CLEVELAND HEIGHTS

Water Utility Optimization
January 12, 2015

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History

- Several years of revenue/cost challenges
- Increased rates to overcome losses
- No significant investment in the water utility in the past 21 years.
- System failures have been handled on a reactive basis
- ESG Selected from RFQ process May 2014
- ESG and Cleveland Heights began DEE in September 2014
  1. Diagnose system deficiencies
  2. Develop executable solutions
  3. Guarantee net annual savings of $250,000 or more

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Key Considerations

1. Water utility has the potential to generate $4-7M annually for Cleveland Heights

2. Strategic investment in infrastructure will produce attractive ROI based on current purchase price.

3. “Best in Class” condition could be achieved within 5 years

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Project Outcomes

1. Significantly exceeds cash flow goal of $250k per year

2. Increases the value of the water utility

3. Set's the foundation for significant future revenue generation potential

4. Improves customer service

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Agenda

Areas of Focus

Findings

Master Meters

Recommendations

Next Steps

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AREAS OF FOCUS

	Issue			
Focus Area	Accuracy	Billing Errors	Leakage	High Pressure
1. Residential Meters	✓	✓		
2. **Commercial Meters**	✓	✓		
3. Master Meters	?	✓		
4. Credit Meters	?	✓		
5. **Distribution System**			✓	✓
6. Billing Process		✓		
7. Data Acquisition		✓		

Approximately 61% Non-Revenue Water Loss

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Improvement Opportunities

Area of Focus	Current Condition	Annual Estimated Revenue Loss	Revenue Loss Type	Revenue Generated	Proposed Solution
Water Meters	▪ Residential meter are accurate ▪ Commercial meters are inaccurate ▪ Antiquated data collection systems	**($2.6M)**	Apparent	**$0.65M**	▪ Replace commercial meters ▪ Replace select Residential Meters ▪ Upgrade data collection to AMI
Billing & Mngmt	▪ Deficient standard operating practices ▪ Insufficient tools and training ▪ Antiquated billing software	**($0.5M)**	Apparent	**$0.25M**	▪ Conduct Detailed Audit ▪ Create GIS ▪ Optimize process and SOP's
Water Distribution System	▪ Master meters not well understood ▪ Oversized and inaccurate credit meters ▪ High pressure zones increase leaks ▪ Leaks are continuing	**($7.05M)**	Real	**$3.7M**	▪ Identify and fix major leaks ▪ Implement leak detection program ▪ Develop hydraulic model ▪ Install Pressure Reducing Valves
	Total	**($10.2M)**		**$4.6M**	

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Meter Testing

- Majority of the meter population is 21+ years old
- Residential Meters
  - There are approximately 14,500 residential meters
  - Most are within AWWA accuracy tolerances (>98.5%)
  - Approximately 4% (600) are outside acceptable tolerance or non-functional and should be replaced
- Commercial Meters
  - There are approximately 1400 commercial meters (1”-8”)
  - These meters are:
    - Inaccurate
    - Oversized sized and allowing flow to pass undetected
    - Improper technology – turbine vs. compound
  - **Represents 1/3rd of total water sold**

