



STREAMLINE MONTGOMERY: DEVELOPING THE NON-REVENUE WATER REDUCTION ROADMAP

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IEPA #19729

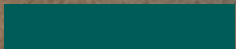


Agenda

1. Background
2. WY2021 Water Audit Results and the “Buckets”
3. Key NRW Reduction Strategies
4. Observations/Next Steps

A circular logo with a gold border and a teal ribbon-like shape at the bottom. Inside the circle, the number "50" is written in a large, bold, serif font, and the word "Years" is written in a smaller, cursive font below it.

50
Years

A solid teal horizontal bar.

BACKGROUND

GENERAL INFORMATION

Village of America, Illinois

- Located in NE Illinois (Kane and Kendall Counties)
- Current Water Sources – Deep Wells and Shallow Wells
- 5.8 MG of Water Storage Capacity
- Service Incorporated/ Unincorporated Areas



29,928

**Population
Served**

9,473

**Water Service
Accounts**

2.7 MGD

**Average Day
Water Demand**

137 miles

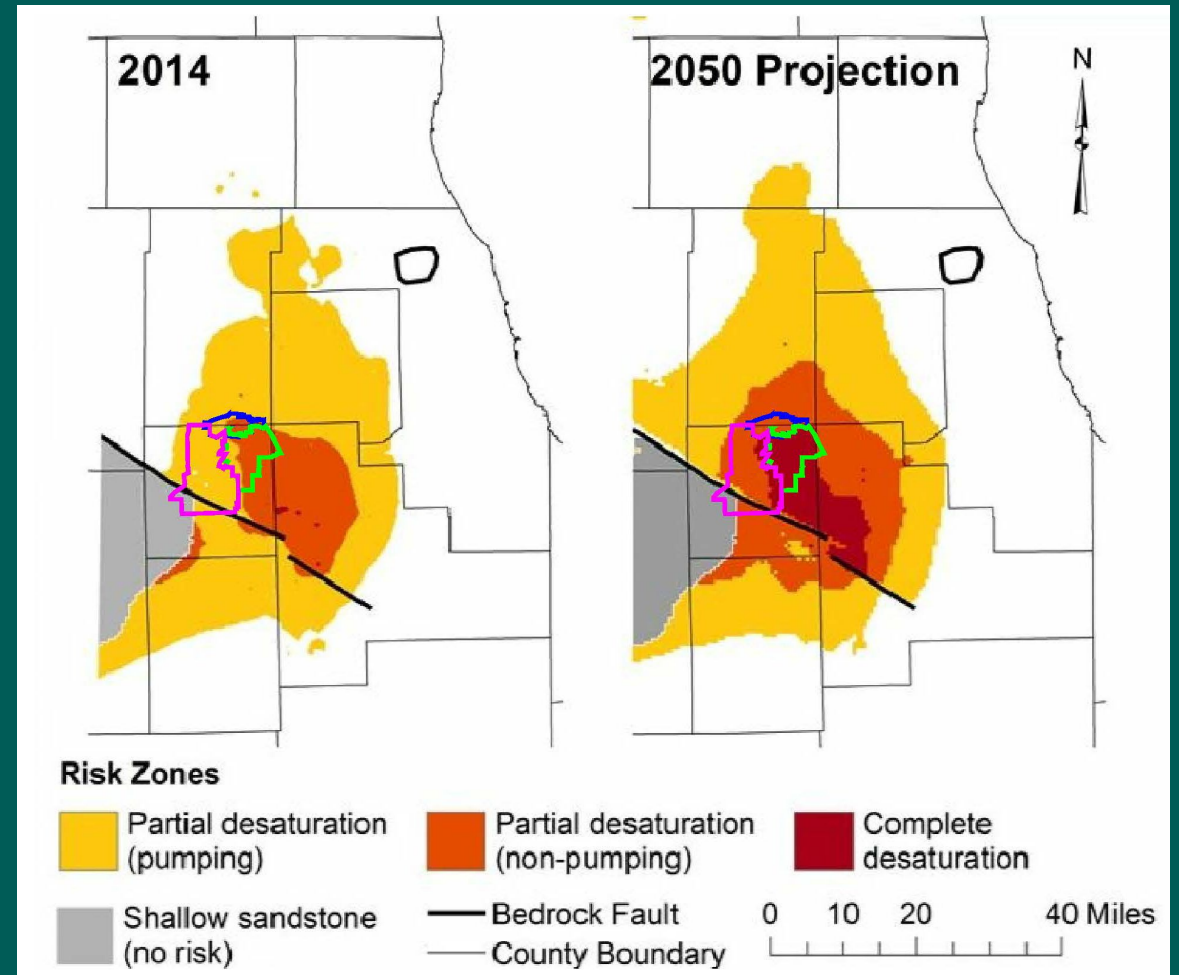
**Water Distribution
System**

Regional Deep Sandstone Modeling Showing Dewatering Risk

- Areas Already Experiencing Dewatering
- If Current Trends Water Use Continues, ISWS Expects a Large Area To Be At Risk By 2050



