THE FUTURE OF METER READING SYSTEMS: A COMPARISON OF FIXED VS. MOBILE NETWORK AUTOMATED METER READING

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Overview

- What is an Automated Meter Reading (AMR) System?
- Benefits of Implementing Automated Metering Infrastructure (AMI) or Mobile AMR
- Case Study: City of Nampa

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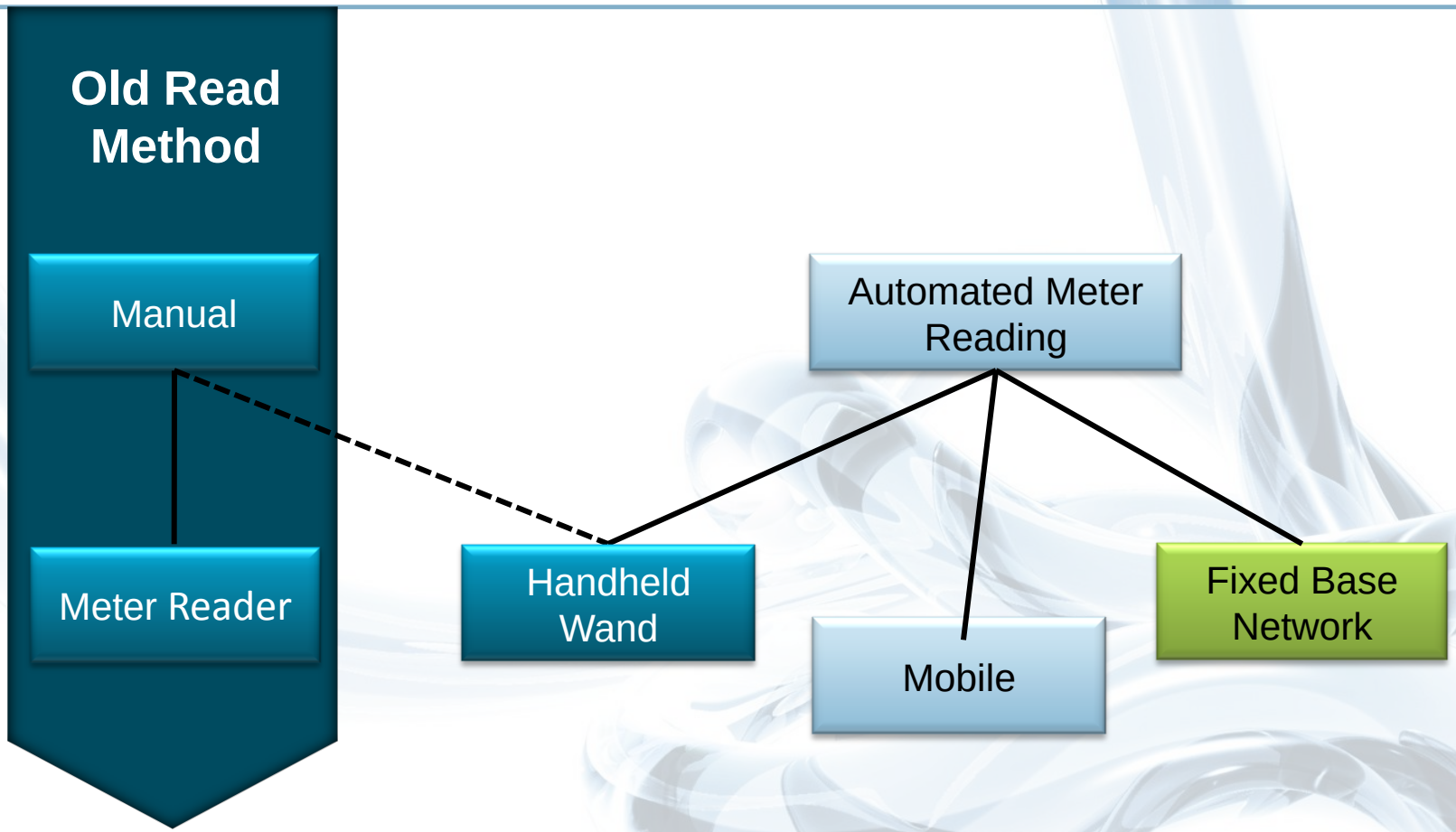
Water Meter Reading Overview



