



WHERE DO WE START

Checklist of Finding Unaccounted for Water

MEASURE	YES	NO
1. All water uses metered?		
2. All master meters kept accurate?		
3. Any chance of backflow, bypass, or double metering of water?		
4. Any known major errors or corrections needed in billing records? Such as wrong multipliers on meters?		
5. Telemetry accurate?		
6. All valves and backflow preventers between pressure planes working properly?		
7. Possibility of check valve or foot valve on well allowing water to flow back into the well?		
8. Unusual pressure drops in any part of the system or isolated complaints about low pressure?		
9. Both system and customer meters regularly tested and properly sized?		
10. Meter readers motivated to find leaks and trained to do so?		
11. Slow or stopped meters identified by billing department?		
12. Streams and storm sewers routinely walked for unusual flows from possible leaks?		
13. All parks, schools, wastewater treatment plants, and government buildings metered?		
14. Authorized un-metered uses estimated and reported?		
15. Are comparisons of water produced to water used made on a regular basis and unaccounted for water percentages monitored over time?		
16. High flow occurring during periods when flow should be low?		
17. Is the percentage of unaccounted for water over 10% or has it been increasing over time?		

Leak Repair Summary Report

By _____ Date: _____
 Work Order No. _____ Crew _____ Date Completed: _____

Area/Location: _____

Found per Leak Detection Survey (Attached)? _____

TYPE LEAK		PIPE MATERIAL	
_____ Meter Leak	_____ Fire Hydrant	_____ Galvanized Iron	_____ A.C.P
_____ Meter Spud	_____ Meter Yoke	_____ Black Iron	_____ Steel
_____ Valve	_____ Joint	_____ Ductile Iron	_____ P.V.C.
_____ Curb Stop	_____ Main	_____ Cast Iron	_____ Copper
_____ Service	_____ Other	_____ Polybutylene	_____ Transite

OTHER INFORMATION

Depth to top of pipe _____ feet. Type of bedding _____ Type of backfill _____
 Leakage rate _____ gpm (_____ Measured _____ Estimated) Estimated age of the leak _____
 Estimated water lost _____ gallons. Previous repairs? _____
 How was the leak repaired (previously/this time)? _____
 _____ (Attach "before" and "after" photos)
 Shape and dimensions _____ System Pressure measured ? _____
 Corrosion? _____ Outside _____ Inside

COST OF REPAIRS

Labor Costs:

Total hours worked _____ X Average hourly rate \$ _____ = \$ _____

Equipment Costs:

Equipment Used _____ Hours Used _____ X _____ Cost of Equipment Used = Total Equipment Cost

1. _____ X \$ _____ = \$ _____

2. _____ X \$ _____ = \$ _____

3. _____ X \$ _____ = \$ _____

4. _____ X \$ _____ = \$ _____

Materials Used? _____ Cost \$ _____

Administrative/Supervisory/ Other Costs _____ \$ _____

TOTAL COST OF REPAIRS: _____ \$ _____

Table 1. Leak Rates from Holes of Known Size
Gallons Per Minute -- gpm.

Area of Leak in Square Inches	Pressure - Pounds per Square Inch (p.s.i.)					
	10	20	40	60	80	100
0.0005	0.5	0.8	1.1	1.3	1.5	1.7
0.01	1.7	1.6	2.2	2.6	3.1	3.4
0.025	2.7	3.8	5.4	6.6	7.8	8.5
0.05	5.4	7.6	11	13	15	17
0.075	8.1	11	16	20	23	25
0.1	11	16	22	26	31	34
0.2	22	31	43	53	61	68
0.3	32	46	65	79	92	102
0.4	43	61	88	106	122	136
0.5	54	76	106	132	153	171
0.6	59	82	129	159	183	205
0.7	76	107	151	185	214	239
0.8	88	122	173	211	242	273
0.9	97	137	194	238	275	307
1	106	153	216	254	305	341
1.1	119	168	227	281	335	409
1.2	129	183	259	317	365	375
1.3	140	198	280	343	397	443
1.4	151	214	302	370	427	478
1.5	162	229	324	396	458	512
1.6	173	244	345	423	488	546
1.7	183	258	367	449	519	580
1.8	194	275	389	478	549	611