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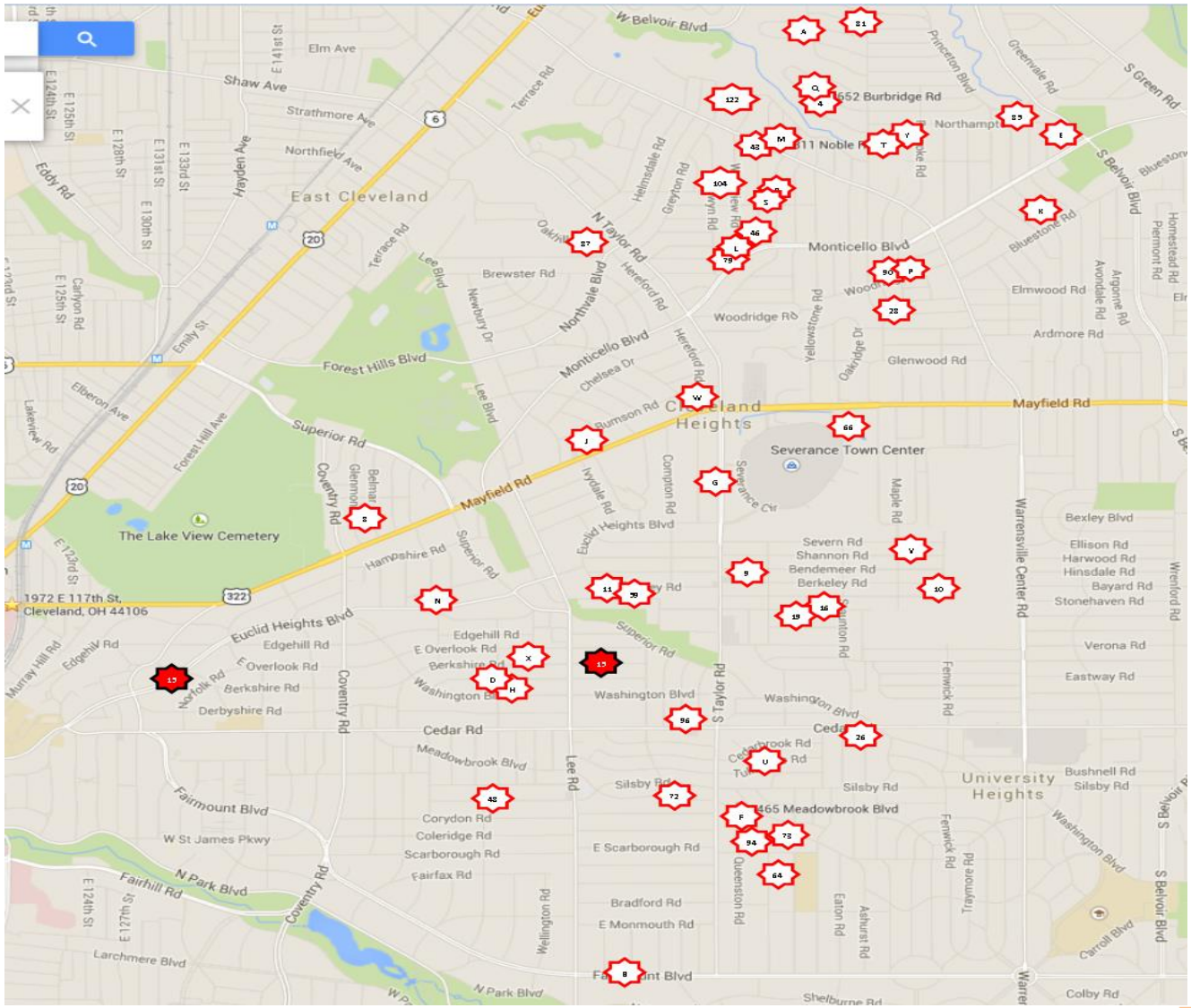
Residential Meter Tests



