LEAK DETECTION / LOCATION SURVEY REPORT
FOR THE
CITY OF GARDEN RIDGE
COMAL COUNTY, TEXAS

March 1, 1996 -- April 30, 1996

By

John E. Gapinski and James R. Shipley
of the
EDWARDS AQUIFER AUTHORITY
Division of Planning and Environmental Management
Leak Detection/Location Program
August, 1996

Edwards Aquifer Authority
1615 N. St. Mary's
P. O. Box 15830
San Antonio, Texas 78212-9030
210-222-2204

EDWARDS AQUIFER AUTHORITY

6.25-7.5

August 28, 1996

Mayor Jay Millikin
City of Garden Ridge
9357 Schoenthal Road
San Antonio, Texas 78266-1839

Dear Mayor Millikin:

We are pleased to submit this final report of the leak detection survey performed on City of Garden Ridge water distribution system. This report lists findings by separate categories for your convenience.

The Edwards Aquifer Authority (Authority) appreciates the cooperation and assistance you have provided during the survey. Special thanks to Jeff Brown for his attention and patience during the survey. The Authority hopes that the information provided herein will be beneficial to the City in identifying and targeting areas of actual water loss and potential water loss.

This survey has demonstrated the water saving potential of the Leak Detection Program. Maintaining the best possible program is vital in order to continue the successes realized. For this reason, the Authority is soliciting your comments, both positive and negative, and any suggestions you may have on how to improve our program.

Please respond to this request candidly, as the Authority cannot improve on deficiencies or support positive measures without the knowledge of such conditions.

Please convey our commendations and thanks to Mariano Troncoso and Scott Wood for their assistance in this project. The Edwards Aquifer Authority sincerely appreciates your water conservation efforts. Should you require additional information regarding this report or have any water related questions, please do not hesitate to call.

Sincerely,

John E. Gapinski
Leak Detection Technician I

James R. Shipley
Leak Detection Technician II

JEP:JRS/ bmc
Enclosures

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SUMMARY

On December 21, 1995, the Edwards Aquifer Authority (EAA) received a request from the City of Garden Ridge to perform a leak detection / location survey on its water distribution system. A pre-survey conference was held February 21, 1996, at the City of Garden Ridge City Hall to discuss the work to be performed. It was agreed that EAA would perform sonic leak detection on all available access points and computerized leak location as needed. A final report, including any unusual system condition found and an updated master water plat would be submitted to the City at the conclusion of the survey.

John E. Gapinski of EAA began the survey on March 1, 1996. The survey was concluded on April 30, 1996. Over the course of the survey, EAA surveyed a total of 914 access points including 696 customer service connections, 71 fire hydrants, 136 valves, and 11 other access points covering 19.09 miles of distribution main.

Mr. Gapinski detected 15 utility side leaks and 11 customer side leaks for a total of 26 leaks. The utility side leaks included 10 service leaks, 2 meter box leaks, 2 main leaks, and 1 fire hydrant leak. EAA estimates 69,016 gallons of water per day has been saved by the repair of 15 utility side leaks as of May 21, 1996. The leaks discovered during the survey range from 28,368 gallons per day to small meter box leaks.

As part of the survey, EAA located 47 valves of various types, 200 services, 11 fire hydrants, and 11,150 feet of main not shown on the master water plats. EAA surveyors were unable to locate 20 valves of various types shown on the master water plats. An additional 2 items were discovered to need some type of repair or adjustment.

DISCUSSION

A. Total Access Points Surveyed: 914

The following is an outline of the various access points used during the survey:

Customer Service Connections:	696
Main Valves:	136
Fire Hydrants:	71
Others:	11

B. Total Miles of Distribution Main Surveyed: 19.09

C. Total Leaks Detected: 26

Service line, valve, main, and fire hydrant leaks were located by acoustic leak detection or by visual inspection. Meter box leaks and customer side leaks were located through house to house surveying.