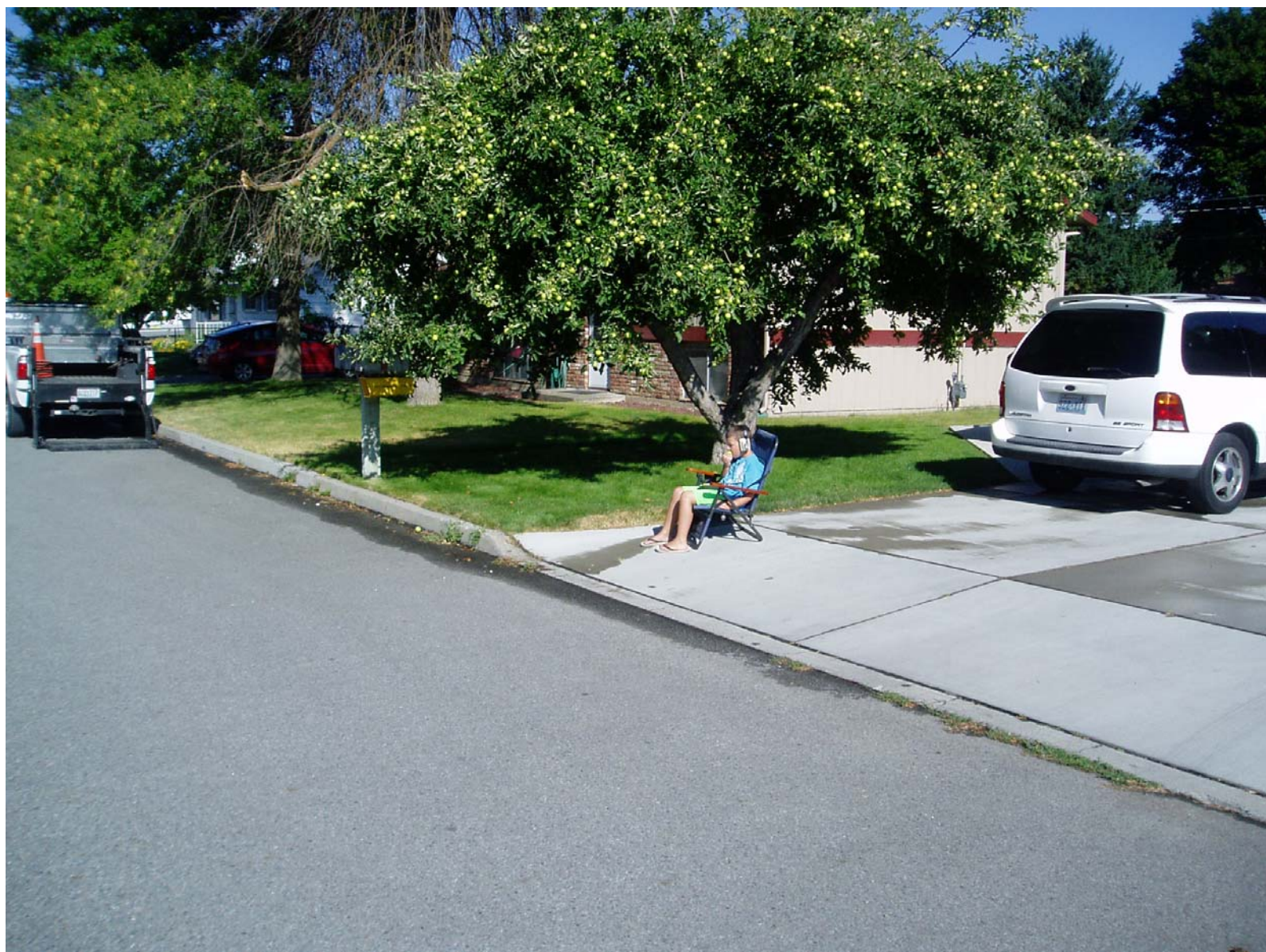




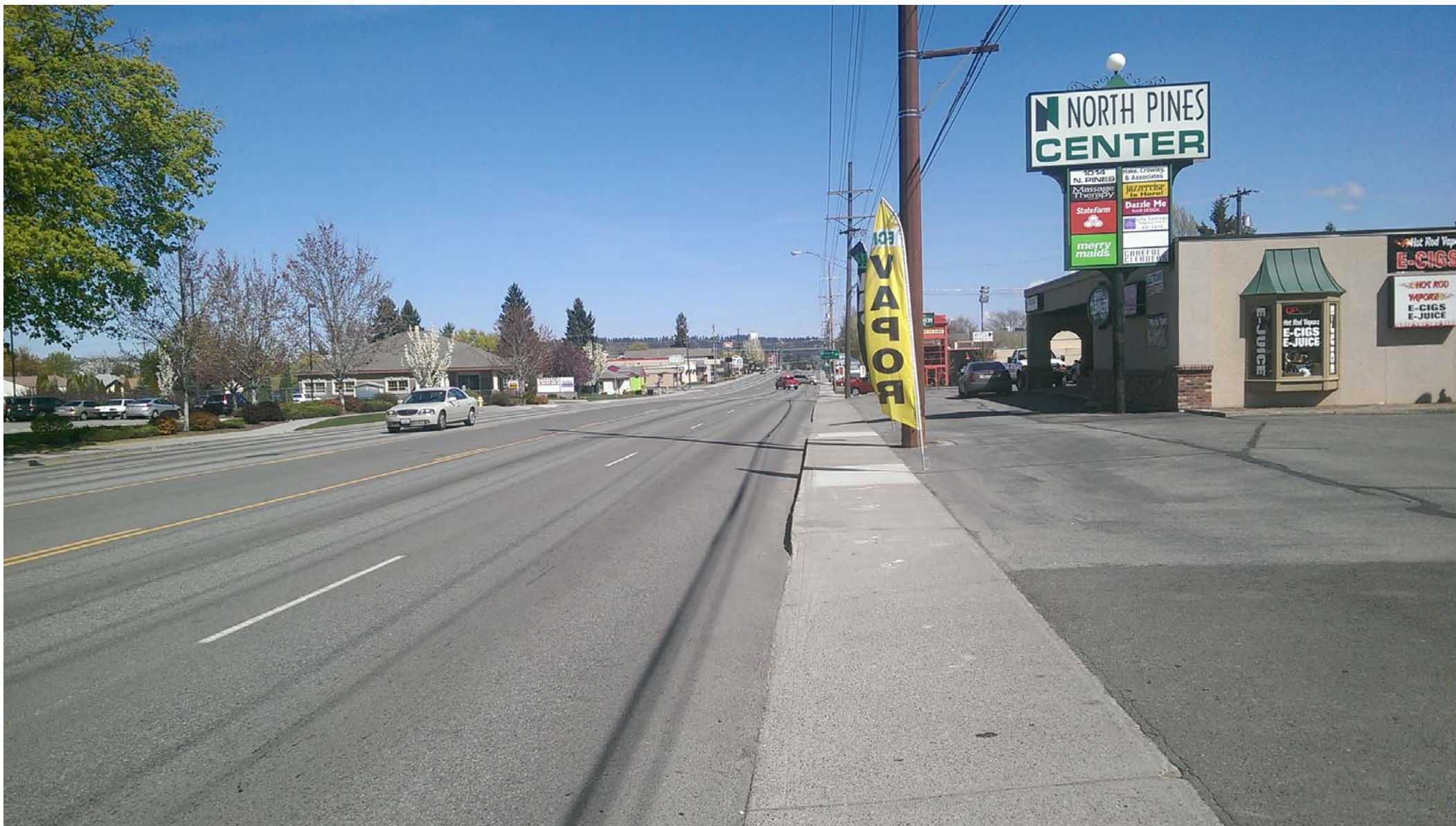




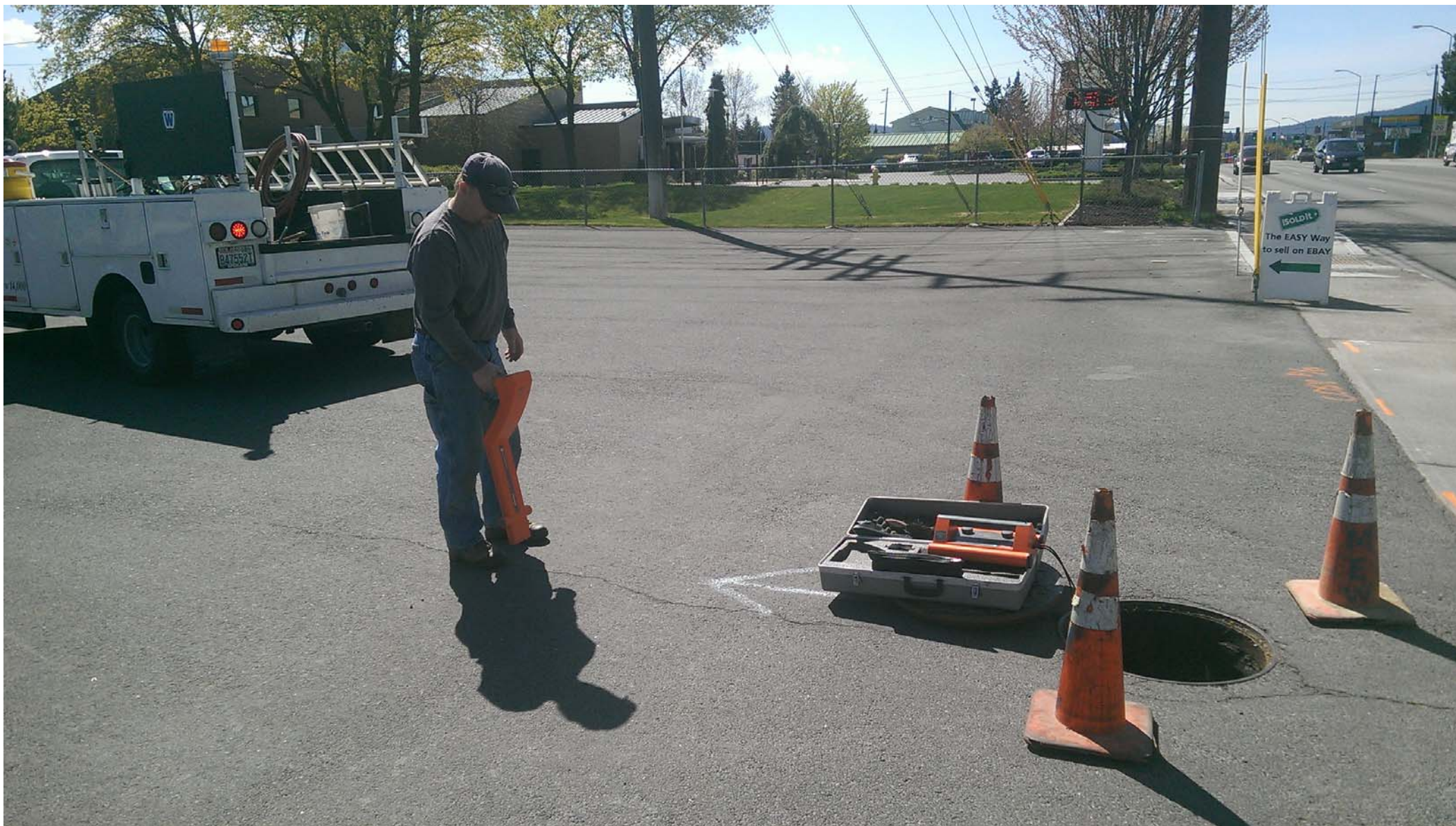














SURVEY FIELD NOTES

CUSTOMER: Modern Electric DATE: 11/26/2012 – 11/30/2012
 ALD TECH: Jordan Marsh CUSTOMER'S REPRESENTATIVE: John Rhodes

