

EDWARDS UNDERGROUND
WATER DISTRICT

REPORT 95-05

LEAK DETECTION / LOCATION SURVEY REPORT

FOR

CITY OF LIVE OAK

LIVE OAK, TEXAS

MARCH 23, 1995 - APRIL 7, 1995



EDWARDS UNDERGROUND
WATER DISTRICT

6.25-7.5

June 29, 1995

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Mr. Roger D. Aguillon
Superintendent Of Utilities
City Of Live Oak
8001 Shin Oak
Live Oak, Texas 78233

Dear Mr. Aguillon:

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

The Edwards Underground Water District (District) appreciates the cooperation and assistance you have provided during the survey. Special thanks to Gilbert Herrera and the staff for their attention and patience during the survey. The District hopes that the information provided herein will be beneficial to the City of Live Oak 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 District is soliciting your comments, both positive and negative, and any suggestions you may have on how to improve our program.

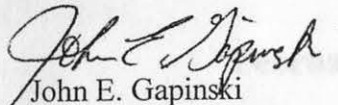
Please respond to this request candidly, as the District cannot improve on deficiencies or support positive measures without the knowledge of such conditions.

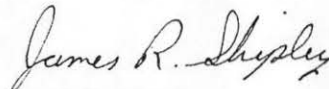


Mr. Roger D. Aguillon
June 29, 1995 - Page 2

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

JEG:JRS/ bmc
Enclosures

010jrs

Edwards Underground Water District
1615 E. St. Marys
P.O. Box 15000
San Antonio, Texas 78212-4000
210-222-2201

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**LEAK DETECTION / LOCATION SURVEY REPORT
FOR THE
CITY OF LIVE OAK
BEXAR COUNTY, TEXAS**

February 7, 1995 -- April 7, 1995

By

John E. Gapinski and James R. Shipley
of the

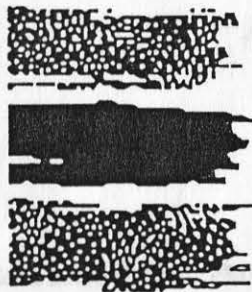
EDWARDS UNDERGROUND WATER DISTRICT

Division of Planning and Environmental Management

Leak Detection/Location Program

May, 1995

- A. Service Leaks
- B. Fire Hydrant Leaks
- C. Water Main Leaks
- D. Customer Side Leaks
- E. Arterial To Main
- F. Unstable To Leaks
- G. Regulator/Valves



ENCLOSURES REPORT

- A. Edwards Under Water System

**Edwards Underground Water District
1615 N. St. Marys
P. O. Box 15830
San Antonio, Texas 78212-9030
210-222-2204**

SUMMARY

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<ul style="list-style-type: none"> A. Service Leaks B. Fire Hydrants Leak C. Meter Box Leaks D. Customer Side Leaks E. Added To Plats F. Unable To Locate G. Repairs Needed 	

ENCLOSURES TO REPORT

- A. Revised Master Water System Distribution Plats

SUMMARY

On May 5, 1992, the Edwards Underground Water District (EUWD) received a request from the City of Live Oak to perform a leak detection / location survey on its water distribution system. A pre-survey conference was held December 14, 1994 at the City of Live Oak Public Works Center to discuss the work to be performed. It was agreed that EUWD 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 EUWD began the survey on February 6, 1995, and the survey was concluded on April 7, 1995. Over the course of the survey, EUWD surveyed a total of 3,062 access points including 2,253 customer service connections, 177 fire hydrants, 551 valves, and 81 other access points covering 27.92 miles of distribution main. Computer leak sound correlation was performed on 19 locations by EUWD.

EUWD surveyors detected 35 utility side leaks and 97 customer side leaks for a total of 132 leaks. The utility side leaks included 27 service leaks, 5 meter box leaks, and 3 fire hydrant leaks. EUWD estimates 27,634 gallons of water per day has been saved by the repair of 35 utility side leaks as of June 8, 1995. The leaks discovered during the survey range from 5,100 gallons per day to numerous small meter box leaks.