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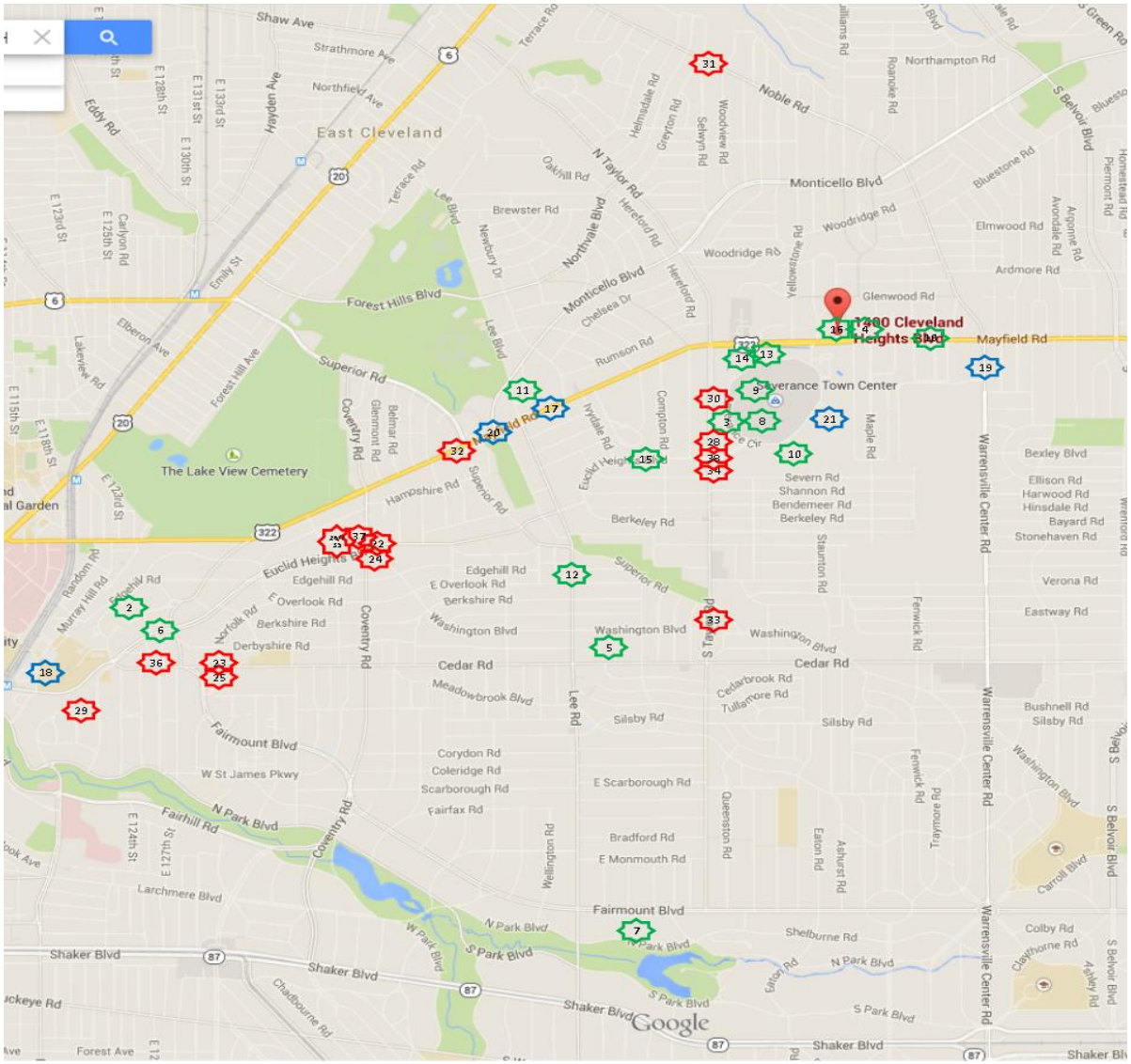
Commercial Meter Tests



Turbine versus Compound Meters

Size	Low Flow Turbine (gpm)	Low Flow Compound (gpm)	Current Weighted Average Accuracy
2”	2.5	0.5	98.5%
3”	4	0.5	38.6%
4”	6	0.75	71.9%
6”	12	0.75	78.5%

Conclusion: Existing turbine meters significantly under-register low flow water leading to lost revenue