SET UP# 201	GV FH	CS MTR	OTHER WELL	NOISE LEVEL: LOW	LOCATION: 109 N University
<p>Noise in area is greatest on meter for 10633 E Sprague (candy shop). Meter is running at 4.5 GPM with no usage inside building. Noise in area continued when meter was shut off. Currently investigation of main in area is held up due to candy shop need for water and not being able to shut off to eliminate noise from leak on customer side.</p>					

SET UP# 211	GV FH	CS MTR	OTHER WELL	NOISE LEVEL: HIGH	LOCATION: 11303 E Auld 50° 65' 919
<p>Leak on hydrant. Noise did not cease when exercised.</p>					

SET UP# 222	GV FH	CS MTR	OTHER WELL	NOISE LEVEL: LOW	LOCATION: 816 N Van Marter SCF 70036
<p>Leak noise more defined on hydrant rather than hydrant gate valve. However, noise is too small to investigate.</p>					



LOCATE: 3

SET UP: 317

SNR: -

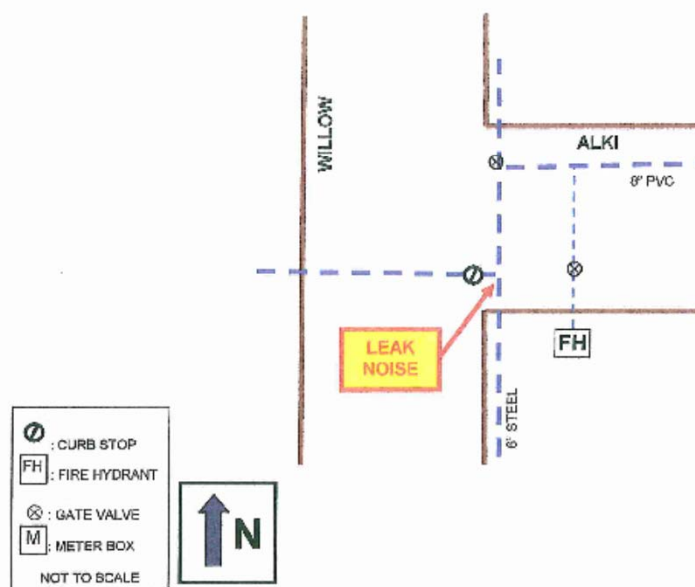
LOCATE DETAIL SHEET

CUSTOMER: Modern Electric DATE: 11/30/12

TECH: JMarsh CUSTOMER'S REP: JRhodes

DETECTION OF LEAK: Correlator: ☐ Sonic: ☒

TYPE & SIZE OF MAIN: 6 inch Steel



REMARKS: Leak noise best on curb stop for 525 N Willow. Ground mic of area indicates leak may be on blind flange nearby.

CUSTOMER INPUT:

DATE REPAIRED: _____ BY: _____ EST. LEAK SIZE: _____ GPM



LOCATE: 2

SET UP: 302

SNR: 15

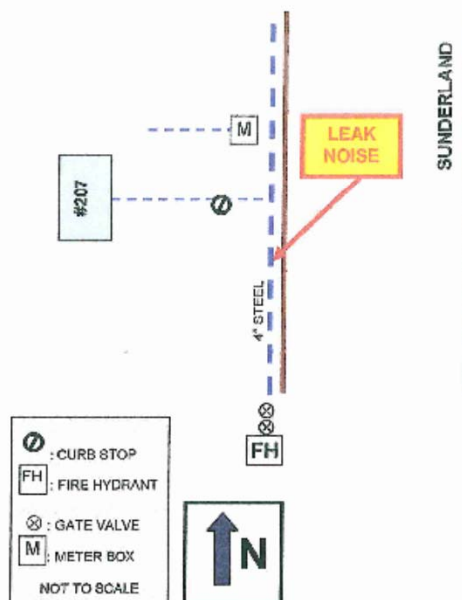
LOCATE DETAIL SHEET

CUSTOMER: Modern Electric DATE: 11/30/12

TECH: JMarsh CUSTOMER'S REP: JRhodes

DETECTION OF LEAK: Correlator: ☒ Sonic: ☒

TYPE & SIZE OF MAIN: 4" Steel



REMARKS: Leak correlated 50-60 feet north of gate valves next to hydrant 394.
Marked curb with white paint.

CUSTOMER INPUT:
DATE REPAIRED: _____ BY: _____ EST. LEAK SIZE: _____ GPM



LOCATE: 1

SET UP: 229

SNR: -

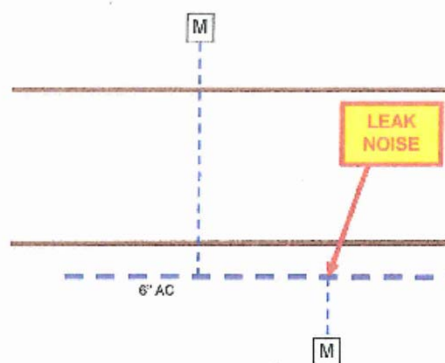
LOCATE DETAIL SHEET

CUSTOMER: Modern Electric DATE: 11/29/12

TECH: JMarsh CUSTOMER'S REP: JRhodes

DETECTION OF LEAK: Correlator: ☐ Sonic: ☒

TYPE & SIZE OF MAIN: 6" AC SERVICE: 11010 E Cataldo



⊙ : CURB STOP
FH : FIRE HYDRANT
⊗ : GATE VALVE
M : METER BOX
NOT TO SCALE



REMARKS: Leak noise greater on service for 11010 E Cataldo.

CUSTOMER INPUT:

DATE REPAIRED: _____ BY: _____ EST. LEAK SIZE: _____ GPM



SURVEY FIELD NOTES

CUSTOMER: Modern Electric DATE: 11/26/2012 – 11/30/2012
 ALD TECH: Jordan Marsh CUSTOMER'S REPRESENTATIVE: John Rhodes

SET UP#	GV	CS	OTHER	NOISE LEVEL:	LOCATION:
73	FH	MTR	WELL	HIGH	12715 E Mission 90# 70055

Leak on hydrant. Noise did not cease when exercised. Hydrant 482.

SET UP#	GV	CS	OTHER	NOISE LEVEL:	LOCATION:
76	FH	MTR	WELL	LOW	12423 E Mission 90# 70186

Leak on hydrant. Noise did not cease when exercised. Hydrant not draining. Hydrant appears to have been hit. Hydrant 510.

SET UP#	GV	CS	OTHER	NOISE LEVEL:	LOCATION:
94	FH	MTR	WELL	LOW	12403 E Sinto

Services for medical building at Sinto/Houk (south side of Sinto) are running. Noise is area most likely caused by this.