As part of the survey, EUWD located 67 valves of various types, 15 fire hydrants, and 500 feet of main not shown on the master water plats. EUWD surveyors were unable to locate 25 valves of various types shown on the master water plats. An additional 11 items were discovered to need some type of repair or adjustment.

DISCUSSION

A. Total Access Points Surveyed: 3,062

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

Customer Service Connections: 2,253

Main Valves: 551

Fire Hydrants: 177

Others: 81

B. Total Miles of Distribution Main Surveyed: 27.92

C. Total Leaks Detected: 132

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

Meter Box: 5

Fire Hydrant: 3

Service: 27

Customer Side: 97

A detailed listing of these leaks is recorded in appendices A through D. Separate appendices are provided for each category of leak.

D. Detected Utility Side Leaks Not Repaired, as of June 8, 1995: 0

E. Total Estimated Water Saved by Repair of Detected Utility Side Leaks In Gallons Per Day as of April 7, 1995: 27,634

Leakage estimates for main line, service line, fire hydrants, and valve leaks are based on hole size and system pressure in pressure per square inch. This information was furnished by City of Live Oak personnel when EUWD was not on site at the time of repair. Totals are only recorded for leaks repaired as of June 8, 1995 with estimates.

Meter Box: 155

Fire Hydrants: 920

Service: 26,559

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 Live Oak personnel.

F. Field Survey Findings Vs. Master Water Plats.

1. Water system access points that could not be located: 25

Main Line Valves: 15

Blow Off Valves: 10

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

A list of these items are included in appendix F.

2. Valves located, but not shown on plats: 67

Main Line Valves: 38

Blow Off Valves: 3

Pressure Regulating Valves: 1

Fire Hydrant Valves: 14

Service Valves: 10

Fire Line Valves: 1

A list of these valves is included in appendix E.

3. Feet of main located, but not shown on plat: 500

Enchanted Oak at Shin Oak Dr.: 300'

Palisades Dr. At Converse Rd. : 200'

4. Fire hydrants located, but not shown on plats: 15

Fire hydrant with valve: 14

Fire hydrant without valve: 1

A list of these fire hydrants is included in appendix E.

G. Miscellaneous Maintenance Needed

Valve Stacks Needing Raise To Grade: 7

Repair Needed: 2

Lids Needed: 2

A list of these items is included in appendix G.

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

The 42" by 42", 1" = 400' Water Distribution Plat furnished by the City of Live Oak has been subdivided into seven 24" by 36", 1" = 200' plats. This enlargement was necessitated by the need to add the surveyor's field notes to the plats.

Abbreviations Used on the Revised Distribution System Plats:

UTL	--	Unable To Locate
NC	--	Needs Cleaning
RTG	--	Raise To Grade
ARV	--	Air Relief Valve
PRV	--	Pressure Regulating Valve
BFP	--	Back Flow Preventor
NR	--	Needs Repair
FHWV	--	Fire Hydrant With Valve
FH	--	Fire Hydrant Without Valve

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.

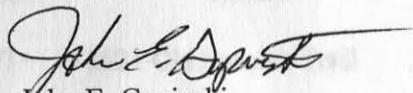
All mains, fire hydrants, water services, and valves added to the plats are for access point accounting. The location and placement of these items on the plats are intended to indicate what was actually found during the field survey. Placement of main valves on the plat is the surveyor's best guess of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

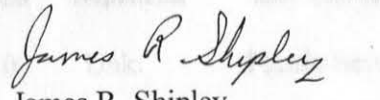
RECOMMENDATIONS AND COMMENTS

- I. Revise master water distribution plats from "As built" plans, EUWD plats, and utilizing the knowledge and expertise of long tern 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 field maintenance supervisors for use in the operation and maintenance of the water distribution system.
- II. 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.
- III. Consider ductile iron pipe for the primary main line material used for new installation and main replacement. As the production cost of water increase, the need for routine systemwide 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. 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 if pipe material.
- IV. Install lead valves as part of the installation on all new or replacement fire hydrants.
- V. 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. EUWD recommends that all well meters and a percentage of large commercial meters be tested in place yearly for accuracy.
- VI. We wish to express our appreciation for the assistance and cooperation we received from the management and staff of the City of Live Oak. 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.