1. Service Leaks: 10
2. Customer Leaks: 11

A detailed listing of these leaks is recorded in appendices **A** and **B**. Separate appendices are provided for each category of leak.

3. Fire Hydrant Leaks: 1

9111 Garden Ridge Dr.	Repaired 3/25/96	1,440 GPD

4. Meter Box Leaks: 2

21810 Tommy Trail	Repaired 4/24/96	9 GPD
20802 Woodland Cove	Repaired 4/16/96	43 GPD

5. Main Leaks: 2

8110 Park Lane Dr.	Repaired 4/23/96	15,840 GPD
Garden North Dr. Lot 3	Repaired 4/22/96	15,840 GPD

D. Detected Utility Side Leaks Not Repaired, as of May 21, 1996: 0

E. Total Estimated Water Saved by Repair of Detected Utility Side Leaks In Gallons Per Day as of, May 21, 1996: 69,016

Leakage estimates for main line, service line, fire hydrants, and meter box leaks are based on hole size and system pressure in pressure per square inch. This information was furnished by City of Garden Ridge personnel when EAA was not on site at the time of repair. Totals are only recorded for leaks repaired as of May 21, 1996 with estimates.

Service Leaks	42,324 GPD
Fire Hydrant Leaks	1,440 GPD
Meter Box Leaks	52 GPD
Main Leaks	25,200 GPD

Customer leaks were generally small. No attempt was made to estimate this leakage. Customers were notified by doortag or in person when possible or will be notified by City of Garden Ridge personnel.

F. Field Survey Findings Vs. Master Water Plats.

1. Water system access points that could not be located: 20

Main Line Valves:	18
Blow Off Valves:	2

Suspected locations were surveyed by EAA with a ferromagnetic detector to locate buried valves. When successful, these locations were marked. It is conceivable that additional valves remain to be located within the system. All valve box lids located were painted blue.

A list of these items are included in appendix **D.**

2. Valves located, but not shown on plats: 47

Flush Valves	1
Main Valves	38
Blow Offs With Valves	8

A list of these valves is included in appendix **C.**

3. **Feet of main located, but not shown on plats: Approximately 11,150'**

West of Cedar Branch	1,300'
Bat Cave Road	600'
Plum Ranch	600'
Gardenia Bend	2,000'
Cedar Branch	500'
Laurel Ln.	300'
FM 2252	2,000'
FM 3009	800'
Primrose	200'
Azalea Circle	600'
Aster Circle	900'
Meadow Rue	700'
Hoya Ln.	650'

4. **Fire hydrants located, but not shown on plats: 11**

Fire Hydrants With Valves:	10
Fire Hydrants Without Valves:	1

A list of these fire hydrants is included in appendix **C.**

G. Miscellaneous Maintenance Needed

8336 Park Lane Dr.	Fire Hydrant Bonnet Cracked.
9340 Cinchona Trail	Curb Stop Broken.

H. Revisions To The Master Water System Distribution Plats Included With This Report

The seven 24" x 36" Water Distribution Plats furnished by the City of Garden Ridge has been revised to reflect what was found in the field survey. All services, valves, fire hydrants, mains, and meter assemblies located were added to the plats. Incorrect services and valve locations were changed on these plats.

Abbreviations Used on the Revised Distribution System Plats:

UTL	Unable To Locate
FH	Fire Hydrant Without Valve
FHWV	Fire Hydrant With Vale
V	Main Valve
S	Water Service Surveyed

All mains were surveyed from all available access points.

All valves located were surveyed. When direct contact could not be made, a probe rod was used.

Fire hydrants labeled as fire hydrants without lead valves are hydrants where the lead valve could not be located or does not exist.

Any item circled and highlighted in yellow on the plats indicates that it was added, could not be located, or needs repair. All items are labeled on the plats.

All mains, services, fire hydrants, and valves added to the plats are for access point accounting. The location and placement of these items on the plats are intended to indicate what was actually found during the field survey. Placement of main valves on the plat is the surveyor's best guess of what they control. Every effort was made to ensure the accuracy of these plats, but The Edwards Aquifer Authority does not guarantee their accuracy.