Manual or Touch-Read Meter Reading

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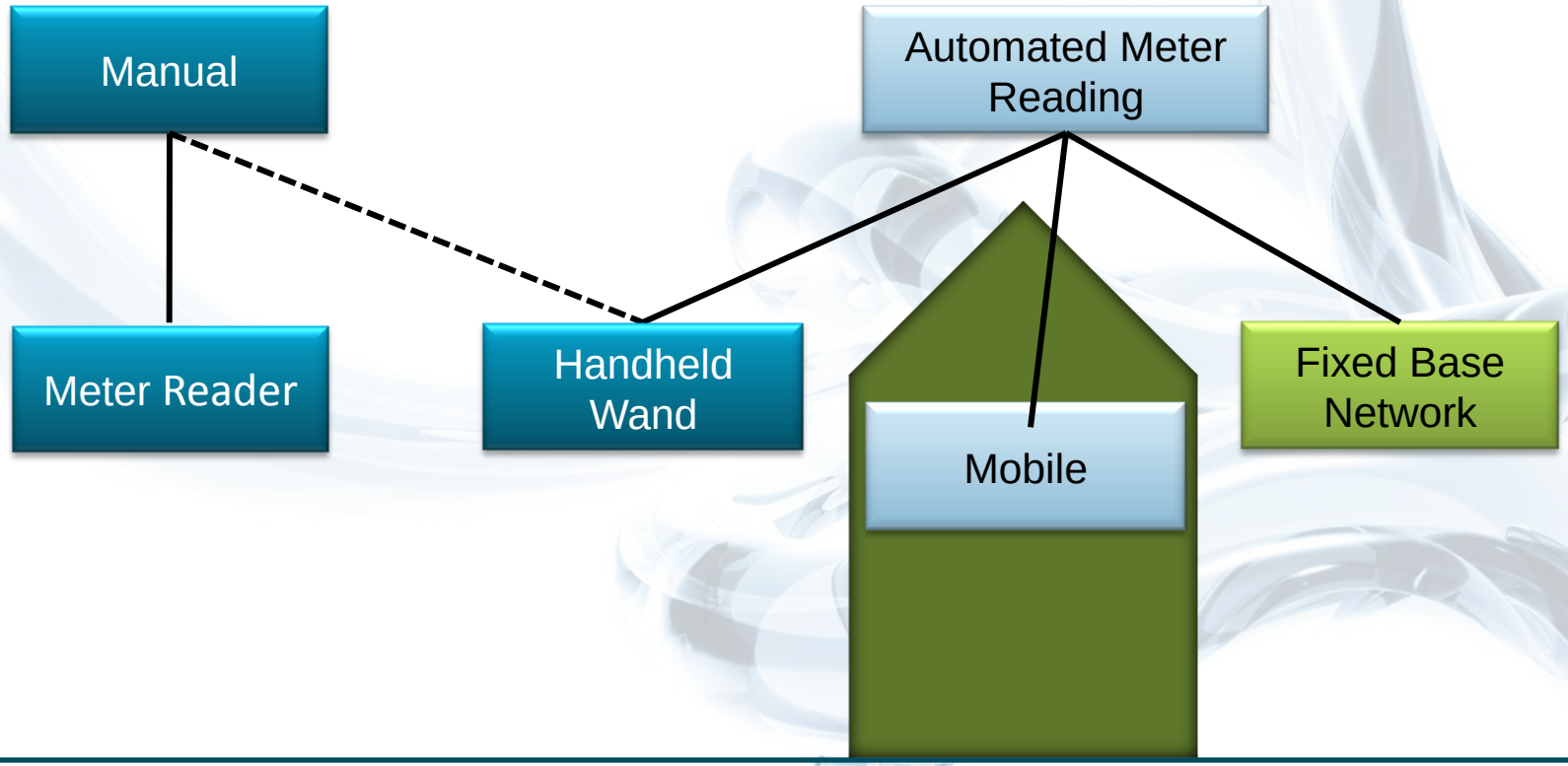
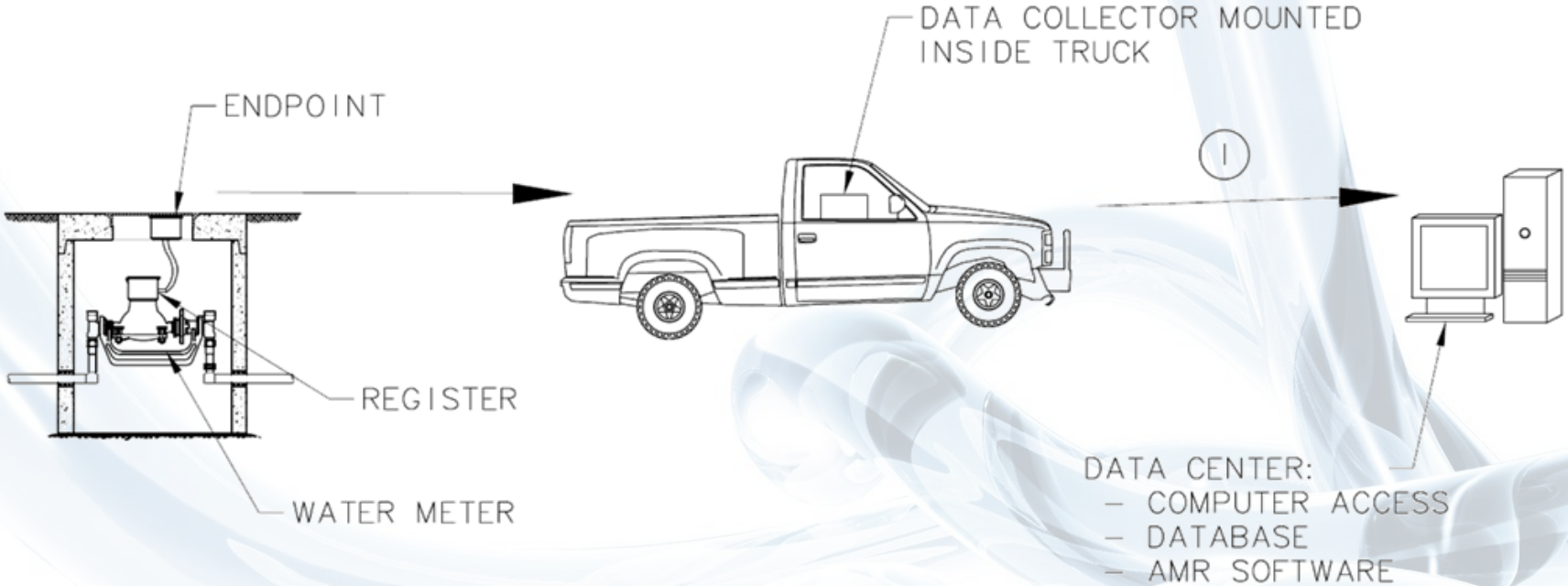
Water Meter Reading Overview