FIRE HYDRANTS















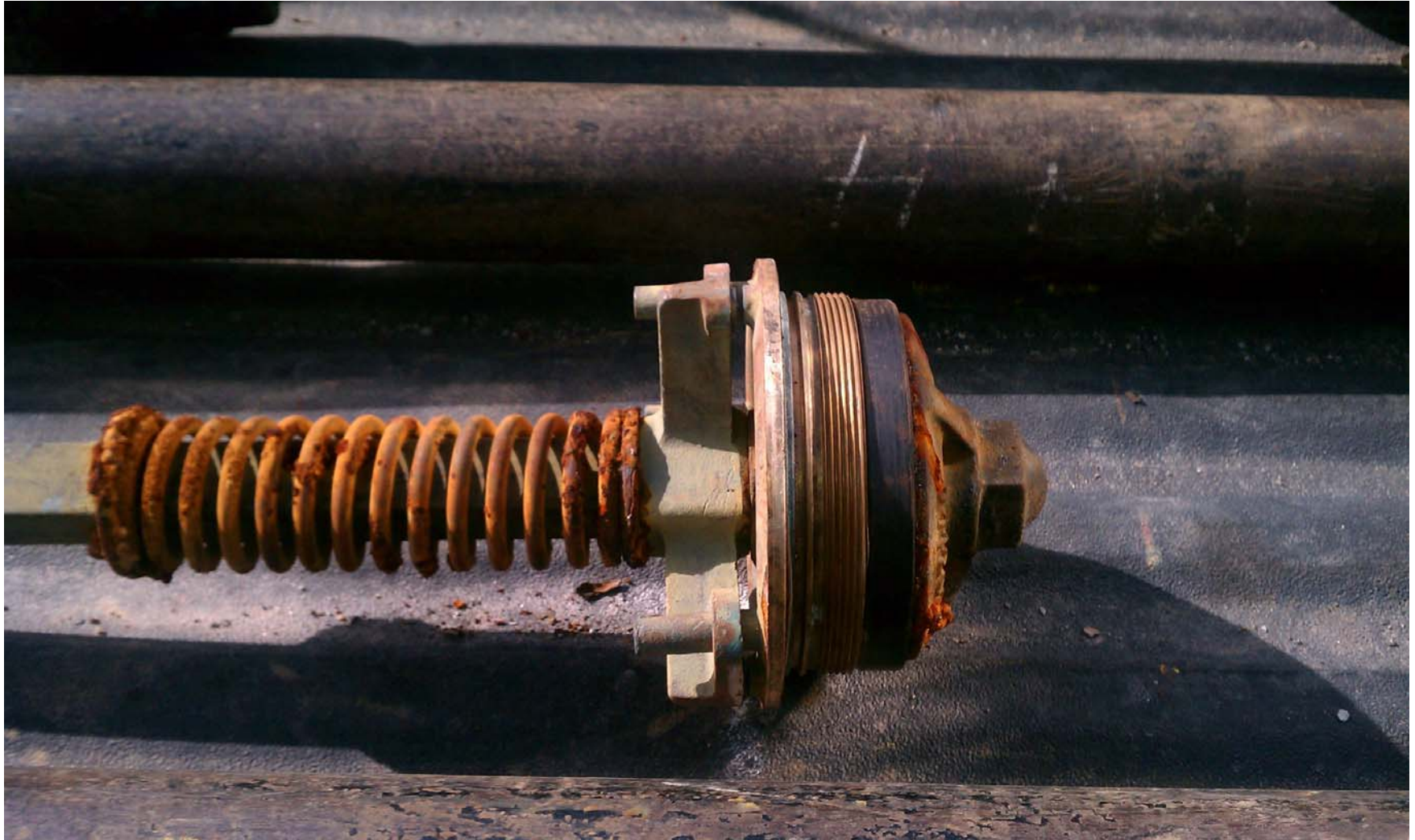
















SERVICE REPAIRS

























































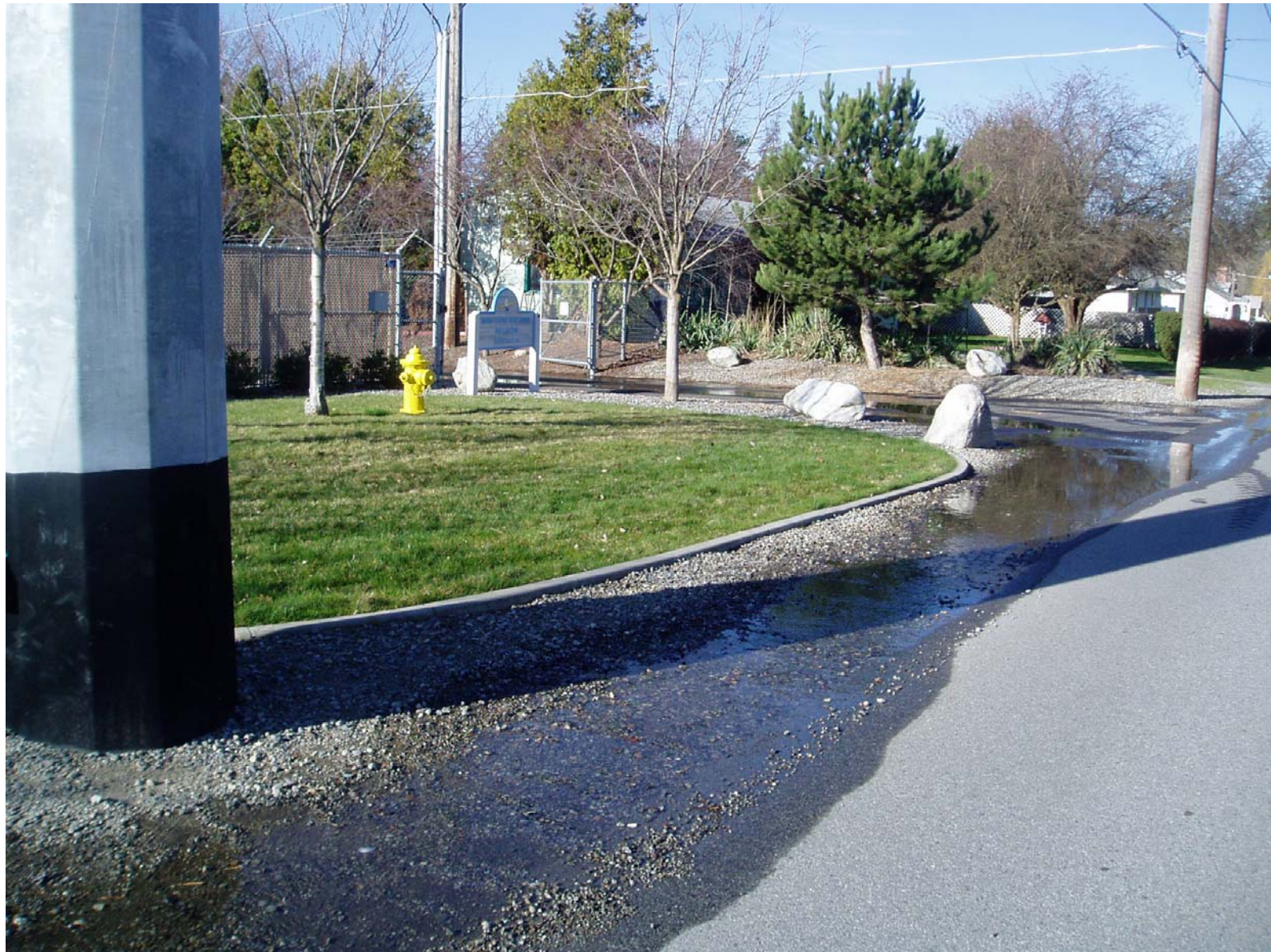
































Picked By: _____
Date Picked: _____
Phone (509) 928-4540 • Fax (509) 922-2070 • Email: modern@mewco.com
Inventory Picking List
104 North Pine Street • P.O. Box 12008 • Spokane Valley, WA 99214-0008

