRADE. TOP OF METER BOXES ARE TO BE SET 1/2 INCH TO 1 INCH ABOVE FINISH GRADE.
22. ALL BUTTERFLY VALVES 3" AND GREATER IN DIAMETER SHALL MEET THE REQUIREMENTS OF AWWA C504 (LATEST REVISION) AND SHALL BE INTERNALLY COATED IN ACCORDANCE WITH AWWA C550 (LATEST REVISION). ALL CHECK VALVES SHALL MEET THE REQUIREMENTS OF AWWA C506 (LATEST REVISION) AND SHALL BE INTERNALLY COATED IN ACCORDANCE WITH AWWA C550 (LATEST REVISION). ALL FLEXIBLE COUPLINGS SHALL BE PRESSURE STYLE 38 OR AN APPROVED EQUAL, AND SHALL INCLUDE A JOINT HARNESS TO PREVENT SEPARATION, UNLESS OTHERWISE NOTED IN THESE PLANS.
23. VALVE NOT EXTENSIONS, IF REQUIRED, SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
24. ALL STATIONING IS ALONG THE CENTERLINE OF STREETS UNLESS OTHERWISE INDICATED.

**WATER AND SEWER SEPARATION NOTES:**

- WATER AND SEWER FACILITIES SHALL BE SEPARATED IN ACCORDANCE WITH THE ARIZONA ADMINISTRATIVE CODE, CHAPTER 8, ARTICLE 2, SECTION R18-5-302 AND PARAGRAPHS 1-5 ARE PROVIDED FOR CONTRACTOR'S INFORMATION. WATER AND SEWER MAINS SHALL BE SEPARATED IN ORDER TO PREVENT PUBLIC WATER SYSTEMS FROM POSSIBLE CONTAMINATION. THE SEWER MAINS ARE MEASURED PERPENDICULARLY FROM THE CENTER OF THE SEWER AS FOLLOWS:
1. A WATER MAIN SHALL NOT BE PLACED WITHIN 6 FEET HORIZONTAL DISTANCE AND BELOW 2 FEET VERTICAL DISTANCE ABOVE THE TOP OF A SEWER MAIN UNLESS EXTRA PROTECTION IS PROVIDED. EXTRA PROTECTION SHALL CONSIST OF CONSTRUCTING THE SEWER MAIN WITH MECHANICAL JOINT DUCTILE IRON PIPE OR WITH SLIP-JOINT DUCTILE IRON PIPE. IF JOINT RESTRAINT IS PROVIDED, ALTERNATE EXTRA PROTECTION SHALL CONSIST OF ENCASEMENT FOR AT LEAST 10 FEET BEYOND THE AREA COVERED BY THIS SECTON (C90) (A) & WITHIN 2 FEET HORIZONTALLY AND 2 FEET BELOW THE SEWER MAIN.
  2. NO WATER PIPE SHALL PASS THROUGH OR COME INTO CONTACT WITH ANY PART OF A SEWER MAIN. THE MINIMUM HORIZONTAL SEPARATION BETWEEN WATER MAINS AND MANHOLES SHALL BE 6 FEET, MEASURED FROM THE CENTER OF THE MANHOLE.
  3. THE MINIMUM SEPARATION BETWEEN FORCE MAINS OR PRESSURE SEWERS AND WATER MAINS SHALL BE 2 FEET VERTICALLY AND 6 FEET HORIZONTALLY UNDER ALL CONDITIONS. WHERE A SEWER FORCE MAIN CROSSES ABOVE OR LESS THAN 6 FEET BELOW A WATER LINE, THE SEWER MAIN SHALL BE ENCASED IN AT LEAST 6 INCHES OF CONCRETE OR CONSTRUCTED USING MECHANICAL JOINT DUCTILE IRON PIPE FOR 10 FEET ON EITHER SIDE OF THE WATER MAIN.
  4. THE SEPARATION REQUIREMENTS DO NOT APPLY TO BUILDING, PLUMBING, OR INDIVIDUAL HOUSE SERVICE CONNECTIONS, SEWER MAINS (GRAVITY, PRESSURE, AND FORCE) SHALL BE KEPT A
  5. MINIMUM OF 50 FEET FROM WELLS UNLESS THE FOLLOWING CONDITIONS ARE MET:
    - a. WATER MAIN PIPE, PRESSURE TESTED IN PLACE TO 50 PSI WITHOUT EXCESSIVE LEAKAGE, IS USED FOR GRAVITY SEWERS AT DISTANCES GREATER THAN 20 FEET FROM WATER WELLS, OR
    - b. WATER MAIN PIPE, PRESSURE TESTED IN PLACE TO 150 PSI WITHOUT EXCESSIVE LEAKAGE, IS USED FOR PRESSURE SEWERS AND FORCE MAINS AT DISTANCES GREATER THAN 20 FEET FROM WATER WELLS. EXCESSIVE LEAKAGE MEANS ANY AMOUNT OF LEAKAGE WHICH IS GREATER THAN THAT PERMITTED UNDER THE AWWA STANDARD APPLICABLE TO THE PARTICULAR PIPE MATERIAL OR VALVE TYPE.