The staff's knowledge, enthusiasm, and professional work habits contributed to the success of this survey.

Your efforts and timely repair of the leaks discovered in this survey have saved a significant amount of precious water. Our thanks to all the staff for your efforts in helping to conserve the Edwards Aquifer.


John E. Gapinski
Leak Detection Technician I


James R. Shipley
Leak Detection Technician II

Line	Date	Address	Leak	Repair	Service	Recheck Date
1	2/7	541 Shady Oak	120	Unk.	Plastic Service	4/27
2	3/10	12801 Whipping Oak	720	3/13	Plastic Service	3/13
3	2/23	12528 Whipping Oak	720	3/9	Plastic Service	3/9
4	2/23	12714 Atlas Hollow	90	3/7	Plastic Service	3/7
5	2/12	11809 Roney Shadow	100	4/14	Plastic Service	3/14
6	2/13	123753 Whipping Oak	4,000	3/14	Plastic Service	3/14
7	2/23	12829 Whipping Oak	2,400	3/14	Plastic Service	3/14
8	2/8	7502 Red Maple	120	3/14	Plastic Service	3/14
9	2/7	7915 Sandy Oak	1440	3/13	CC Adapter	3/13
10	2/27	7814 Sandy Oak	9	3/25	Yoke	3/25
11	2/27	7445 Sandy Oak	90	4/12	Plastic Service	4/12
12	3/20	7915 Emerald Trace	100	3/24	Plastic Service	3/24
13	2/10	12415 Red Oak	1440	2/10	Male Adapter	2/10
14	1/24	11770 Canyon Oak	60	4/20	Shut Service	4/27
15	1/21	11400 Canyon Oak	1440	4/20	Long Service	4/27
16	1/21	11400 Canyon Oak	120	4/12	Short Service	4/27

**CITY OF LIVE OAK
SERVICE LINE LEAK LIST / 1995
APPENDIX A**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Loss G.P.M.</u>	<u>Date Repaired</u>	<u>Comments</u>	<u>Recheck Date</u>
1	2/7	12521 Old Spanish Trail	5,100	Unk.	Plastic Service	4/27
2	2/7	12433 Old Spanish Trail	4,860	Unk.	Plastic Service	4/27
3	2/7	541 Shin Oak	120	Unk.	Plastic Service	4/27
4	3/10	12901 Weeping Oak	720	3/13	Plastic Service	3/13
5	2/23	12528 Sandpiper	720	3/9	Plastic Service	3/9
6	2/23	12714 Moss Hollow	60	3/7	Plastic service	3/7
7	2/22	11809 Rainy Meadow	120	3/14	Plastic Service	3/14
8	2/23	12337 Trailing Oak	4,860	3/14	Plastic Service	3/14
9	2/23	12329 Trailing Oak	2,430	3/14	Plastic Service	3/14
10	2/8	7502 Red Ripple	120	3/14	Plastic Service	3/14
11	2/7	7918 Strudy Oak	1440	3/13	CC Adapter	3/13
12	2/27	7414 Hidden Oak	9	3/23	Yoke	3/30
13	2/27	7445 Strudy Oak	360	4/12	Plastic Service	4/27
14	3/20	7716 Marigold Trace	240	2/24	Plastic service	2/24
15	2/10	City Park	1440	2/10	Male Adapter	2/10
16	3/21	11323 Golden Oak	60	4/20	Short Service	4/27
17	3/21	11314 Lone Shadow	1440	4/20	Long Service	4/27
18	3/21	7605 Gnarled Oak	120	4/12	Short Service	4/27

**CITY OF LIVE OAK
SERVICE LINE LEAK LIST / 1995
APPENDIX A**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Loss G.P.M.</u>	<u>Date Repaired</u>	<u>Comments</u>	<u>Recheck Date</u>
19	3/27	7313 Far West	360	4/17	Plastic Service	4/17
20	3/20	8020 Dry Canyon	60	4/10	Short Service	4/17
21	3/20	7702 Strolling Oak	360	4/6	Short Service	4/6
22	3/20	7709 Strolling Oak	360	4/18	Long Service	4/27
23	2/22	11909 Rainy Meadow	720	4/3	Short Service	4/3
24	2/22	11929 Rainy Meadow	120	4/7	Short Service	4/3
25	3/21	7717 Narrow Pass	120	6/6	Pending	6/8
26	2/27	7405 Oak Marsh	120	4/18	Service	4/27
27	2/16	11904 Lone Shadow	120	4/20	Service	4/27