Crew: Water Crew

Date Printed: 04/01/13

Starting Sheet: 1936

W water main repair

Warehouse: Wule:

Project: 65284

W Repair water main

Scheduled Date:

CLOSED

10122 Fyth

Page 1 of Starting Sheet: 1936

Trans #	Proposed		Issued	Description	Type	Return
	Stock	Order				
5230	1 BA			CLAMP REPAIR 8"	MM	

Other:

Gene Rev Norman

Aug 9, 2013 11:56AM

Mo. 2311 E. 1/1



City of Spokane Valley
Community Development
11703 E. Sprague Ave., Suite B-3
Spokane Valley, WA 99216
(509) 720-5240
permits@cityofspokanevalley.org

PID
#65284

PO 1610

ROW-2013-0154

DE-ROW

PROJECT NAME: GANO RESIDENCE

ISSUED: 04/09/2013

SITE ADDRESS: 10122 E 4TH AVENUE SPOKANE VALLEY

EXPIRES:

PROJECT DESCRIPTION: WATER MAIN BREAK - EMERGENCY REPAIR

PARCEL: 10201.1508

APPLICANT: MODERN ELECTRIC & POWER SERVICE
PO BOX 14025 SPOKANE VALLEY, WA 99216

OWNER:

MODERN ELECTRIC & POWER SERVICE
PO BOX 14025
SPOKANE VALLEY, WA 99216

FEES:

PAID

DUE

Right of Way

\$110.00

Totals:

\$110.00

REQUIRED INSPECTIONS

Eng site visit/progress inspection

First Acceptance

The ownership of a Spokane Valley Development Permit will inure to the property owner. The permit applicant, by definition, is the property owner or an authorized agent of the property owner. It is the responsibility of the applicant/permittee that the use described on the front of this permit complies with applicable codes and that required inspections are requested. Failure to request inspections as listed below and obtain the necessary approvals before progressing beyond the point where inspections are required and may necessitate removal of certain parts of the construction are the applicant's/permittee's or property owner's expense.

Owner/Agent

Date:

Staff Approval

Date:

1997-7-2013 13:29 FROM: J & J CONSTRUCTION 5091624786 TC: 9828873 P. 1/6

Russel Company DBA
J & J CONSTRUCTION
Licensed & Bonded RUSSECO05JC
9200 N. Market Street
Spokane, WA 99217
509-468-8557 Office# 509-468-4786 Fax#
jandjgirls@comcast.net

INVOICE #
13-31

BILL TO

Modern Electric Water Co.
P.O. Box 14008
Spokane, WA 99214-0008
O/R: 928-4540
Fax: 922-2878

DATE
5/7/2013

DESCRIPTION OF WORK COMPLETED

AMOUNT

Asphalt Repair

Job Location: 16210 E Mission
9' x 4.5' @ 2" depth using HMA 64 22 asphalt compacted
Minimum charge

650.00

PO 1845

Completed on 5-6-13

Sales Tax

\$7.43

8705

GL# 5931000

Total

\$717.43

Please make payment within 15 days, upon receiving this invoice. After 30 days of non-payment, a finance charge of 1.12% per month, which is an annual percentage rate of .8%, will be applied to the amount owing, unless other arrangements have been made with main office prior to start of project for payment.

Project Costs Drill Information

Modern Electric Water Company Inc

Project ID: 65284

W Repair water main

OVERHEAD

Cost Code	Amount	Date	Depr #	Month End	Type
BE	\$80.00	31-MAR-13		31-MAR-13	C
BE	\$393.14	30-APR-13		30-APR-13	C
TR	\$6.18	31-MAR-13		31-MAR-13	C
TR	\$48.67	30-APR-13		30-APR-13	C
	\$528.02				

DL

Occur Date	Hours	Amount	Dept #	Activity ID	Pay Date	Vehicle	Miles	Eg Hours	Type
31-MAR-13	2	\$126.16	2		05-APR-13				C
01-APR-13	16	\$838.09	2		19-APR-13				C
04-APR-13	2	\$71.16	2		19-APR-13				C
		\$1,035.41							

MATERIAL

Cost Code	Inventory #	Inventory Desc	Amount	Date	CPR #	Dept #	Month End	Type
MM	5290	CLAMP REPAIR 8"	\$271.98	30-APR-13	6640047		30-APR-13	C
			\$271.98					

Project Costs Drill Information

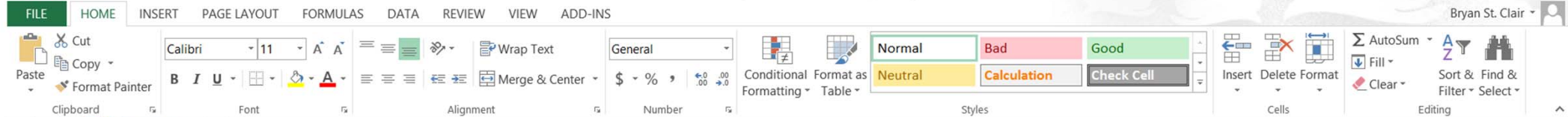
Modern Electric Water Company Inc


Project ID: 65284

W Repair water main

Overhead Total: \$826.02
Direct Labor Total: \$1,035.41
M&E Total:
AP Total:
Material Total: \$271.98

Labor \$1505.58
Equip 57.85
Material 271.98
Permit 110.00
Patch 717.42
\$2662.83



																				
7																				
8	Cost Summary																			
9																				
10	In November and December of 2012 American Leak Detection and Modern Electric/Water personel identified 27 possible leaks																			
11																				
12																				
13	1st Occur	Project ID	Overhead	Direct Labor	Mat./Equip.	Permit	Patch	Study	Total	Post CPP Costs										
14	11/13-12/13	59081	\$ 3,074.72	\$ 3,260.58	\$ 251.36			\$ 8,620.00	\$ 15,206.66	\$15,206.66										
15		65615	\$ 772.07	\$ 1,599.80	\$ 246.87	\$ 110.00			\$ 2,728.74											
16	OK	67638	\$ 456.65	\$ 864.75	\$ 232.47	\$ 110.00			\$ 1,663.87	\$1,663.87										
17	OK	68596		\$ 575.64	\$ 27.74				\$ 603.38	\$603.38										
18		65856	\$ 756.80	\$ 1,568.15	\$ 271.98	\$ 210.00			\$ 2,806.93											
19	4/25/2013	66363	\$ 495.54	\$ 1,026.80	\$ 108.33	\$ 1,260.92	\$ 110.00		\$ 3,001.59	\$3,001.59										
20	4/16/2013	65961	\$ 539.50	\$ 1,117.88	\$ 377.13	\$ 271.00	\$1,326.14		\$ 3,631.65	\$3,631.65										
21		65284	\$ 528.02	\$ 1,035.41	\$ 271.98	\$ 110.00	\$ 717.42		\$ 2,662.83											
22		65919	\$ 425.79	\$ 882.25					\$ 1,308.04											
23		65920	\$ 309.71	\$ 641.75					\$ 951.46											
24		65923	\$ 278.75	\$ 577.58					\$ 856.33											
25		65921	\$ 280.28	\$ 580.75					\$ 861.03											
26		62100	\$ 313.97	\$ 270.09	\$ 21.45				\$ 605.51											
27	5/15/2013	66710	\$ 371.63	\$ 770.10	\$ 35.05				\$ 1,176.78	\$1,176.78										
28	5/2/2013	66758	\$ 955.29	\$ 1,979.56	\$ 237.41		\$1,032.65		\$ 4,204.91	\$4,204.91										
29	OK	70057	\$ 684.27	\$ 383.76	\$ 44.85				\$ 1,112.88	\$1,112.88										
30	OK	70055	\$ 684.27	\$ 383.76	\$ 44.85				\$ 1,112.88	\$1,112.88										
31	OK	70058	\$ 684.27	\$ 383.76	\$ 44.85				\$ 1,112.88	\$1,112.88										
32	OK	70056	\$ 759.66	\$ 431.73	\$ 39.72				\$ 1,231.11	\$1,231.11										
33								TOTAL	\$ 46,839.46	\$34,058.59										
34																				
35																				
36																				