**JOHNSON UTILITIES' WATER NOTES:**

1. THE CONTRACTOR SHALL NOTIFY JOHNSON UTILITIES A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO ANY CONSTRUCTION TO SCHEDULE A PRECONSTRUCTION CONFERENCE. WORK SHALL NOT COMMENCE UNTIL A "NOTICE TO PROCEED" HAS BEEN ISSUED BY JOHNSON UTILITIES AND THE CERTIFICATION OF "APPROVAL" OF CONSTRUCTION HAS BEEN RECEIVED BY THE UTILITY FROM THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY. ANY PIPE INSTALLED PRIOR TO THE "NOTICE TO PROCEED" SHALL BE REMOVED BY THE CONTRACTOR AT THE CONTRACTOR'S OWN EXPENSE.
2. ALL AGREEMENTS MUST BE EXECUTED BEFORE ANY WATER LINE CONSTRUCTION.
3. WATER MAINS ARE TO BE INSTALLED AFTER SEWER INSTALLATION AND WHEN ROUGH GRADE IS TO WITHIN 6 INCHES OF FINAL GRADE. A REGISTERED ENGINEER OR A REGISTERED LAND SURVEYOR MUST CERTIFY TO JOHNSON UTILITIES THAT THE ROUGH GRADE IS WITHIN 6 INCHES OF FINAL GRADE PRIOR TO THE UTILITY ISSUING A "NOTICE TO PROCEED".
4. THE CONTRACTOR IS REQUIRED TO NOTIFY ALL WATER USERS THAT COULD BE AFFECTED BY A POSSIBLE SERVICE INTERRUPTION OR INCONVENIENCE DURING CONSTRUCTION AND IS REQUIRED TO PROVIDE EACH NOTIFIED WATER USER WITH A PHONE NUMBER AT WHICH THE CONTRACTOR CAN BE REACHED IN THE EVENT OF CUSTOMER INQUIRY.
5. IF NEW CONSTRUCTION REQUIRES THE WATER TO BE SHUT OFF TO MAKE TRENCHES TO THE EXISTING SYSTEM, THE CONTRACTOR SHALL PROVIDE JOHNSON UTILITIES WITH A WRITTEN SCHEDULE OF THE PROPOSED CONNECTIONS AT LEAST 48 HOURS PRIOR TO THE START OF SUCH TRENCHING. HOWEVER, NO WATER IS TO BE TURNED OFF UNTIL ALL AFFECTED WATER USERS HAVE BEEN NOTIFIED BY THE CONTRACTOR OF THE SCHEDULE. THE UTILITY APPROVED TURN OFF NOTICES SHALL BE GIVEN OUT A MINIMUM OF FOUR (4) HOURS BEFORE THE WATER IS TO BE TURNED OFF. NO CONNECTION TO THE EXISTING JOHNSON UTILITIES SYSTEM WILL BE PERMITTED ON ANY WORKDAY AFTER 10:30 A.M. OR ON ANY SATURDAY OR SUNDAY, UNLESS PRIOR APPROVAL HAS BEEN OBTAINED IN WRITING FROM JOHNSON UTILITIES. TRENCHES TO EXISTING WATER MAINS WILL NOT BE ALLOWED UNTIL BACTERIA RESULTS FOR NEW WATER LINES ARE REPORTED NEGATIVE.
6. THE CONTRACTOR SHALL PROVIDE JOHNSON UTILITIES WITH A BACK FLOW PREVENTION PROGRAM A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO COMMENCING ANY WATER LINE CONSTRUCTION.
7. ALL WATER MAINS ARE TO BE INSPECTED BY JOHNSON UTILITIES BEFORE BACKFILL. FINAL ACCEPTANCE WILL NOT BE GRANTED WITHOUT A SIGNED RELEASE FROM THE JOHNSON UTILITIES' CONSTRUCTION INSPECTOR STATING THAT THE INSPECTION HAD BEEN PERFORMED AND THAT THE WORK WAS ACCEPTABLE.