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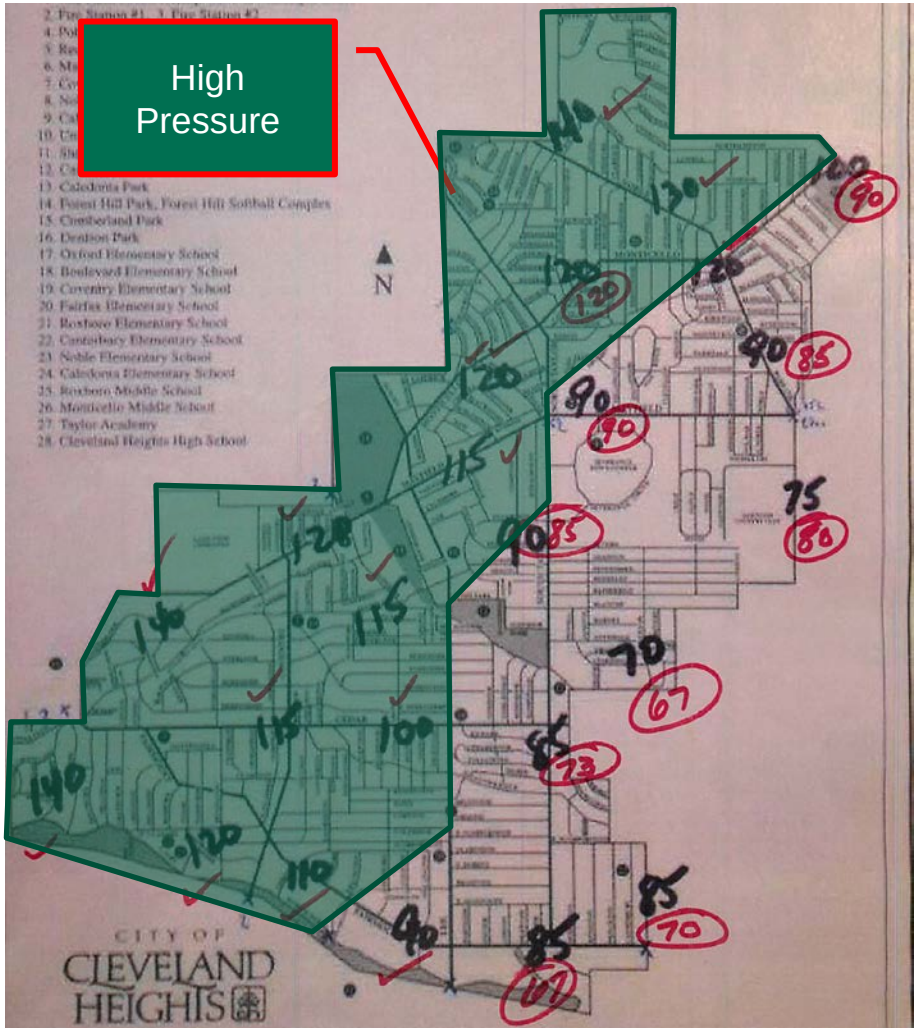
High Pressure Zones

- Real losses (leaks) are directly proportional to line pressure
- Average line pressure required is 70 psig versus 120 to 140 in 30% of the system
- Further analysis and modeling will allow for micro-sectorization



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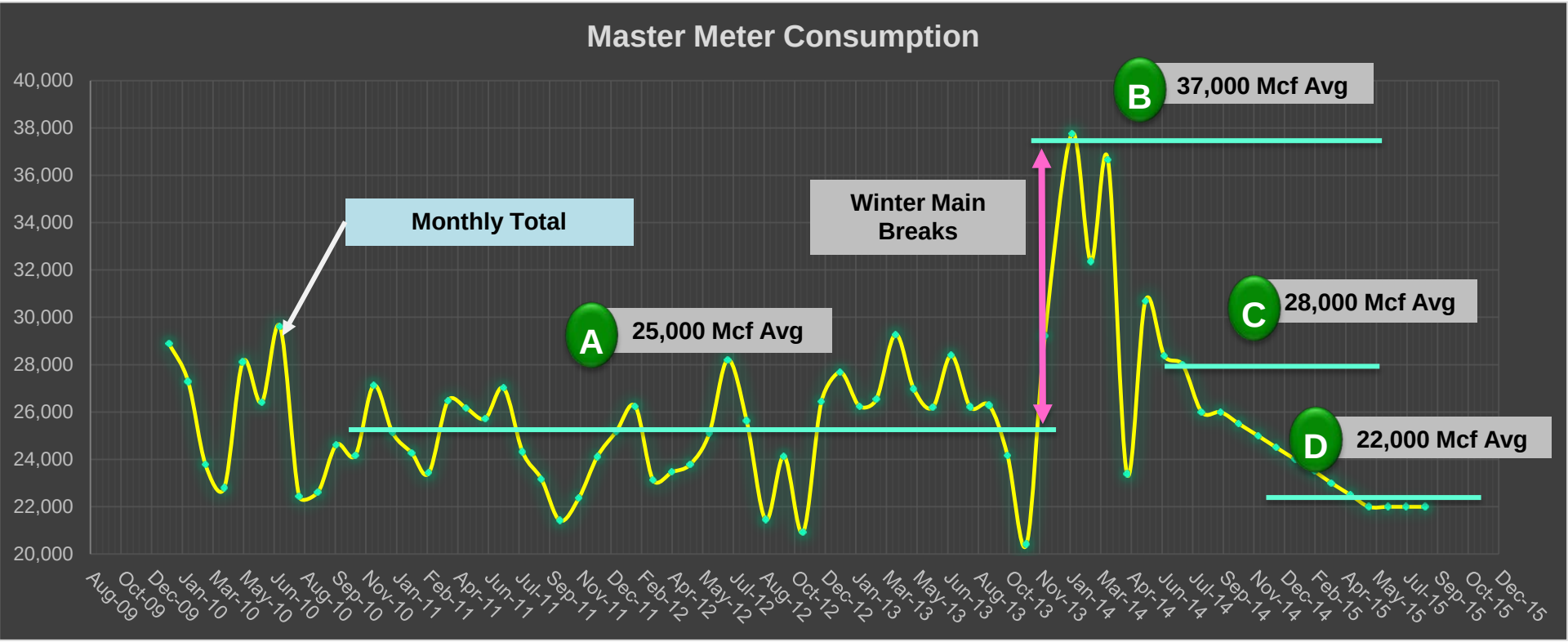
Baseline Water Consumption