SUSTAINABLE SOURCE WATER ASSESSMENT



Montgomery Planning Area Oswego Planning Area Yorkville Planning Area



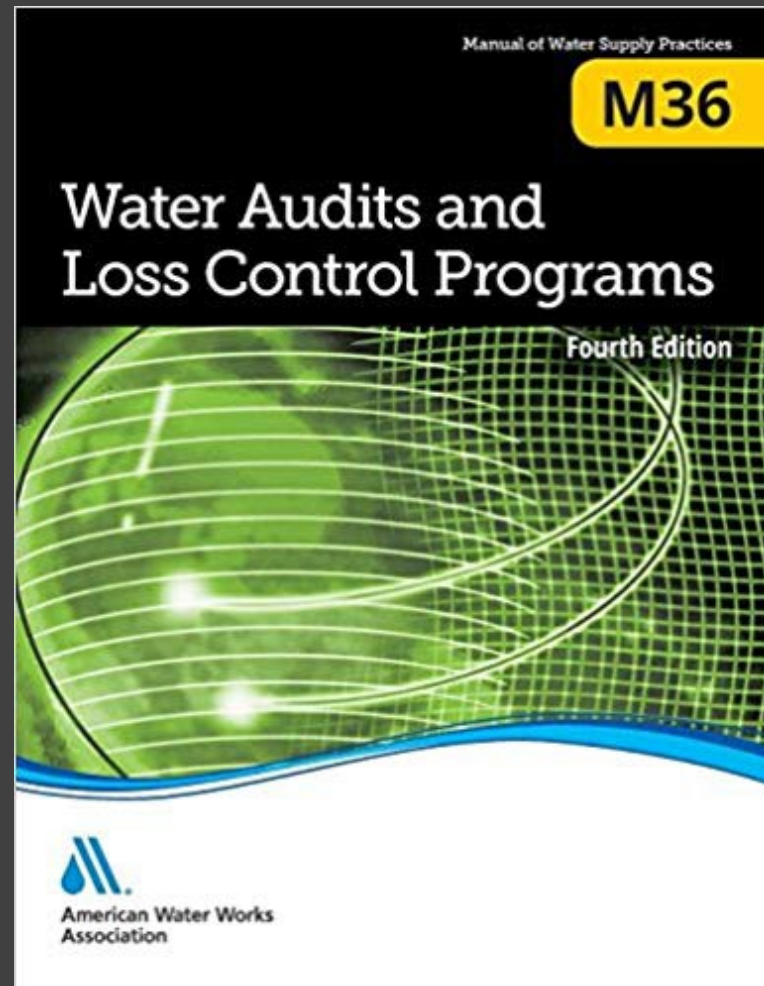
Regulatory Requirements of Lake Michigan Water Allocation Permittee – Loss of Autonomy

- All Lake Michigan Water Supply Customers are Required to Obtain an Allocation Permit which is regulated through IDNR
- Annual Data Collection and Testing
- Annual Water Audit Preparation (and Water System Improvement Plan if NRW < 10%)
 - **WY2021: NRW = 30.7%+**
- Ongoing Infrastructure Improvements Required to Achieve and Remain in Compliance with NRW < 10%





AWWA M36 Manual and Water Audit Software



AWWA Free Water Audit Software: Reporting Worksheet

Water Audit Report for: Northern San Leandro Combined Water Sewer Storm Utility District (0009000)
 Reporting Year: 2013 12/01 - 12/31/13

Please enter data in the white or light blue cells. If data is not available, enter a value of 0. If a value is not available, please estimate a value. Indicate your estimation in the accuracy of the input data by grading the input as a percentage of (0 to 100) using the drop-down list to the left of the input cell. Enter the input value then click on the data in a description of the grade.