8. THE DEVELOPER/CONTRACTOR IS TO PAY FOR ALL WATER CONSTRUCTION INSPECTION FEES. ALL FEES ARE TO BE PAID IN FULL BEFORE THE ACCEPTANCE OF ANY NEW WATER SYSTEM BY JOHNSON UTILITIES.
9. THE CONTRACTOR SHALL NOTIFY JOHNSON UTILITIES FOUR (4) DAYS IN ADVANCE FOR SCHEDULING WATER MAIN TESTING. JOHNSON UTILITIES WILL NOTIFY A.D.E.G. FOR LINE CHARACTERIZATION TESTS.
10. AFTER THE PAVING & CURBS HAVE BEEN INSTALLED, THE JOHNSON UTILITIES' CONSTRUCTION INSPECTOR WILL CHECK VALVE RESERS AND FREE HYDRANTS FOR OPERATION. MAL-FUNCTIONING UNITS ARE TO BE REPAIRED OR RELIQUISHED BY THE CONTRACTOR.
11. FINAL ACCEPTANCE WILL NOT BE GRANTED UNTIL THE PRE CERTIFICATION, THE BACKFILL CERTIFICATION, THE VALVE INSTALLATION CERTIFICATION, THE PASSING OF MICROBIOLOGICAL TESTS AND THE A.D.E.G. CERTIFICATION OF APPROVAL TO GREAT" HAVE BEEN RECEIVED AND ACCEPTED BY JOHNSON UTILITIES. "AS BUILT" PLANS ARE TO BE PROVIDED TO JOHNSON UTILITIES BY THE CONTRACTOR BEFORE ACCEPTANCE BY JOHNSON UTILITIES (THREE (3) XEROX COPIES ARE REQUIRED BY THE UTILITY).
12. ALL CONSTRUCTION WATER WILL BE WETTED WITH AN APPROPRIATE SIZE WATER METER AND BACKFLOW PREVENTER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE WATER METER AND BACKFLOW PREVENTER. THE CONTRACTOR SHALL CHECK WITH JOHNSON UTILITIES FOR AVAILABILITY OF THESE ITEMS.
13. THE CONTRACTOR SHALL HAVE ALL WATER VALVES IDENTIFIED AND LOCATED PRIOR TO PAVING AND SHALL HAVE ALL VALVE BODIES SET TO FINAL GRADE PRIOR TO PAVING.
14. ALL CURB STOPS SHALL BE LOCATED AND PROTECTED DURING ALL PHASES OF CONSTRUCTION.
15. WATER SERVICES ARE TO REMAIN MARKED DURING CONSTRUCTION, AND SERVICES ARE TO BE INSTALLED IN DRAINAGEWAYS OR APPROX TO DRAINAGEWAYS ANY RELOCATION OF SERVICES ARE TO BE BY THE FUTURE LOT OWNER, INCLUDING HEIGHT ADJUSTMENTS. INDIVIDUAL LOT DEVELOPERS OR BUILDERS WILL BE REQUIRED TO INSTALL A CUTOFF VALVE WITHIN 18 INCHES OF THE METER ON THE CUSTOMER'S SIDE IN ACCORDANCE WITH THE JOHNSON UTILITIES' STANDARDS.
16. THE PAVING CONTRACTOR IS TO MARK THE TOP OF CURBS WITH "W" AT ALL SENSIBLE LOCATIONS.
17. NO WATER BODIES NOR LIDS SHALL BE INSTALLED WITHIN CONCRETE PAVED DRAINAGEWAYS OR SIDEWALKS.
18. DURING INSTALLATION OF DRAINAGE CROSINGS, JOHNSON UTILITIES RESERVES THE RIGHT TO HAVE THE CONTRACTOR MAKE MODIFICATIONS OF CROSINGS AS JOHNSON UTILITIES DEEMS NECESSARY.
19. ALL INSTALLED MANLINE VALVES ARE TO BE AWWA C500 OR AWWA C509 AND JOHNSON UTILITIES APPROVED.