RECOMMENDATIONS AND COMMENTS

Revise master water distribution plats from "As built" plans, EAA plats, and utilizing the knowledge and expertise of long term field employees. Master plats should show locations of all main valves, fire hydrants, blow off valves, drain or flush valves, air relief valves, and pressure regulating valves. Revised plats should be made available to the field maintenance staff for use in the operation and maintenance of the water distribution system.

Implement an ongoing in-house main line valve preventive maintenance program for inspection and operation of all system valves. All distribution system valves should be located, operated, repaired or replaced as needed on a routine basis. The use of valve markers are recommended on valves subject to being lost or buried.

All valves should be checked to verify the are in the open position. Direction the valves opens should be recorded and the valve box lids marked accordingly to facilitate future system maintenance.

The time spent on lost, buried, or non-operational valves, and/or the flushing of fire hydrants to reduce pressure and volume to effect leak repair is an additional major source of water loss in leak repair.

Implement an ongoing fire hydrant preventive maintenance program in-house or in conjunction with the local fire department. All hydrants should be inspected, flushed, lubricated, and painted on a routine basis. Lead valves should be installed as part of the installation on all new or replacement fire hydrants.

Review the existing water distribution system and planned water system improvements to ensure sufficient access points are in place to facilitate future leak detection/ location surveys.

Consider ductile iron pipe for the primary main line material used for new installation and main replacement. Ductile iron pipe has a proven history of long service life and its sound carrying characteristics for leak detection are far superior to any other type of pipe material. As the production cost of water increase, the need for routine system-wide leak detection surveys will also increase. Leak sounds generated in metallic pipe are louder and have a tendency to travel further than those developed in non-metallic pipe.

Establish accounting system for water used for fire fighting, street cleaning, main flushing, etc.

Placement of well flow meters should be checked against meter manufacturer specifications for recommended straight pipe lengths both upstream and downstream of meter. All meters have limitations due to piping configurations. An improperly located or installed meter will degrade the inherent specified accuracy below an acceptable level. Meters installed in close proximity to a bend, valve, or other fitting that is likely to disturb the flow conditions at the meter could invalidate the manufactures meter calibration. EAA recommends that all well meters be tested **in place** yearly for accuracy.

During the course of the survey, EAA noted numerous meters in need of replacement. We recommend the initiation of a system wide meter maintenance program. System meters should be upgraded through an ongoing meter change out program. This program should involve replacing a specified number of meters each period with new or rebuild meters, until all system meters have been replaced.

All meter installations should be reviewed to determine whether the meter is properly sized and the correct type for the current use and flow demand.

Water meters are designed to deliver a maximum flow for a short period and a lower flow for long periods without sustaining damage or above normal wear. If a meter is operating outside its intended range, it cannot register all flow, even though it may be calibrated. We recommend that a percentage of large meters be tested yearly for accuracy.

We wish to express our appreciation for the assistance and cooperation we received from the management and staff of the City of Garden Ridge. Management's professional and progressive approach to serving the needs of their customers while helping to conserve a valued resource is commendable. All personnel we worked with were highly trained, meticulous in the performance of their duties, and had a very positive attitude about their jobs and the customers they serve. Your efforts and timely repair of the leaks discovered in this survey have saved a significant amount of precious water.

The Edwards Aquifer Authority appreciates the active participation of Jeff Brown, Mariano Troncoso, and Scott Wood in this survey. Their assistance contributed greatly to its success. Please convey our commendations and thanks to all the staff for their diligence in helping to conserve the Edwards Aquifer.