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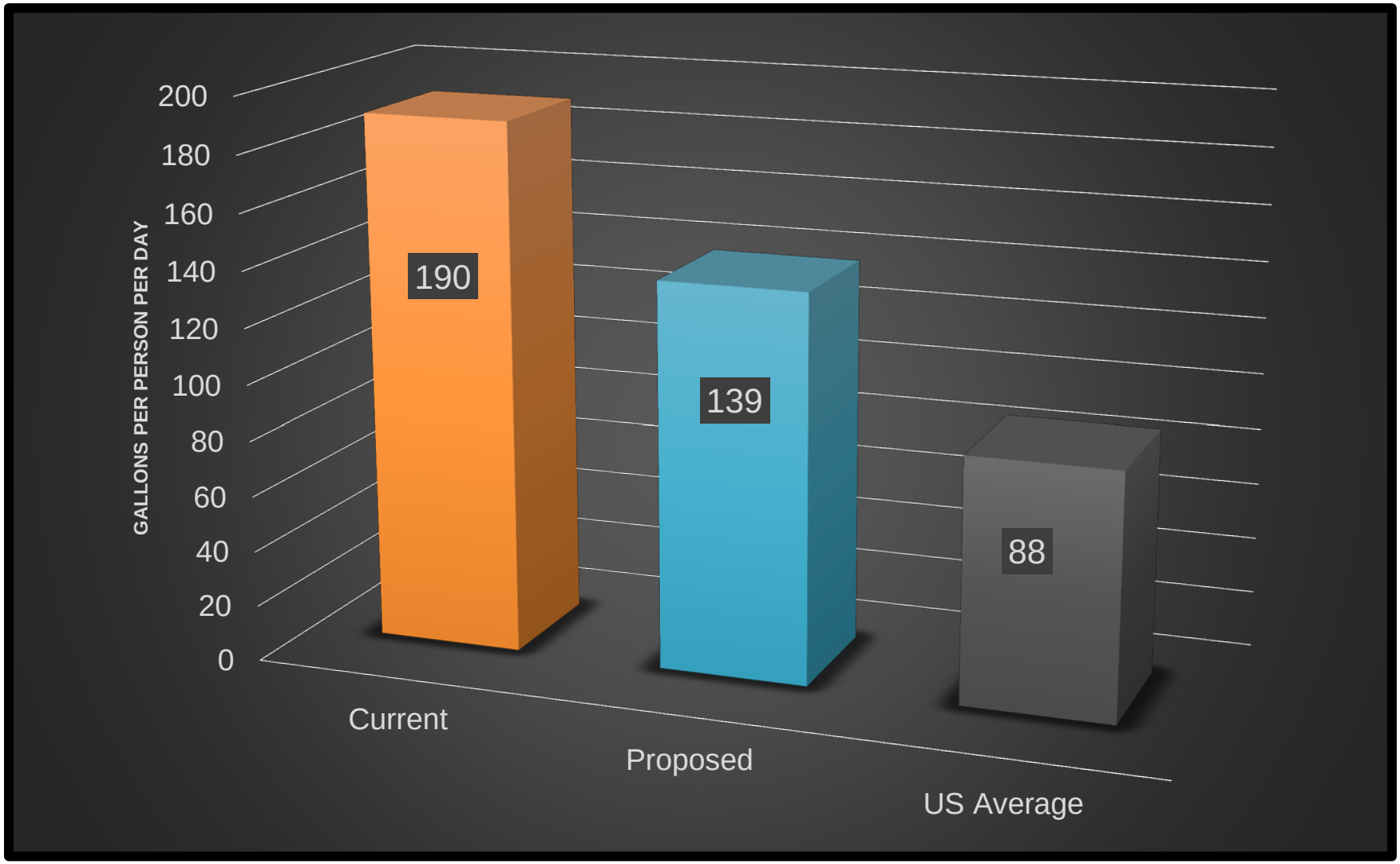
Water Purchased