**CITY OF LIVE OAK
FIRE HYDRANT LEAK LIST
APPENDIX B**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Loss G.P.M.</u>	<u>Date Repaired</u>	<u>Comments</u>	<u>Recheck Date</u>
1	2/9	11309 Welcome Dr.	720	3/7	Replaced Hydrant	3/7
2	2/6	203 Greycliff	100	2/6	Flushed / Reseated	2/6
3	3/20	7434 Oak Marsh	100	3/20	Flushed / Reseated	3/20
4	3/20	7674 Church Oak	9	3/31	Outlet Washer	3/31
5	3/20	11104 Rosier Oak	17	3/20	Carbstop	4/7

**CITY OF LIVE OAK
METER LEAK LIST
APPENDIX C**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Loss G.P.M.</u>	<u>Date Repaired</u>	<u>Comments</u>	<u>Recheck Date</u>
1	2/9	157 Lost Forest	60	3/13	Yoke	3/31
2	2/23	11912 Rainy Meadow	60	3/13	Yoke Washer	3/31
3	3/22	11063 White Sands	9	3/31	Inlet Washer	3/31
4	3/29	7614 Church Oak	9	3/31	Outlet Washer	3/31
5	3/29	11104 Ranger Oak	17	3/30	Curbstop	4/7
6	2/9	12716 Old Spanish Trail		Notified		
7	2/9	12826 Old Spanish Trail				
8	2/9	4531 Russ Oak				
9	2/9	12616 Old Spanish Trail				
10	2/9	2119 La Jolla				
11	2/9	22191 La Jolla		Notified		
12	2/9	245 Whispering Oak				
13	2/9	233 Whispering Oak		Notified		
14	2/9	7841 Village Oak				
15	2/9	12702 Whispering Oak				
16	2/9	7802 South Oak		Notified		
17	2/9	12602 Encinitas Oak		Notified		
18	2/9	241 Mountain View		Notified		

**CITY OF LIVE OAK
CUSTOMER SIDE LEAK LIST
APPENDIX D**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Comments</u>
1	2/9	215 Cherry Wood	
2	2/9	215 Shin Oak	
3	2/9	218 Shin Oak	
4	2/9	106 High Vista	
5	2/9	222 Grey Cliff	Notified
6	2/7	12516 Old Spanish Trail	Notified
7	2/9	12320 Old Spanish Trail	Notified
8	2/9	550 Shin Oak	
9	2/9	12616 Old Spanish Trail	
10	2/9	237 La Jolla	
11	2/9	225 La Jolla	Notified
12	2/9	245 Whispering Oak	Notified
13	2/9	238 Whispering Oak	Notified
14	2/9	7841 Village Oak	
15	2/9	12702 Weeping Oak	
16	2/9	7902 Sturdy Oak	Notified
17	2/9	12402 Enchanted Oak	Notified
18	2/9	304 Mountain Shadow	Notified

**CITY OF LIVE OAK
CUSTOMER SIDE LEAK LIST
APPENDIX D**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Comments</u>
19	2/9	222 Lost Forest	
20	2/21	7509 Leading Oak	
21	2/21	7410 Leading Oak	
22	2/21	12818 Lone Shadow	
23	2/21	7522 Jonquill	Notified
24	2/21	7510 Jonquill	Notified
25	2/21	13010 Lone Shadow	Notified
26	2/21	122 Sandy Oak	
27	2/21	105 Sandy Oak	
28	2/21	117 Little Oak	
29	2/21	105 Little Oak	
30	2/21	12488 Welcome	Notified
31	2/21	7922 Old Spanish Trail	
32	2/21	7910 Old Spanish Trail	
33	2/21	12021 Forest Nook	
34	2/21	12017 Forest Nook	
35	2/21	7502 Red Ripple	Notified
36	2/21	7501 Red Ripple	
37	2/22	12105 Lone Shadow	Notified