All volumes to be entered as: MILLION GALLONS (MG) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Volume from own's sources	Water imported	Water exported	WATER SUPPLIED
1,000,000 MG/yr	1,000,000 MG/yr	1,000,000 MG/yr	825,000 MG/yr

AUTHORIZED CONSUMPTION

Billed unmetered	Billed metered	Unbilled unmetered	Unbilled metered	AUTHORIZED CONSUMPTION
700,000 MG/yr	50,000 MG/yr	10,319 MG/yr	10,319 MG/yr	710,319 MG/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

WATER LOSSES (Water Supplied - Authorized Consumption)

Unauthorized consumption	Customer metering inaccuracies	Systematic data handling errors	Apparent Losses
3,000 MG/yr	2,071 MG/yr	5,000 MG/yr	15,071 MG/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses	WATER LOSSES
40,677 MG/yr	66,646 MG/yr

NON-REVENUE WATER

NON-REVENUE WATER
25,000 MG/yr

SYSTEM DATA

Length of main	Number of active AND installed service connections	Service connection density
100.0 miles	1,000	10 connections/mile

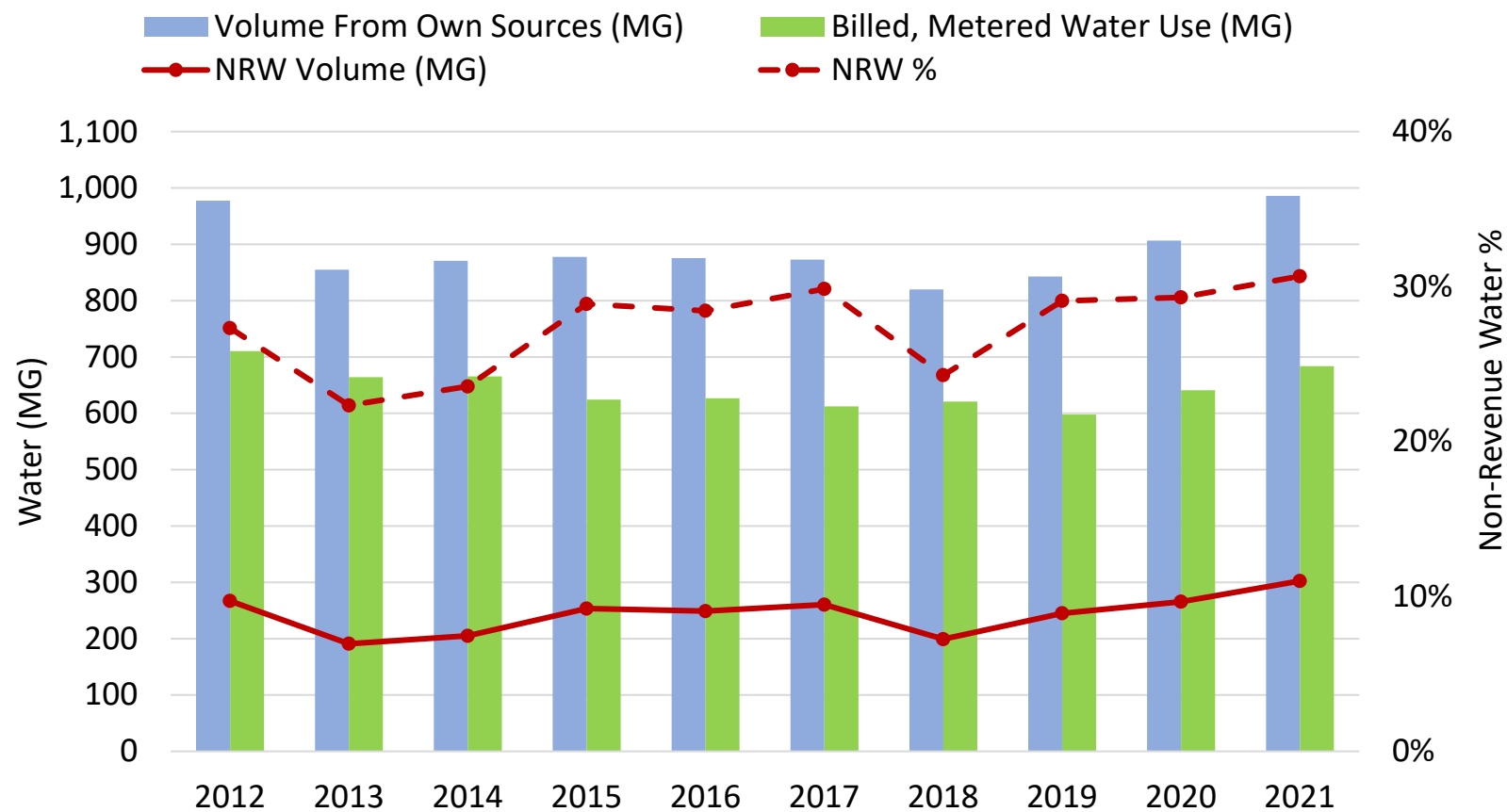
Are customer meters typically located at the curbside or property line? Yes (length of service line, tapping the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 60.0 psi