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General
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Conditional Formatting
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NormalBadGood
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InsertDeleteFormat
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Clear
Editing

Sort & Find & Filter
Select

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1																							
2	Modern Electric Water																						
3	City Water Distribution Leak Abatement																						
4	North Leak Project 2013 TS# 1494 (incorrectly named "South" in C1 file)																						
5	8/7/2013																						
6																							
7	Analysis Summary																						
8																							
9																							
10	1250 kWh/MGD * 456.192 MGD =		804,240																				
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12	GPM	446.8																					
13	MGD	643.392																					
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Leak Survey 2012

FileHomeShareView

←→↶↷

This PC > Removable Disk (D:) > Eugene 2014 > Leak Survey 2012

Search Leak Survey 2012

★ Favorites

Desktop

Downloads

Recent places

SkyDrive

Homegroup

This PC

Desktop

Documents

Downloads

Music

Pictures

Videos

OS (C:)

Removable Disk (D:)

Network

Name	Date modified	Type	Size
Leak 11224 E valleyway	1/24/2013 1:30 AM	File folder	
Leak on Brdwy 2012	1/24/2013 7:58 AM	File folder	
Leak repair 11204 E Mallon	1/24/2013 7:58 AM	File folder	
Leak repair 12905 E Desmet	1/24/2013 7:58 AM	File folder	
226 N Felts	8/28/2012 12:32 PM	Adobe Acrobat D...	37 KB
1505 N Felts	8/28/2012 12:31 PM	Adobe Acrobat D...	109 KB
9320 E Boone	8/28/2012 12:31 PM	Adobe Acrobat D...	63 KB
11009 E 3rd	8/28/2012 12:32 PM	Adobe Acrobat D...	32 KB
11204 E Mallon	8/28/2012 12:32 PM	Adobe Acrobat D...	33 KB
12905 E Desmet	8/28/2012 12:31 PM	Adobe Acrobat D...	42 KB
American Leak 2	8/28/2012 12:31 PM	Adobe Acrobat D...	23 KB
American Leak	8/28/2012 12:31 PM	Adobe Acrobat D...	21 KB
Hyd Parts Fowler	9/26/2012 2:18 PM	Adobe Acrobat D...	71 KB
Hyd Parts	8/28/2012 12:31 PM	Adobe Acrobat D...	249 KB
J&J #1407	8/30/2012 3:50 PM	Adobe Acrobat D...	34 KB
J&J #1432	8/30/2012 3:50 PM	Adobe Acrobat D...	27 KB
J&J (2)	9/26/2012 2:18 PM	Adobe Acrobat D...	60 KB
J&J (3)	9/26/2012 2:18 PM	Adobe Acrobat D...	52 KB
J&J (4)	9/26/2012 2:18 PM	Adobe Acrobat D...	40 KB
J&J (5)	9/26/2012 2:18 PM	Adobe Acrobat D...	54 KB
J&J Felts	8/30/2012 3:49 PM	Adobe Acrobat D...	24 KB
J&J Mallon	8/30/2012 3:50 PM	Adobe Acrobat D...	23 KB
J&J	9/26/2012 2:18 PM	Adobe Acrobat D...	52 KB
MEWCO FIS Project Information Summar...	8/31/2012 12:55 PM	Microsoft Excel 97...	31 KB
Payroll	9/26/2012 2:18 PM	Adobe Acrobat D...	385 KB

30 items | 1 item selected 70.7 KB

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⌵

Inventory Picking List

Picked By: _____

Date Picked: _____

Crew: Water Crew

Date Printed: 08/06/13

Staking Sheet: 2190

W Repair 1" Svc leak 13406 E Desmet

Warehouse: Water

Project: 70406

W Repair 1" Svc leak 13406 E Desmet

Scheduled Date:

Page 1 of Staking Sheet: 2190

<u>Item #</u>	<u>Proposed</u>		<u>Issued</u>	<u>Description</u>	<u>Type</u>	<u>Return</u>
	<u>Stock</u>	<u>Order</u>				
5315	2 EA			COUPLING COMPRESSION 1"	MM	
5910	1 FT			PIPE GALV 1"	MM	

Other:

How much revenue could
you capture with Badger Meter
rotating disc meters?
www.badgermeter.com/lowflowcalc

3 Month
Water Loss
at 60 psi

Stream Diameter	Gallons	Cubic Feet
1/4"	1,181,500	4,475
3/16"	666,000	2,521
1/8"	296,000	1,115
1/16"	74,000	280
1/32"	18,500	70

Leaks 2013 > Leaks 2013 packets

Search Leaks 2013 packets

Organize Open with Adobe Acrobat XI Share with Print Burn New folder

★ Favorites

- Desktop
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Libraries

- Documents
- Music
- Pictures
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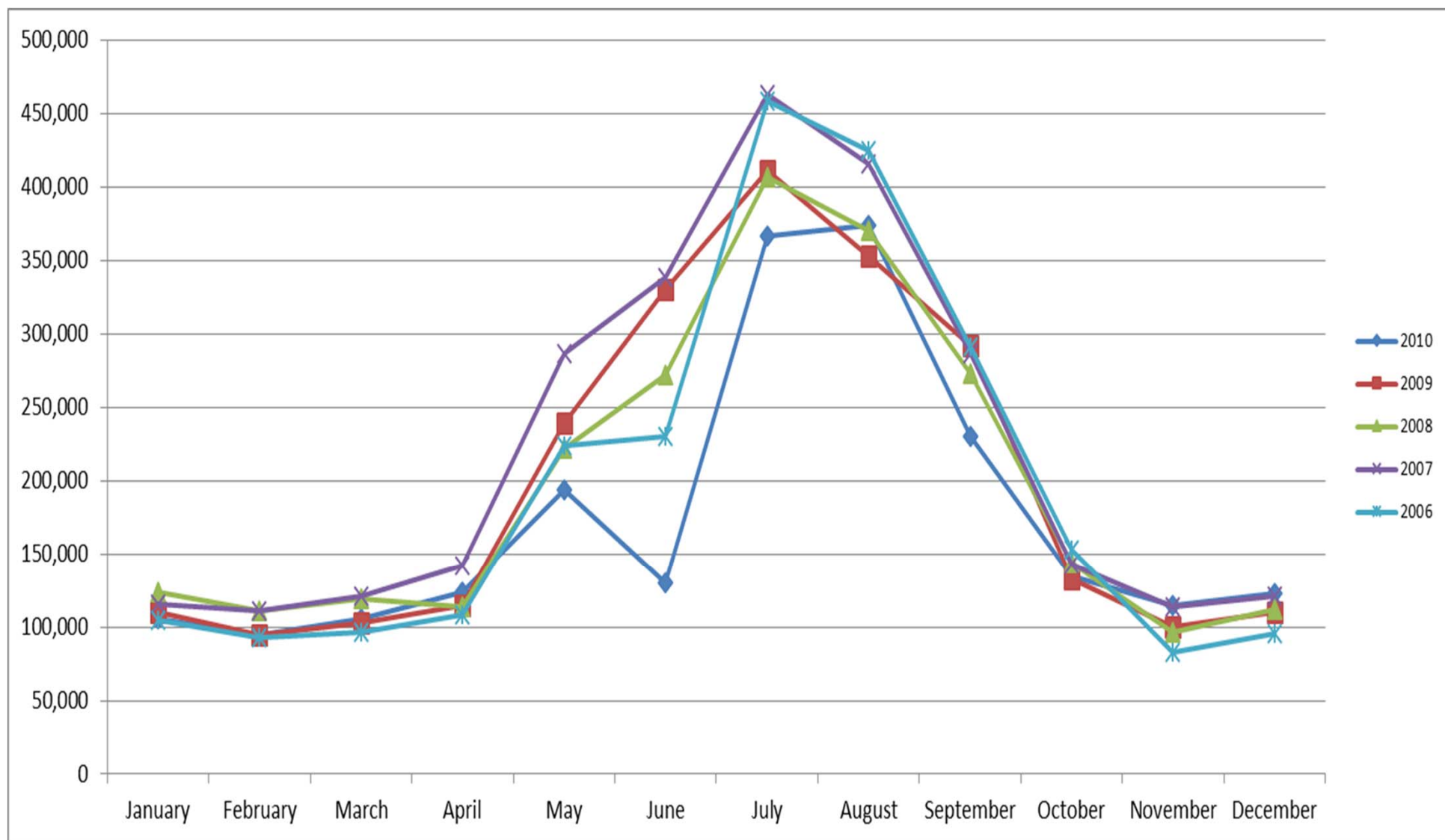
Computer