**CITY OF LIVE OAK
CUSTOMER SIDE LEAK LIST
APPENDIX D**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Comments</u>
38	2/22	12009 Lone Shadow	Notified
39	2/22	12006 Lone Shadow	Notified
40	2/22	11904 Lone Shadow	Notified
41	2/22	11605 Crooked Oak	Notified
42	2/22	11606 Crooked Oak	Notified
43	2/22	7802 Oak Forest	Notified
44	2/22	7818 Oak Forest	Notified
45	2/22	7821 Oak Forest	Notified
46	2/23	12518 Sand Piper	Notified
47	2/22	12501 Sand Piper	Notified
48	2/23	11928 Rainy Meadows	Notified
49	2/22	7701 Leafy Hollow	Notified
50	2/23	7702 Sage Oak	Notified
51	2/23	12414 Lone Shadow	Notified
52	2/27	12226 Lone Shadow	Notified
53	2/27	7721 Old Spanish Trail	Notified
54	2/27	12210 Hollow Glen	Notified
55	2/27	7701 Old Spanish Trail	Notified
56	2/27	7702 Old Spanish Trail	Notified

**CITY OF LIVE OAK
CUSTOMER SIDE LEAK LIST
APPENDIX D**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Comments</u>
57	2/27	7608 Old Spanish Trail	Notified
58	2/27	7550 Old Spanish Trail	
59	2/27	7542 Old Spanish Trail	Notified
60	2/27	7538 Old Spanish Trail	Notified
61	2/27	7521 Old Spanish Trail	Notified
62	2/27	7510 Old Spanish Trail	Notified
63	2/27	7406 Old Spanish Trail	
64	3/20	7513 Wishing Oaks	Notified
65	3/20	7521 Wishing Oaks	Notified
66	3/20	7542 Wishing Oaks	Notified
67	3/20	12301 Northledge	Notified
68	3/20	7610 Antique Oak	Notified
69	3/20	7629 Antique Oak	Notified
70	3/20	11906 Northledge	Notified
71	3/20	7422 Hidden Oak	
72	3/20	7417 Hidden Oak	Notified
73	3/20	11934 Northledge	
74	3/20	11942 Northledge	Notified
75	3/20	7530 Leafy Hollow	Notified

**CITY OF LIVE OAK
CUSTOMER SIDE LEAK LIST
APPENDIX D**

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<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Comments</u>
76	3/20	11620 Lone Shadow	Notified
77	3/20	7709 Marigold Trace	
78	3/22	7705 Marigold Trace	Notified
79	3/22	7613 Marigold Trace	Notified
80	3/22	7902 Dry Canyon	Notified
81	3/22	7716 Cool Sand	Notified
82	3/27	7545 Narrow Pass	
83	3/22	11095 Lone Shadow	
84	3/29	11309 Golden Oak	
85	3/29	7814 Hunter Oak	Notified
86	3/29	11061 White Sands	Notified
87	3/29	11112 Ranger Oak	
88	3/29	11088 Ranger Oak	Notified
89	3/29	7426 Mountain Oak	Notified
90	3/29	7415 Mountain Oak	
91	3/29	7509 Valley Oak	
92	3/29	7513 Valley Oak	
93	3/29	7309 Sage Oak	Notified
94	3/29	12201 Lucky Oak	Notified