**PNAL COUNTY NOTES:**

1. DEVELOPER SHALL OBTAIN A PNAL COUNTY RIGHT OF WAY
2. USE PERMIT PRIOR TO ANY WORK BEING PERFORMED WITHIN THE COUNTY RIGHT OF WAY.
3. TRAFFIC CONTROL AND BARRICADING SHALL BE ACCORDING TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES OR PNAL COUNTY REQUIREMENTS. CONTRACTOR TO SUPPLY LIGHTED BARRICADES AT 50' INTERVALS WITH OPEN TRENCH SIGNAGE.
4. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THESE PLANS SHALL BE IN ACCORDANCE WITH THE MAG STANDARD SPECIFICATIONS AND DETAILS.
5. NO TRENCH TO BE LEFT OPEN/UNCOVERED AFTER WORKING HOURS.
6. CONTRACTOR IS RESPONSIBLE FOR BLUE STAKE MARKING DAILY AS CONSTRUCTION IS IN PROGRESS.

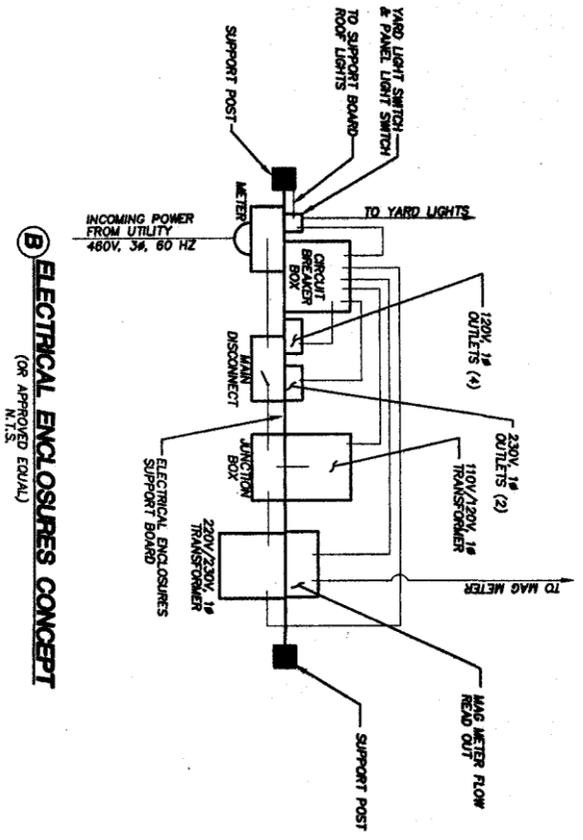
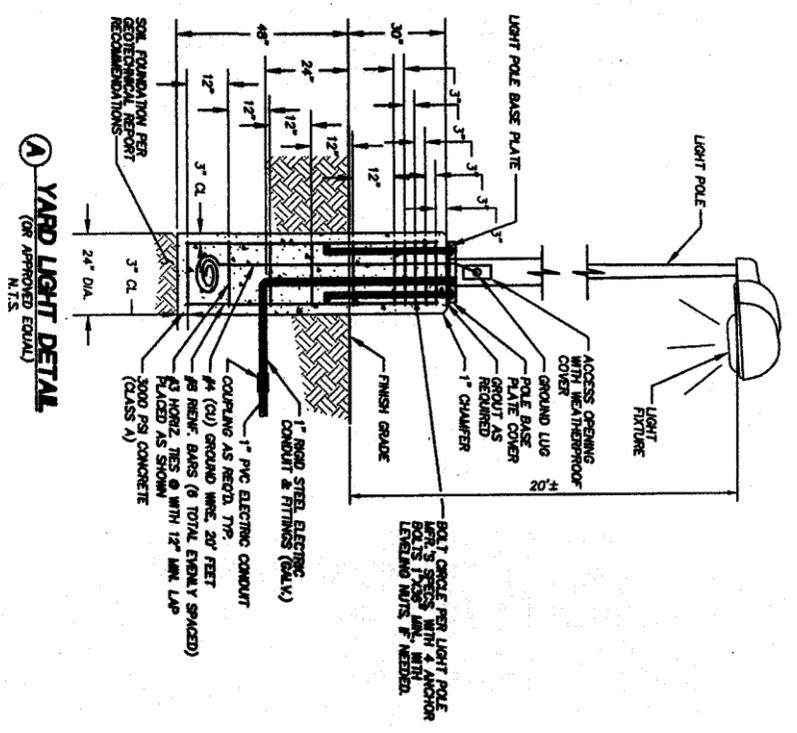
<p>CLIENT/PROJECT</p> <p><b>CRESTFIELD WELL #2</b></p>	<p>DATE</p> <p>MAY 2005</p>	<p>REVISIONS</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>NO.</th> <th>DATE</th> <th>APP.</th> <th>DESCRIPTION</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	APP.	DESCRIPTION					<p><b>SPECIFIC ENGINEERING, LLC.</b></p> <p>8230 E. SHEA BOULEVARD SUITE 220 SCOTTSDALE, ARIZONA 85254 Phone: (480) 596-6335 Fax: (480) 596-6437</p>
NO.	DATE	APP.	DESCRIPTION								
<p>SHEET</p> <p>2 OF 9</p>	<p>WATER NOTES/DETAILS</p>										











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**SPECIFIC ENGINEERING, LLC.**

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CLIENT/PROJECT: **CRESTFIELD WELL #2**

TITLE: **ELECTRIC DETAILS**

SHEET: **7 OF 9**