COST DATA

Total annual cost of operating water system	Customer retail unit cost (applied to Apparent Losses)	Variable production cost (applied to Real Losses)
\$1,000,000 \$/year	\$0.50 \$/1000 gallons (US)	\$3,000.00 \$/million gallons



Historical Water Audits

WY2021:

304 MG NRW

30.8% NRW

Data Validity Score= 62

NRW Volume vs. NRW %

Non-Revenue Water Components:

UNBILLED AUTHORIZED USE

- Hydrant Flushing
- Fire Use (Fighting, Training, Hydrant maintenance)
- Auto-flushers
- Construction uses
- Treatment Losses



APPARENT LOSSES

- Water Systematic Data Handling Error
- Customer Meter Inaccuracies
- Theft



REAL LOSSES

- Water Main Breaks/Leaks
- Service Line Leakage up to Customer Meter
- Storage Tank Overflows



**Unbilled
Authorized
Consumption
94.1 MG
31.1%**

**Apparent Losses
17.2 MG
5.7%**

**Real Losses
191.2 MG
63.2%**

- Unbilled Metered Consumption
- Unbilled Unmetered Consumption
- Unauthorized Consumption
- Customer Meter Inaccuracies
- Systematic Data Handling Errors
- Real Losses

**NRW:
The “Buckets” of
Water**

The background of the slide is a grayscale photograph of numerous large, dark-colored pipes stacked in neat rows, receding into the distance. A small teal horizontal bar is positioned above the text.