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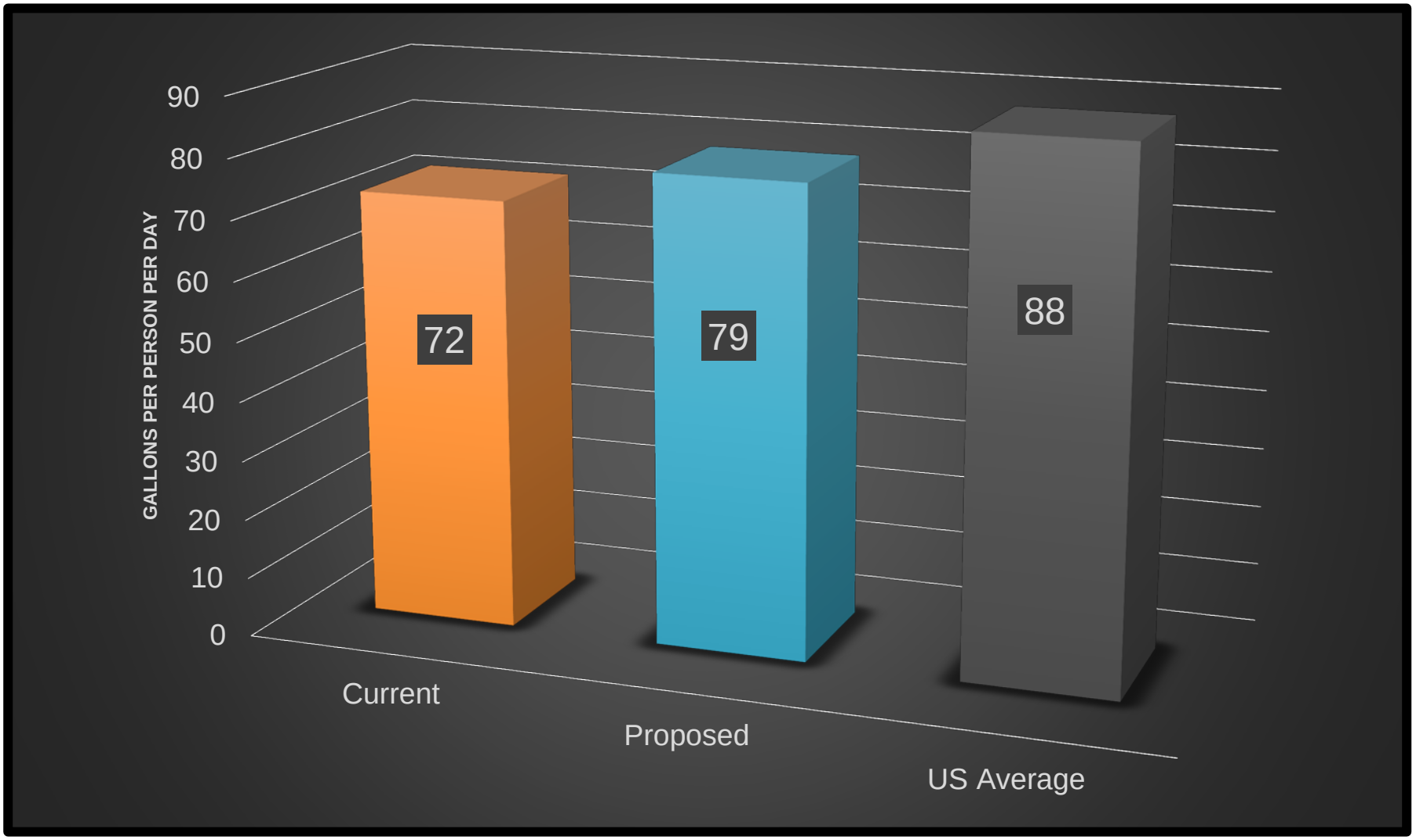
Water Sold