John E. Gapinski
Leak Detection Technician I

James R. Shipley
Leak Detection Technician II

CITY OF GARDEN RIDGE
SERVICE LINE LEAK LIST / 1996
APPENDIX A

Line #	Date	Address	Loss G.P.M.	Date Repaired	Comments	Recheck Date
1	4/11	9392 Garden Ridge Drive	360	4/24	Service	4/29
2	4/16	9182 Garden Ridge Drive	720	4/24	Service	4/29
3	4/23	9526 Sumac Circle	360	5/3	Service	5/21
4	4/21	9337 Teakwood Lane	9,216	5/2	Service	5/21
5	4/10	20740 Timber Rose Drive	1,440	4/17	Service	4/29
6	4/21	9212 Blue Bell Drive	720	5/14	Service	5/21
7	4/2	9474 Garden Ridge Drive	60	4/8	Service	4/29
8	4/9	7977 Garden North Drive	360	4/24	Service	4/29
9	4/24	21630 Forest Waters Circle	28,368	4/23	Service	4,29
10.	4/16	9445 Sumac Lane	720	4/22	Corporation Washer	4/29

CITY OF GARDEN RIDGE
CUSTOMER SIDE LEAK LIST / 1996
APPENDIX B

Line #	Date	Address	
1	4/29	9159 Garden Ridge Drive	Notified
2	4/29	9111 Garden Ridge Drive	Notified
3	4/29	8749 Garden Ridge Drive	
4	4/3	9153 Sundew Circle	Notified
5	4/3	20473 Blazing Star Trail	Notified
6	4/29	9392 Cinchona Trail	Notified
7	4/24	8435 Twisted Oaks	Door Tag
8	4/18	21784 Tommy Trail	Notified
9	4/30	9502 Gloxinia Drive	Notified
10	4/24	9355 Osage Circle	
11	4/30	9404 Magic Falls	

CITY OF GARDEN RIDGE
ADDED TO PLATS / 1996
APPENDIX C

Line #	Address	Added	Number Added
1	Garden North Dr. Lots 7-10-14-15-22 -25-31-35-36	Services	9
2	Parkview Dr.	Services	2
3	Valley Park Dr.	Services	3
4	Park Lane Dr.	Services	5
5	Bat Cave Rd.	Services	1
6	Garden North Dr. @ Ridge North Dr.	Valves	2
7	Garden North Dr. Lot 34	Valve	1
8	21635 Valley Park Dr.	Valve	1
9	21855 Bat Cave Rd.	Valve	1
10	Tommy Trail Dr. Lots 21-20	Blow Off	1
11	8110 Park Lane Dr.	Blow Off	1
12	Park Lane Dr. @ Bat Cave Rd.	1 Blow Off 1 Main Valve	2
13	21640- 21729-21110-21120-21349 Forest Waters Circle	Services	5
14	20860-20811 Glen Cove Circle	Services	2
15	21490 -21825 Fairview Dr.	Services	2
16	Golden Rod Ln.	Services	8
17	Sumac Circle	Service	1

CITY OF GARDEN RIDGE
ADDED TO PLATS / 1996
APPENDIX C

Line #	Address	Added	Number Added
18	9409-9424-9515-9546 Teakwood Ln.	Services	4
19	Bat Cave Rd. @ 21450 Forest Waters Circle	Fire Hydrant With Valve	1
20	21360 Water Wood Dr.	Valve	1
21	9020 Sumac Cove	Blow Off	1
22	20802-20805-20806-20810 Woodland Cove	Services	4
23	9279 Blazing Star Trail	Service	1
24	20473 Grass Creek Dr.	Service	1
25	20232 Bat Cave Rd.	Service	1
26	9235 Cinchona Trail	Service	1
27	20666 Timber Rose Dr.	Service	1
28	9403-9415-9422 Gloxinia Dr.	Services	3
29	Hoya Lane	Services	5
30	Garden Ridge Dr.	Services	18
31	Plum Ranch	Services	10
32	Azalea Gate	Services	6
33	Hickory Bend	Services	20
34	Magic Falls	Services	5