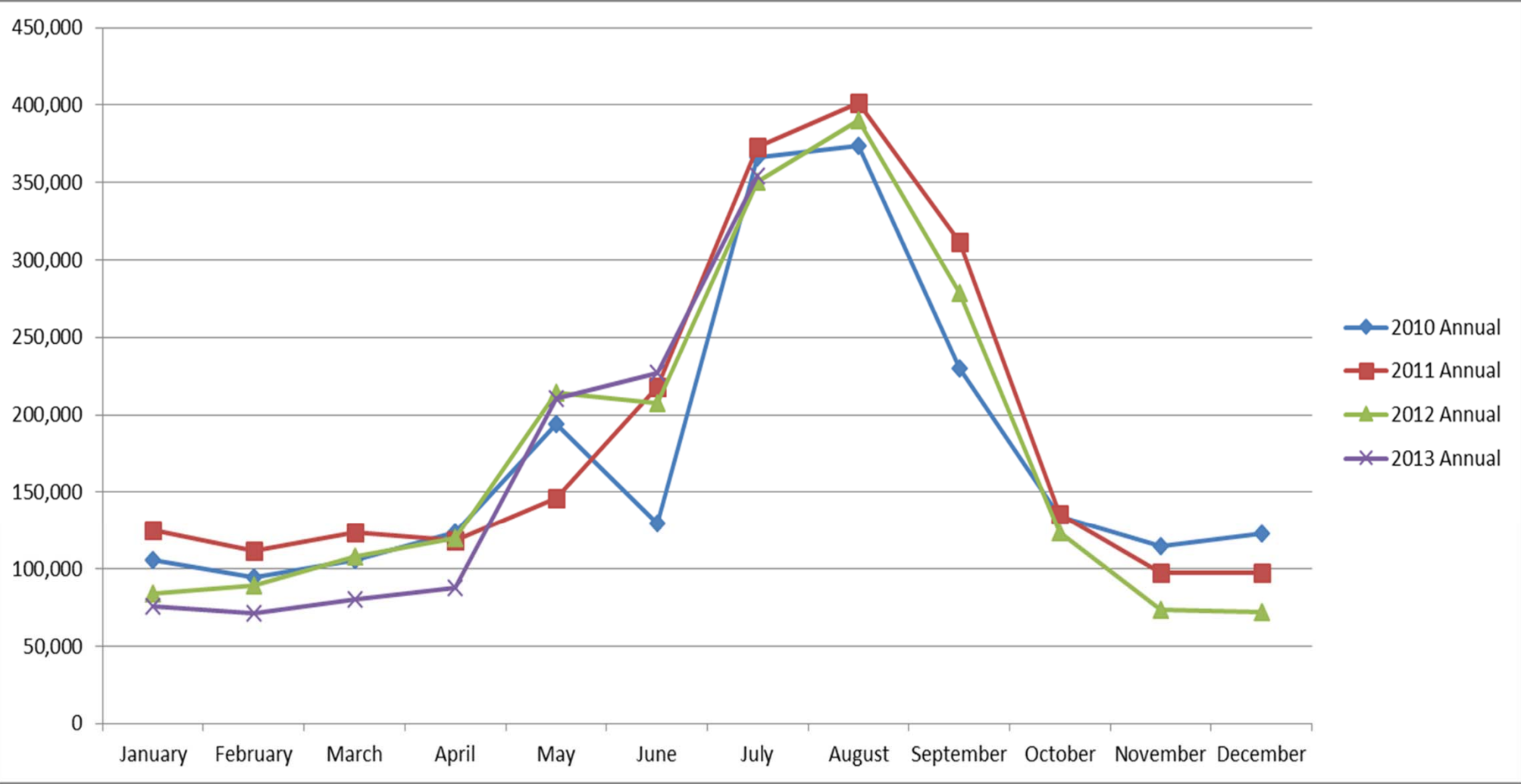
- OS (C:)
- Removable Disk (E:)
- io (\\svr-db-prod.ap
- Programs (\\svr-db-
- bstclair (\\curly) (Y:)
- company (\\larry) (Z