**CITY OF LIVE OAK
CUSTOMER SIDE LEAK LIST
APPENDIX D**

Page 6 of 6

<u>Line #</u>	<u>Date</u>	<u>Address</u>	<u>Comments</u>	<u>Number Added</u>
95	3/29	12206 Lucky Oak	Notified	2
96	3/29	12601 Wilderness Trail	Main Valve	1
97	3/29	12513 Far West	1 Service Valve, 1 Fire Hydrant 1-gate, 1 Main Valve	3
4	2	10000 West of Sandpaper	2 Main Valves	2
5	2	10000 West of Sandpaper and 10000 West	1 Service Valve	3
6	2	10000 West of Sandpaper	1 Main Valve	3
7	2	10000 West	1 Main Valve, 1 Fire Hydrant with valve	2
8	2	10000 West of Sandpaper Dr. and Farroll	3 Main Valves, 1 Fire Hydrant with valve	4
9	2	10000 West of Sandpaper	Blow Off	1
10	4	10000 West of Sandpaper	10000 West of Sandpaper	4
11	4	10000 West of Sandpaper	Main Valve	1
12	4	10000 West of Sandpaper	Fire Hydrant with valve	1
13	4	10000 West of Sandpaper	2 Main Valves	2
14	4	10000 West of Sandpaper	Main Valve	1
15	4	10000 West of Sandpaper	1 Main Valve, 1 Blow Off	3
16	4	10000 West of Sandpaper	Fire Hydrant with valve	1

**CITY OF LIVE OAK
ADDED TO PLATS
APPENDIX E**

Page 1 of 3

<u>Line #</u>	<u>Plat #</u>	<u>Address</u>	<u>Added</u>	<u>Number Added</u>
1	2	Shin Oak @ Woodview	2 Main Valves	2
2	2	Lone Shadow @ Red Ripple	Main Valve	1
3	2	IH35 between Shin Oak and Sandpiper	1 Service Valve, 1 Fire Line Valve, 1 Main Valve	3
4	2	IH35 west of Sandpiper	2 Main Valves	2
5	2	IH35 between Sandpiper and Topperwein	3 Service Valves	3
6	2	IH35 @ Farrell Rd.	3 Main Valves	3
7	2	Farrell Rd.	1 Main Valve, 1 Fire Hydrant with valve	2
8	2	IH35 between Farsight Dr. and Farrell	3 Main Valves, 1 Fire Hydrant with valve	4
9	2	IH35 @ Albrecht	Blow Off	1
10	4	Pat Booker Rd. west of Village Oak	PRV, 3 Service Valves	4
11	4	Oak Terrace @ Village Oak	Main Valve	1
12	4	Village Oak south of Oak Terrace	Fire Hydrant with valve	1
13	4	Oak Terrace between Village Oak and Shin Oak	2 Main Valves	2
14	4	Sturdy Oak north of Weeping Oak	Main Valve	1
15	4	Converse Rd. @ Shin Oak	2 Main Valves, 1 Blow Off	3
16	4	Shin Oak east of City Hall	Fire Hydrant with valve	1

**CITY OF LIVE OAK
ADDED TO PLATS
APPENDIX E**

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<u>Line #</u>	<u>Plat #</u>	<u>Address</u>	<u>Added</u>	<u>Number Added</u>
17	4	Shin Oak east of City Hall	3 Service Valves	3
18	4	Converse Rd. @ Palisades Dr.	Main Valve, 200' Main	2
19	4	Palisades Dr. between Converse Rd. and Oak Terrace	1 Fire Hydrant with valve, 1 Main Valve	2
20	4	Palisades Dr. west of Oak Terrace	Main Valve	1
21	4	Harper Valley @ Enchanted Oak	Main Valve	1
22	5	Cherrywood	Main Valve	1
23	5	Shin Oak @ Village Oak	Main Valve	1
24	5	Welcome Dr. @ Greycliff	Main Valve	1
25	5	Lone Shadow @ Village Oak	Main Valve	1
26	5	Enchanted Oaks	300' 12" AC, 1 Valve, 3 Fire Hydrants with valves	5
27	5	Old Spanish Trail @ Whispering Oaks	2 Main Valves	2
28	5	Splintered Oak	1 Main Valve, 1 Fire Hydrant	2
29	5	City Park #1	1 Main Valve, 1 Blow Off, 1 Fire Hydrant with valve	3
30	5	Lone Shadow @ Grass Hollow	Fire Hydrant with valve	1
31	5	Lone Shadow @ Rainbow Falls	Fire Hydrant with valve	1
32	5	Old Spanish Trail near tank	Fire Hydrant with Valve	1
33	5	Leafy Hollow @ Langacre	Main Valve	1