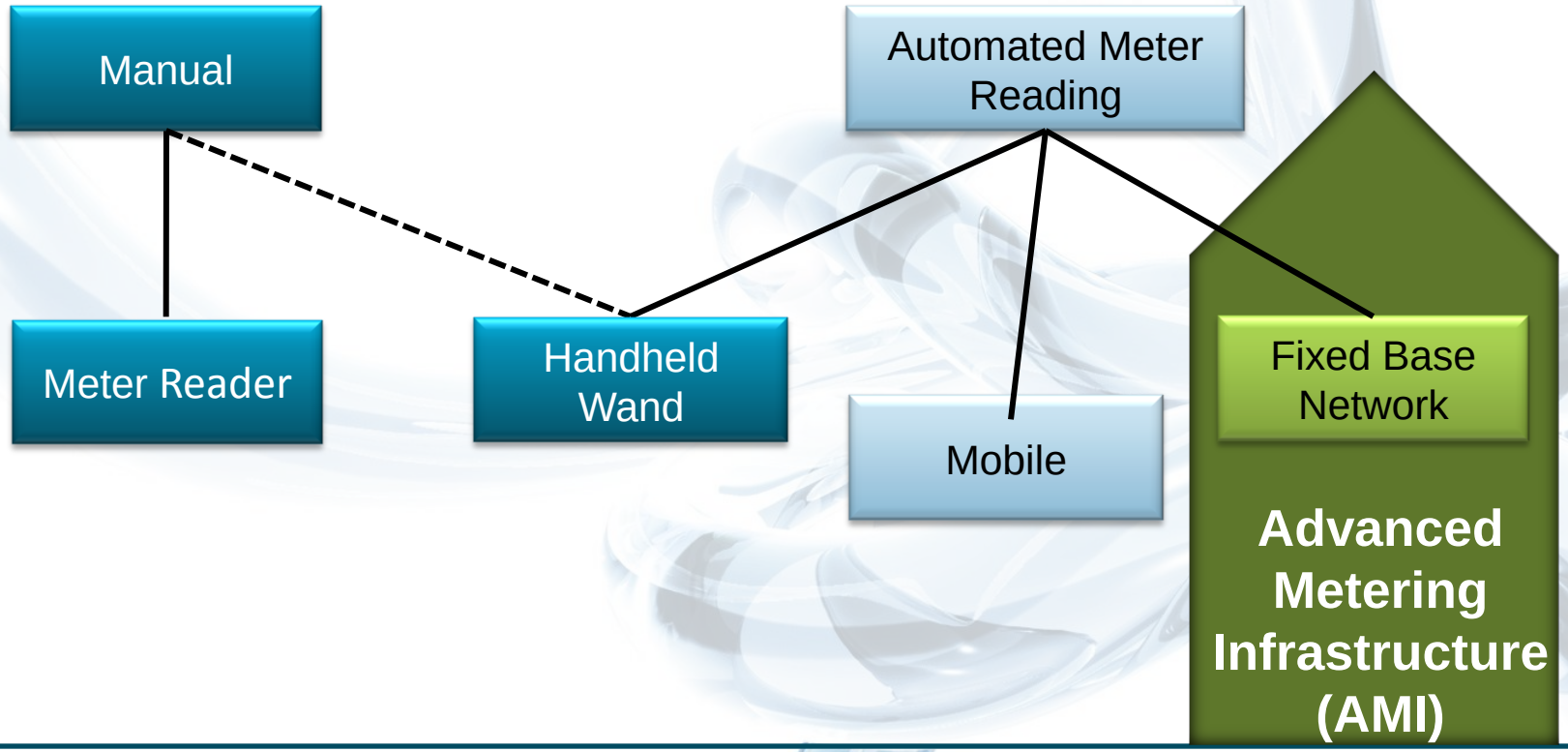
Mobile Automated Meter Reading



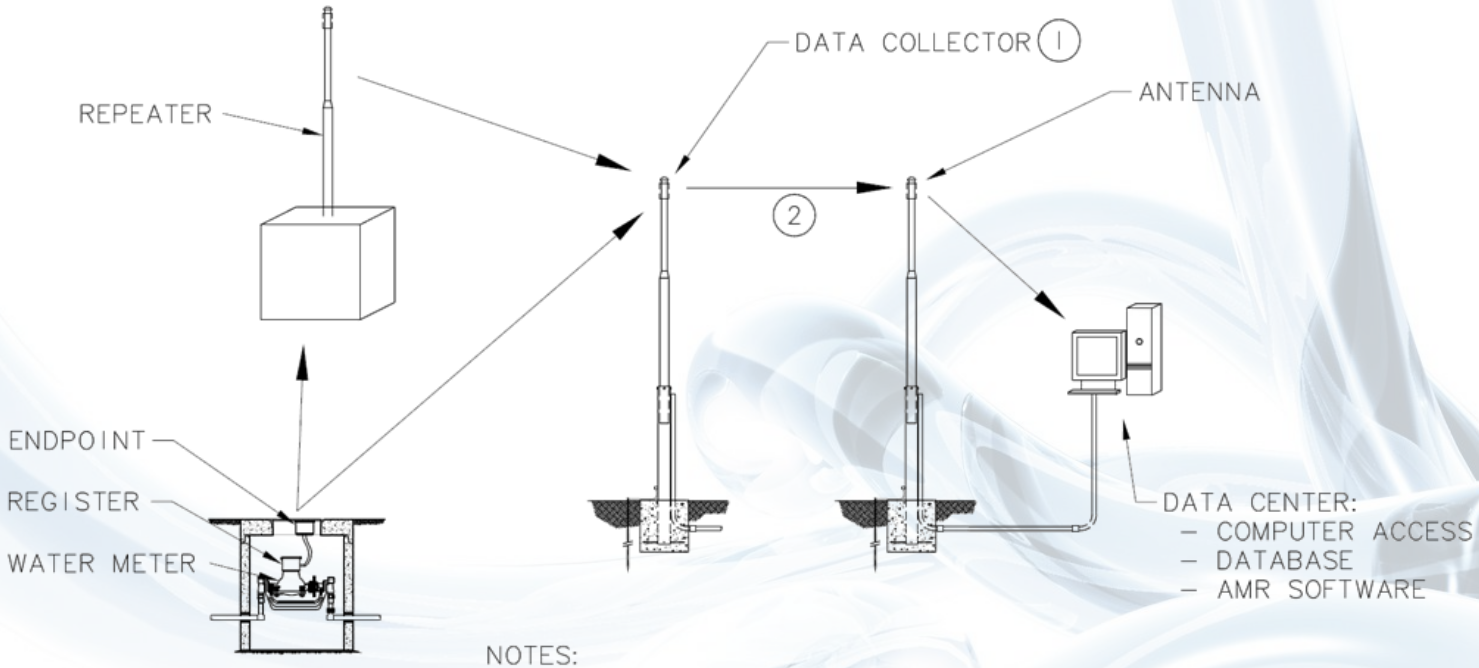
NOTES:

1 DATA IS DOWNLOADED FROM TRUCK COMPUTER TO CENTRAL DATABASE AT THE END OF A WORKDAY

Water Meter Reading Overview



Fixed Base Automated Metering Infrastructure: AMI



NOTES:

1. COLLECTORS MAY BE MOUNTED ON WATER TOWERS, LIGHT POLES, BUILDINGS OR OTHER CITY–OWNED INFRASTRUCTURE. COLLECTORS MAY BE POWERED BY ELECTRICAL SERVICE OR SOLAR PANELS.

2. DATA BACKHAUL MAY OCCUR BY A NUMBER OF DIFFERENT METHODS INCLUDING CELLULAR, WI–FI, SCADA COMMUNICATIONS, DIRECT CABLE OR OTHER MEANS.

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Meter Pit Component Demonstration

- Kim Lord, City of Nampa
- Tony Baltierra, City of Nampa

Rate of Data Collection

- **Manual Meter Reading**
  - One meter reading per meter per one or two month period
  - Or 100-400 meter reads per day per individual
- **Mobile Meter Reading**
  - 2,000 to 30,000 meter reads per day per truck
  - Dependent on frequency of drive routes
- **Fixed Base Meter Reading**
  - Up to 720 reads per month per meter

Rate Unit	Manual	Mobile AMR	Fixed Base AMI
Reads Per Worker per Day	100-400		Essentially real time
Reads Per Vehicle per Day		2,000-30,000	Essentially real time

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Benefits of AMR/AMI

- ❑ **Lower operating costs: rapid meter data collection**
- ❑ **Eliminate human error**