GALLONS PER PERSON PER DAY
90
80
70
60
50
40
30
20
10
0
72
79
88
Current
Proposed
US Average

Non Revenue Water Summary

Category	Current	Proposed	Best Case
	Mg/yr		
Imported	**3149**	**2,587.69**	**1,619.00**
Exported	52	52	52
Billed metered:	**1196**	**1,281.69**	**1,281.69**
Aparent Losses	327	226	226
Real Losses	**1,621.00**	**1,059.69**	**91**
Non revenue Loss %	**61.4%**	**49.5%**	**18.2%**
Annual Non-Revenue Loss Savings	**$0**	**$2,440,583**	**$6,652,440**
Leak Repair Funds (20 year term)	**$0**	**$10,000,000**	**$86,500,000**

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Recommended Improvements

1. Replace all commercial meters 1” and larger
2. Install AMI data collection system across all meters
   - Enables simultaneous reading of all customer, import and export water meters to enable real-time water loss analysis
3. Optimize number of Import/Export points and install pressure control valves
4. Audit billing system and remediate errors
5. Find and repair major leaks
   - Main replacement (open cut)
   - Slip lining (trenchless technology)
   - Main repairs
   - Service line/Hydrant repairs
   - Engineering
   - Construction management
6. Develop tools and provide training
   - Dynamic Flow Model
   - Graphical Information System (GIS)
   - Leak Detection Surveying
   - Non revenue water loss analysis
   - Pressure modulation

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MASTER METER ANALYSIS

- Confusion over import vs. credit meters
- (4) import meters misread by factor of 10 and 100 (dropped fixed zeros)
- **Total amount owed $1.37M - $1.02M**
- Credit meters should be changed to compound meters to record low flow.
- Any credit meter locations not recording any flow should be removed from the system (unless acting as emergency connection)
- Validate import vs. credit on dual meter configurations
- Verify boundary valves closed

2 fixed zeros

3 fixed zeros

Baseline & Financial Summary

Handouts

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Guarantee

- Firm Project Implementation Cost
  - Based on the agreed upon scope of work
- Savings reconciled annually - **$4,727,289**
  - Must meet or exceed total annual guaranteed savings
- Operational savings are agreed upon - **$497,580**
- Adjust baseline to account for changes in:
  - Minimum number and type of customers
  - Value of water
- Total guarantee capped at value of improvements - $19.9M
- **Additional actual project savings above the guarantee amount to be shared 50/50 for the guarantee period**

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Project Implementation Timeline

Project Item	Duration (Months)	Start Date	Completion Date
Water Meters	12	4/15	5/16
AMI	12	5/15	5/16
Optimize Import/Export Points and Pressure Control	10	7/15	5/16
Find and Repair Major Leaks	20	4/15	2/17
Engineering, Billing Audit, Tools & Training	15	2/15	5/16
Total	**24**	**2/15**	**2/17**

Why Proceed?

1. Financial Stability
   - Generate $750k+ revenue in first performance year (2017)

	Projected 5 Year Cash Flow	Projected 10 Year Cash Flow
Business as Usual	**($14.8M)**	**($26.9M)**
Recommended Project	**$.9M**	**$4.7M**

2. Increases the value of the water utility
3. Significant Future Revenue Generation Potential
   1. Puts key processes, tools and training in place for further improvement
   2. Enables surgical identification and remediation of losses
4. Improves customer service

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Next Steps

- Feedback
- Authorization to Proceed with Recommendations – 1/19/15
- Finalize Contract Documents – 2/6/15
- Contract Execution – 2/9/15
- Begin Implementation – 3/1/15
- Completion – 2/9/17

Thank You

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