KEY NON-REVENUE REDUCTION STRATEGIES



NRW Reduction Strategy Categories

1. General
2. Unbilled Authorized Consumption
3. Apparent Losses
4. Real Losses

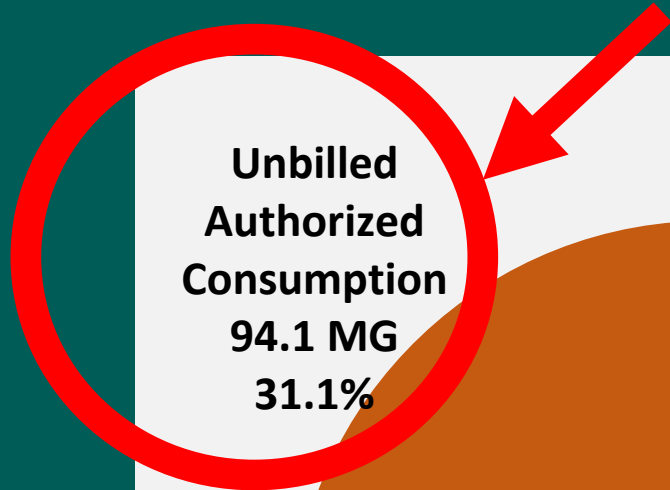


KEY NRW REDUCTION PLAN INITIATIVES

GENERAL PLAN ITEMS

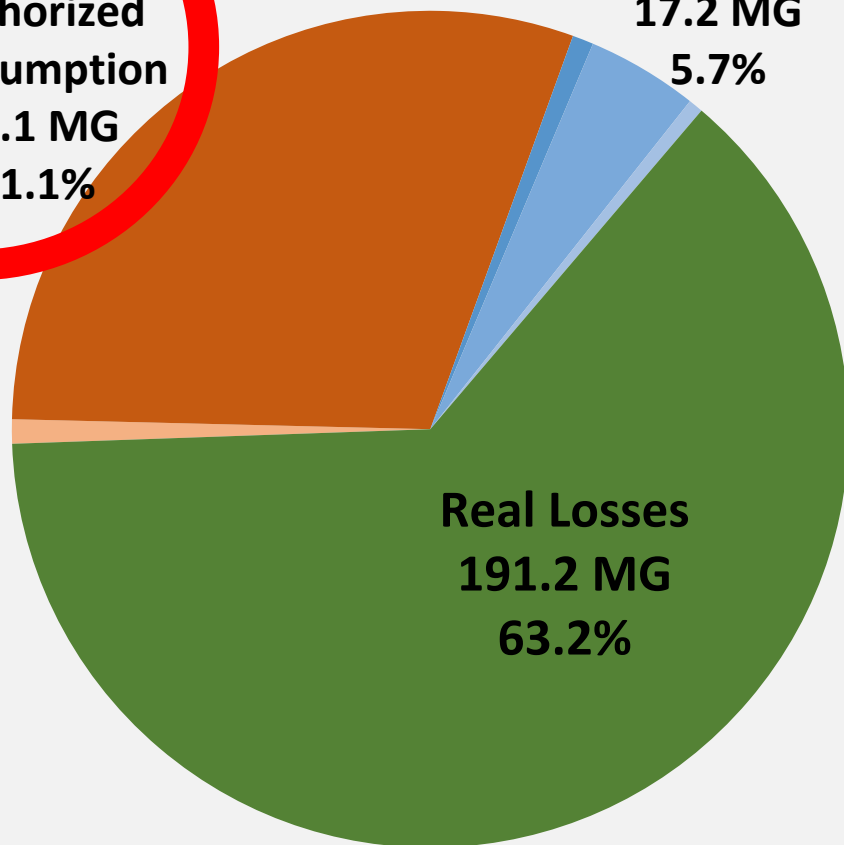
- Establish a Water Loss Team and Champion – Meet Quarterly
- Continually Complete Annual Water Audit
- Monitor Impact of NRW Initiatives and Pivot as Necessary
 - ✓ Required by IDNR and Good Practice