Reduced Personnel, Vehicles, Oversight, & Equipment

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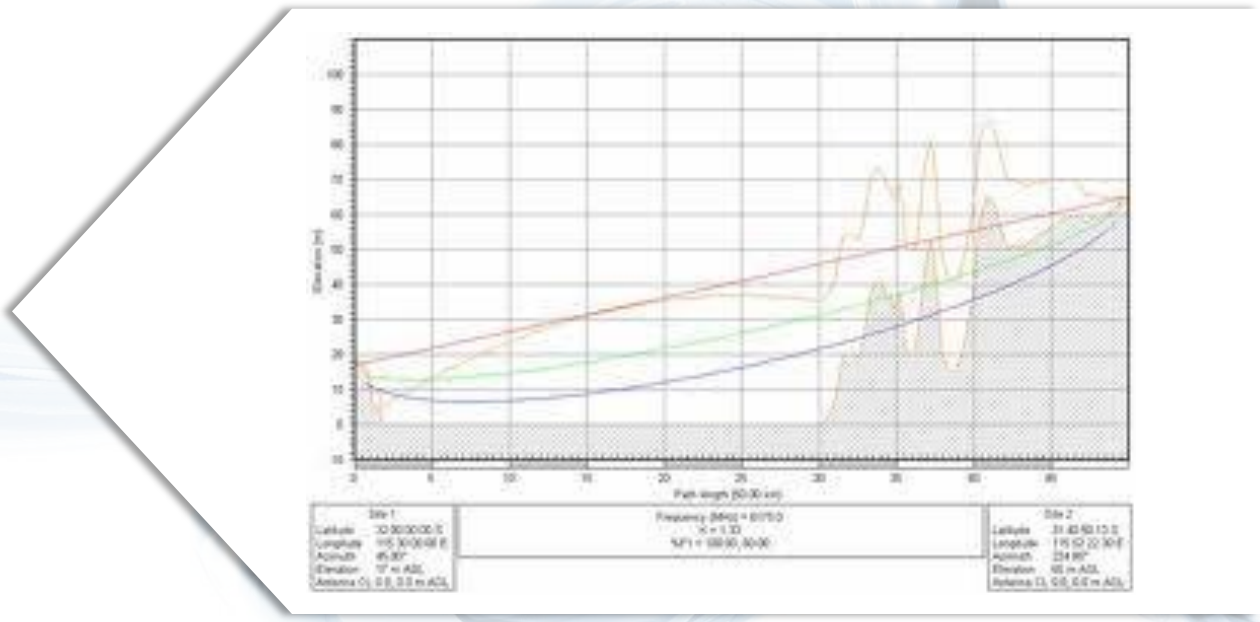
Benefits of AMR/AMI

- **Enhanced customer service support**

Benefits of AMR/AMI

- Engineering and Operations Troubleshooting Support
- Water and Sewer Master Planning Support



Benefits of AMR/AMI

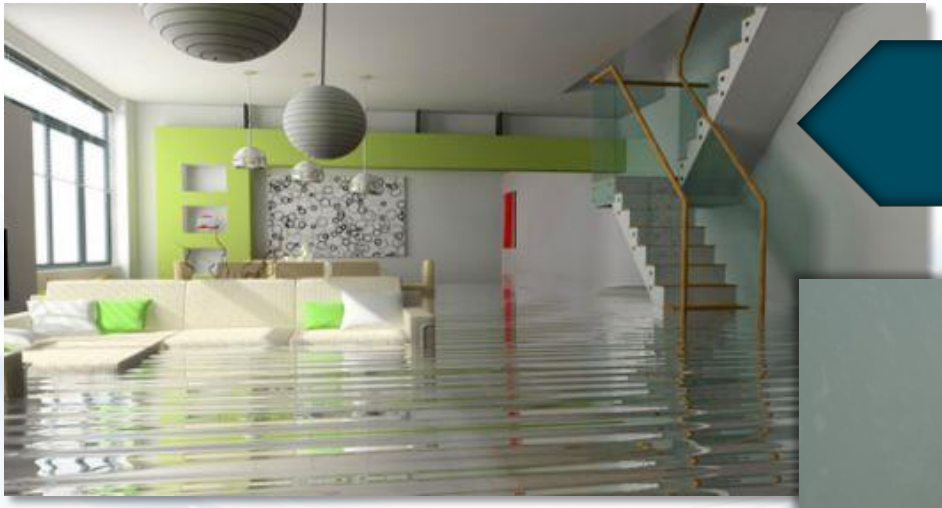
- **Water Conservation Support**
  - Water usage tracking
  - Time-of-use rate structures