CITY OF GARDEN RIDGE
ADDED TO PLATS / 1996
APPENDIX C

Line #	Address	Added	Number Added
36	Gardenia Bend	Services	16
37	Hoya Ln.	Services	5
38	West of Cedar Branch	2 Valves 1 Fire Hydrant With Valve 1 Service 1,300' 8" Main	4
39	Bat Cave Rd.	1 Valve 1 Blow Off 600' Main	2
40	Laurel Ln. @ Gardenia Bend	Valve	1
41	Gardenia Bend @ Cedar Branch	Valve	1
42	Gardenia Bend Lots 21-18	Valves	2
43	Across from Lot 13 Cedar Branch	Valve	1
44	South End of Cedar Branch	Valve	1
45	9525 Gardenia Bend	Valve	1
46	Hoya Ln. @ Azalea Gate	Valve	1
47	Across from Lot 17 Cedar Branch	Valve	1
48	Gardenia Bend @ Azalea Gate	Valve	1
49	Hickory Bend @ Cedar Branch	Valves	2
50	Hickory Bend @ Magic Falls	Valves	2
51	Gardenia Bend Lot 4	Fire Hydrant With Valve	1

CITY OF GARDEN RIDGE
ADDED TO PLATS / 1996
APPENDIX C

Line #	Address	Added	Number Added
52	Gardenia Bend Lot 22	Fire Hydrant With Valve	1
53	Cedar Branch Lot 10	Flush Valve	1
54	Plum Ranch	Fire Hydrant With Valve 600' Main	1
55	20810 Woodland Cove	Fire Hydrant	1
56	Plum Ranch South of Azalea Gate	1 Valve 1 Blow Off	2
57	Gardenia Bend	2,000' Main	
58	Cedar Branch	500' Main	
59	Laurel Ln.	300' Main	
60	Magic Falls	Blow Off	1
61	FM 2252	4 Fire Hydrants With Valves 6 Valves 1 Service 2,000' 12" Main	11
62	FM 3009	3 Valves 800' Main	3
63	Primrose	1 Blow Off 3 Services 200' Main	4
64	Azalea Circle	1 Blow Off 7 Services 600' Main	8

CITY OF GARDEN RIDGE
ADDED TO PLATS / 1996
APPENDIX C

Line #	Address	Added	Number Added
65	Aster Circle	1 Blow Off 9 Services 1 Fire Hydrant With Valve 900' Main	11
66	Meadow Rue	9 Services 700' Main	9
67	Hoya Ln.	2 Valves 6 Services 650' Main	8
68	Timber Rose Dr. @ Teakwood Ln.	Valve	1
69	9307 Teakwood Ln.	Valve	1

CITY OF GARDEN RIDGE
UNABLE TO LOCATE / 1996
APPENDIX D

Line #	Address	Type	Number
1	Garden North Dr. @ Bat Cave Rd.	Valve	1
2	Garden North Dr. Lot 17	Valve	1
3	Garden North Dr. Lot 25	Valve	1
4	Park View Dr.	Valve	1
5	Bat Cave Rd. @ Park Ln.	Valve	1
6	8445-8435 Twisted Oaks	Valves	2
7	Bat Cave Rd. @ 21510 Forest Waters	Valves	2
8	Golden Rod Ln. @ Forest Waters Circle.	Valve	1
9	21874 Fairview Dr.	Blow Off	1
10	Timber Rose Dr. @ Golden Rod Ln.	Valve	1
11	Sumac Cove @ Sorrel Ln.	Valve	1
12	9215 Bluebell Dr.	Valve	1
13	Blazing Star Trail @ Grass Creek Rd.	Valves	2
14	Blazing Star Trail @ Bat Cave Rd.	Blow Off	1
15	Laurel Ln. @ Gloxinia Dr.	Valve	1
16	Timber Rose Dr. @ Bluebell Dr.	Valve	1
17	9445 Sumac Ln.	Valve	1
18	Park Lane Dr. @ Park Lane Court	Valve	1

CITY OF GARDEN RIDGE
UNABLE TO LOCATE / 1996
APPENDIX D

Line #	Address	Type	Number
19	8258 Garden North Dr.	Valve	1
20	Gloxinia Dr. West of FM 3009	Valve	1