**CITY OF LIVE OAK
ADDED TO PLATS
APPENDIX E**

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<u>Line #</u>	<u>Plat #</u>	<u>Address</u>	<u>Added</u>	<u>Number Added</u>
34	5	Marigold Trace @ Pump Station	2 Main Valves	2
35	5	409 Greycliff	Fire Hydrant	1
36	6	Village Oak @ Toepperwein Rd.	Main Valve	1
37	6	Toepperwein Rd. south of Village Oaks	2 Main Valves	2
38	6	Church Oak @ Toepperwein Rd.	Main Valve	1
7	4	North of Pat Barker Rd. off Pat Barker	1 Main Valve, 1 Blow Off	2
8	4	South of Pat Barker west of Village Oak	Main Valve	1
9	4	Highways Dr. south of Oak Terrace	Main Valve	1
10	5	Angel Oak	Blow Off	1
11	5	Shady Oak	Blow Off	1
12	5	Cross Hollow	Blow Off	1
13	5	Lenny Oaks	Blow Off	1
14	5	McNew Oaks	Blow Off	1
15	5	Marigold Trace	Blow Off	1
16	5	Northern Pine @ White House	Main Valve	1
17	5	12705 Lane Shadow	Main Valve	1
18	5	Cross Hollow @ Lane Shadow	Main Valve	1
19	6	Toepperwein Rd. south of Village Oak	Main Valve	1
20	6	Toepperwein Rd. @ Pat Barker Blvd	2 Main Valves	2

**CITY OF LIVE OAK
UNABLE TO LOCATE
APPENDIX F**

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<u>Line #</u>	<u>Plat #</u>	<u>Address</u>	<u>Type</u>	<u>Number</u>
1	1	North side of Pat Booker east of IH 35	2 Main Valves	2
2	2	IH 35 at Shin Oak	Main Valve	1
3	2	North end of Lone Shadow	Blow Off	1
4	2	IH 35 between Shin Oak and Sandpiper	1 Main Valve, 1 Blow Off	2
5	3	IH 35 @ Toepperwein Rd.	Main Valve	1
6	4	Lone Shadow @ White Sands	1 Main Valve, 1 Blow Off	2
7	4	North of Pat Booker Rd. @ FM 1604	1 Main Valve, 1 Blow Off	2
8	4	South of Pat Booker west of Village Oak	Main Valve	1
9	4	Palisades Dr. south of Oak Terrace	Main Valve	1
10	5	Regal Oak	Blow Off	1
11	5	Shady Oak	Blow Off	1
12	5	Grass Hollow	Blow Off	1
13	5	Ivory Oaks	Blow Off	1
14	5	Hollow Oaks	Blow Off	1
15	5	Marigold Trace	Blow Off	1
16	5	Narrow Pass @ White Sands	Main Valve	1
17	5	12705 Lone Shadow	Main Valve	1
18	5	Grass Hollow @ Lazy Forest	Main Valve	1
19	6	Toepperwein Rd. north of Village Oak	Main Valve	1
20	6	Toepperwein Rd. @ Forest Bluff	2 Main Valves	2

**CITY OF LIVE OAK
REPAIRS NEEDED
APPENDIX G**

Page 1 of 1

<u>Line #</u>	<u>Address</u>	<u>Type</u>	<u>Needed</u>
1	Northledge @ Tank	Main Valve	Operating nut broken
2	12613 Lone Shadow	Double Meter Box	Need Lid
3	11622 Crooked Oak	Double Meter Box	Need Lid
4	12501 Sandpiper	Curb Stop	Broken
5	Village Oak @ Welcome Dr.	Main Valve	Raise to Grade
6	131 Lost Forest Dr.	Main Valve	Raise to Grade
7	Welcome Dr. @ Leafy Hollow	Main Valve	Raise to Grade
8	Wilderness @ Leading Oak	Main Valve	Raise to Grade
9	Lone Shadow @ Narrow Pass	Main Valve	Raise to Grade
10	11619 Honey Grove	Main Valve	Raise to Grade
11	Lucky Oak @ Sage Oak	Main Valve	Raise to Grade