Benefits of AMR/AMI

- **Ability to switch to monthly billing**

Benefits of AMI

- **Real time leak and backflow detection**



Leaks can be detected before a major issue occurs

Separate irrigation system

Benefits of AMI

- **Reduced Turn-on/Turn-offs/Special Reads**
  - Virtual Turn-On/Turn-Off Reads
  - Remote shutoff valve via two-way communications

Benefits of AMI

- Real time identification of Tamper/Water Theft

Implications of AMR/AMI Systems

- **Requires An Up Front Capital Investment**
  - Cost discussion to follow
- **Requires System Implementation & Personnel Training**
  - Personnel
  - Database Support
  - Billing System Integration
  - Work Order Integration

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Mobile AMR vs. Fixed Base AMI

- **Financial Analysis: Costs**
  - Equipment costs, installation, and implementation
  - Ongoing O&M
  - Additional IT support
- **Financial Analysis: Savings**
  - Personnel and vehicles
  - Benefits that are difficult to quantify

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Mobile AMR vs. Fixed Base AMI Model Basis

- 20-Year useful life analysis
- Cost/Benefit comparison relative to current operations
- Net-Present Value comparison
- 2-Year implementation period
- Fund with loan at 6% interest rate
- Do not include cost of meter replacement
- Full system-wide implementation (28,000 accounts)

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Unaccounted Benefits in Financial Model

- **Real Time Leak Detection**
- **Real Time Backflow Detection**
- **Engineering and Operations Troubleshooting**
- **Water and Sewer Master Planning Data Support**
- **Water Conservation Support in Future**
- **No Need to Access Property**
  - Improved Safety
  - Reduced Liability

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Financial Model Overview: Mobile AMR vs. Fixed Base AMI Relative to Current Operations

Mobile AMR Financial Analysis:

Change in Net Present Value	**($2,147,000)**
Payback Period	> 20 Years

Fixed Base AMI Financial Analysis:

Change in Net Present Value	**$158,000**
Payback Period	19 Years

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Conclusions

- Fixed base AMI system is a better financial alternative for the City of Nampa relative to current operations.
- A mobile AMR system is not a better financial alternative relative to current operations and is less efficient than a fixed base AMI system

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Project Description

- Replace 20,000 old meters out of 28,000 meters in the system
- Construct AMI System along with meter replacement

Optimized Project

- **Replace approximately 20,000 old meters**
  - Improve read accuracy
  - AMR compatibility
- **Maintain relatively new meters in place until their service life is exhausted (approximately 8,000 meters)**
- **Install AMI for 20,000 accounts**