Network

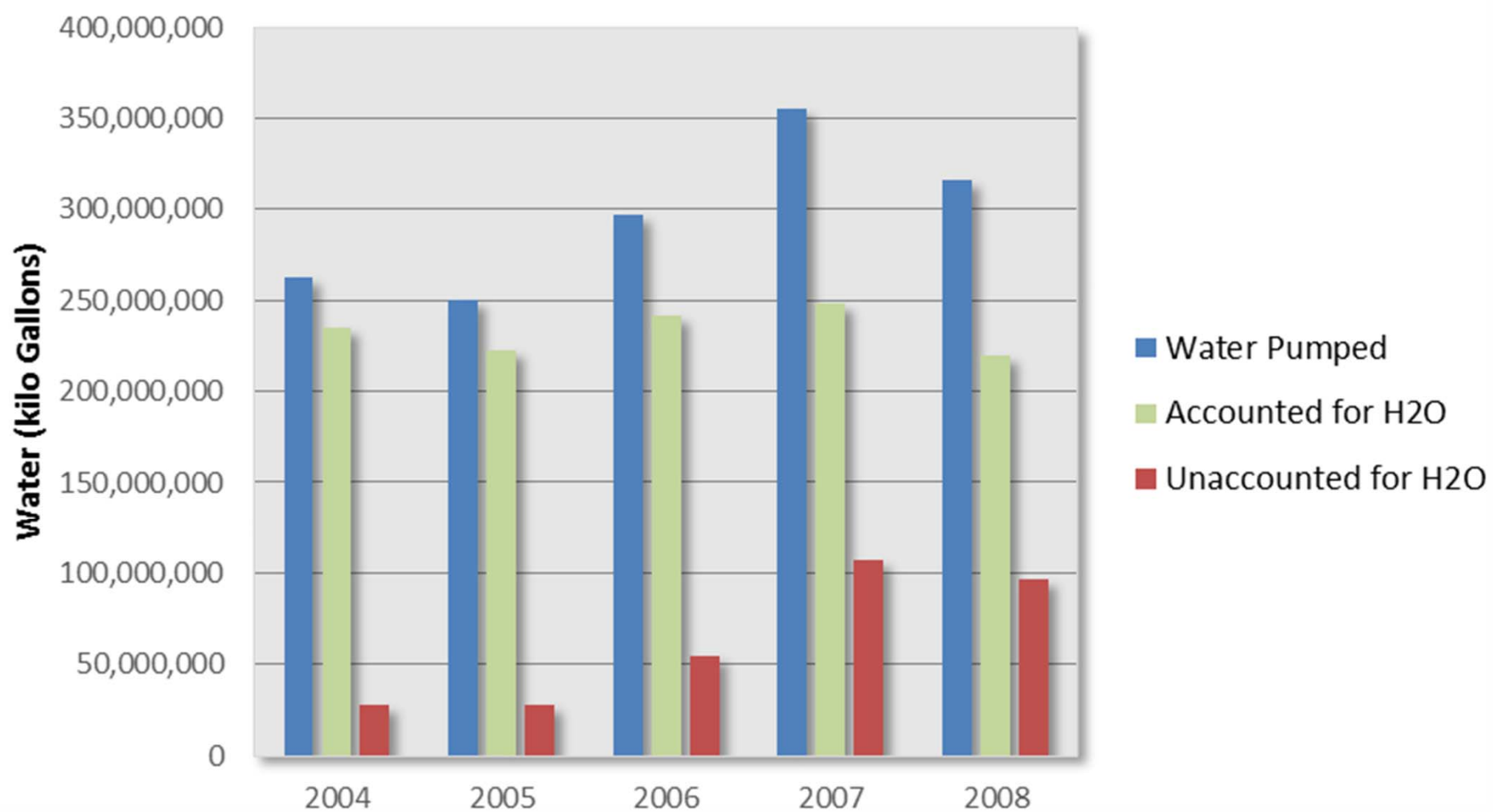
Name	Date modified	Type	Size
2012 Leak Survey 2	4/2/2013 6:55 AM	Adobe Acrobat D...	2,187 KB
2012 Leak Survey	3/20/2013 10:34 AM	Adobe Acrobat D...	5,289 KB
2013 1st Packet	8/1/2013 10:33 AM	Adobe Acrobat D...	510 KB
2013 2nd Packet	8/1/2013 1:08 PM	Adobe Acrobat D...	398 KB
2013 3rd Packet	8/1/2013 1:39 PM	Adobe Acrobat D...	172 KB
2013 4th Packet	8/1/2013 1:52 PM	Adobe Acrobat D...	241 KB
2013 5th Packet	8/1/2013 2:14 PM	Adobe Acrobat D...	353 KB
2013 6th Packet	8/1/2013 2:28 PM	Adobe Acrobat D...	1,366 KB
2013 7th Packet	8/1/2013 2:57 PM	Adobe Acrobat D...	390 KB
2013 8th Packet	8/1/2013 3:35 PM	Adobe Acrobat D...	425 KB
2013 Revised 1st Packet	8/12/2013 1:18 PM	Adobe Acrobat D...	884 KB
Project 62100	8/12/2013 3:08 PM	Adobe Acrobat D...	339 KB
Project 66710	8/12/2013 3:08 PM	Adobe Acrobat D...	346 KB
Project 66758	8/12/2013 3:04 PM	Adobe Acrobat D...	493 KB
Set up #60	8/12/2013 3:04 PM	Adobe Acrobat D...	373 KB
Set up #73	8/12/2013 3:06 PM	Adobe Acrobat D...	371 KB
Set up #85	8/12/2013 3:07 PM	Adobe Acrobat D...	373 KB
Set up #222	8/12/2013 3:07 PM	Adobe Acrobat D...	371 KB
Setup #211	8/2/2013 7:08 AM	Adobe Acrobat D...	32 KB
Setup #275	8/2/2013 7:08 AM	Adobe Acrobat D...	40 KB
Setup #313	8/2/2013 7:08 AM	Adobe Acrobat D...	40 KB
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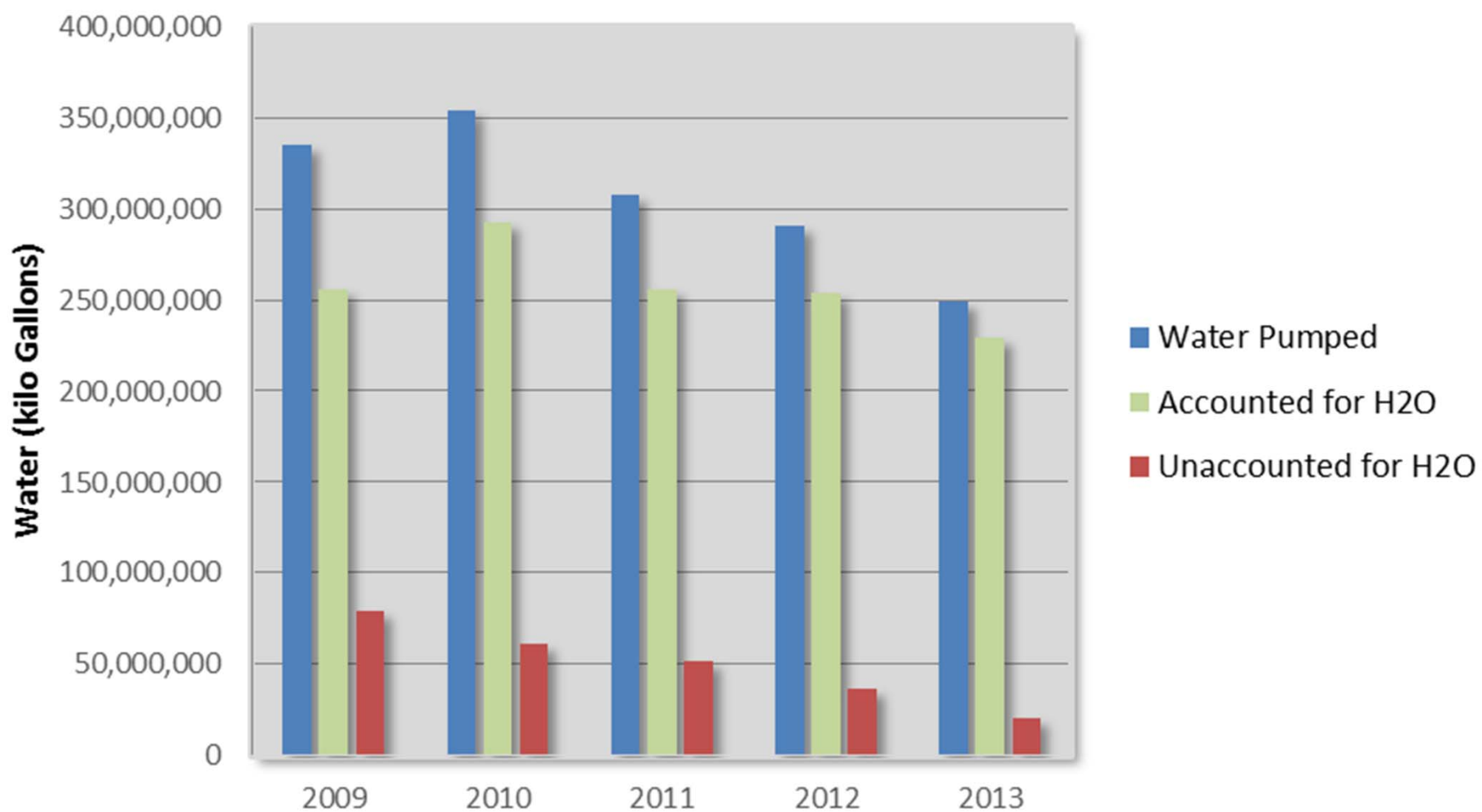




Period (2004-08)



Period (2009-13)



2-Yr Comparison (2008 & 2013)