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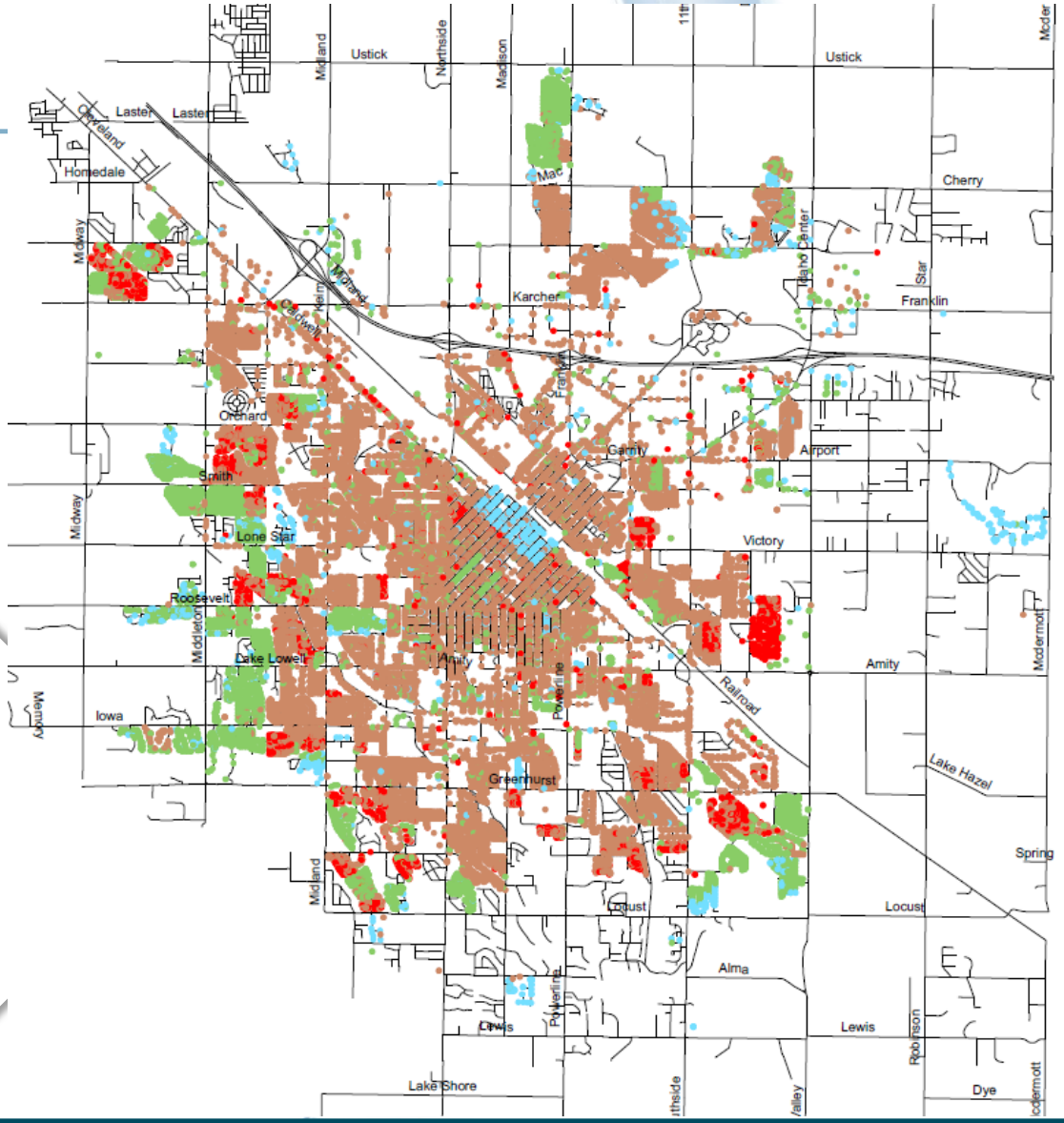

Legend

Water Meter Type

- ABB
- Radio Read
- Standard
- Touch Read

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Fixed Base AMI Financial Models

- **Approximately 7-Year Implementation**
  - Utilize cash from water fund revenues and fund balance

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Financial Model Overview: New Meters Relative to Current Operation

Conservative Analysis:

Change in Net Present Value	**$1,384,000**
Payback Period	13-14 Years

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Financial Model Overview: AMI System Relative to Current Operation

Conservative Analysis:

Change in Net Present Value	**($79,000)**
Payback Period	> 20 Years

Optimistic Analysis:

Change in Net Present Value	**$1,084,000**
Payback Period	16-17 Years

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Seven Year Implementation: New Meters and AMR - Probable Cost

Year	Meters	AMR System	Previously Budgeted
2011	($1,058,000)	($819,000)	$500,000
2012	($805,000)	($559,000)	“
2013	($829,000)	($481,000)	“
2014	($854,000)	($495,000)	“
2015	($880,000)	($510,000)	“
2016	($906,000)	($525,000)	“
2017	($933,000)	($541,000)	“
Totals	($6,265,000)	($3,930,000)	$3,500,000

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Cost/Benefit Model Sensitivity

- Non Quantifiable System Benefits
- Meter Pit Lid Replacement

Next Steps

- Pre-qualify AMR suppliers to bid on the project
- Bid AMR system
- Bid new water meters
- AMI and meter installation begins in 2011

Model

- Model discussion if time allows

Acknowledgements

City of Nampa Staff

Nampa City Council

Questions?

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Murray, Smith & Associates, Inc.
Engineers/Planners