**Unbilled
Authorized
Consumption
94.1 MG
31.1%**

**Apparent Losses
17.2 MG
5.7%**

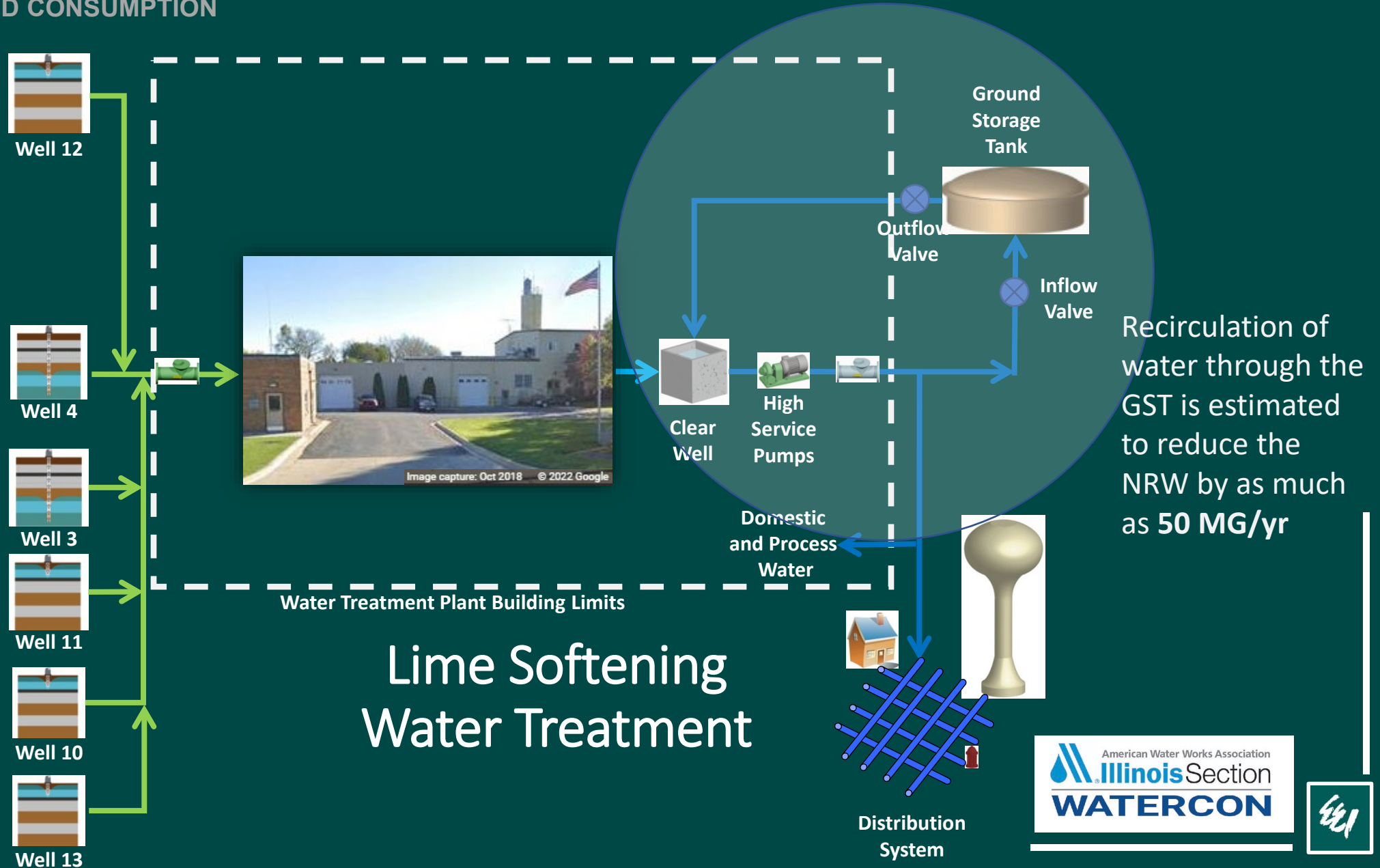


- Unbilled Metered Consumption
- Unbilled Unmetered Consumption
- Unauthorized Consumption
- Customer Meter Inaccuracies
- Systematic Data Handling Errors
- Real Losses

**NRW:
The “Buckets” of
Water**

KEY NRW REDUCTION PLAN INITIATIVES

UNBILLED AUTHORIZED CONSUMPTION





Location	Number of Days/Year	Times/Day	Flushing Time (minutes)	Flow Rate (gpm)	Usage (gal)
Case St.	365	3	20	200	4,380,000
Jefferson St.	365	3	20	200	4,380,000
Helene Rieder Dr.	365	3	30	200	6,570,000
Ashlawn/Oswegoland Park District Civic Center	365	3	20	200	4,380,000
Galena FD	365	3	15	200	3,285,000
Total					22,995,000

KEY NRW REDUCTION PLAN INITIATIVES

UNBILLED AUTHORIZED WATER USE

- Improve the Tracking of Unbilled, Unmetered Water:
 - Fire Protection Districts use
 - Flushing hydrants
- Review/minimize auto-flusher use (WY2021 = 23± MG estimated):
 - Review metering possibilities (Could be 2X the estimate or more)
 - Dead-end main improvements
 - Water Distribution System in line Chlorination
- Convert Unbilled Water Use to Billed Water Use
 - Water Treatment Plant Losses

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94.1 MG
31.1%**

**Apparent Losses
17.2 MG
5.7%**

- Unbilled Metered Consumption
- Unbilled Unmetered Consumption
- Unauthorized Consumption
- Customer Meter Inaccuracies
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- Real Losses

**Real Losses
191.2 MG
63.2%**

**NRW:
The “Buckets” of
Water**

KEY NRW REDUCTION PLAN INITIATIVES

APPARENT LOSSES

- Full Customer Meter Change-Out Program with AMI Technology – Complete by 2026
- Master Meters – Continue with Annual Testing
- Large Water User/Meter Testing
- Billing software inconsistencies - Forensic data investigation and analysis

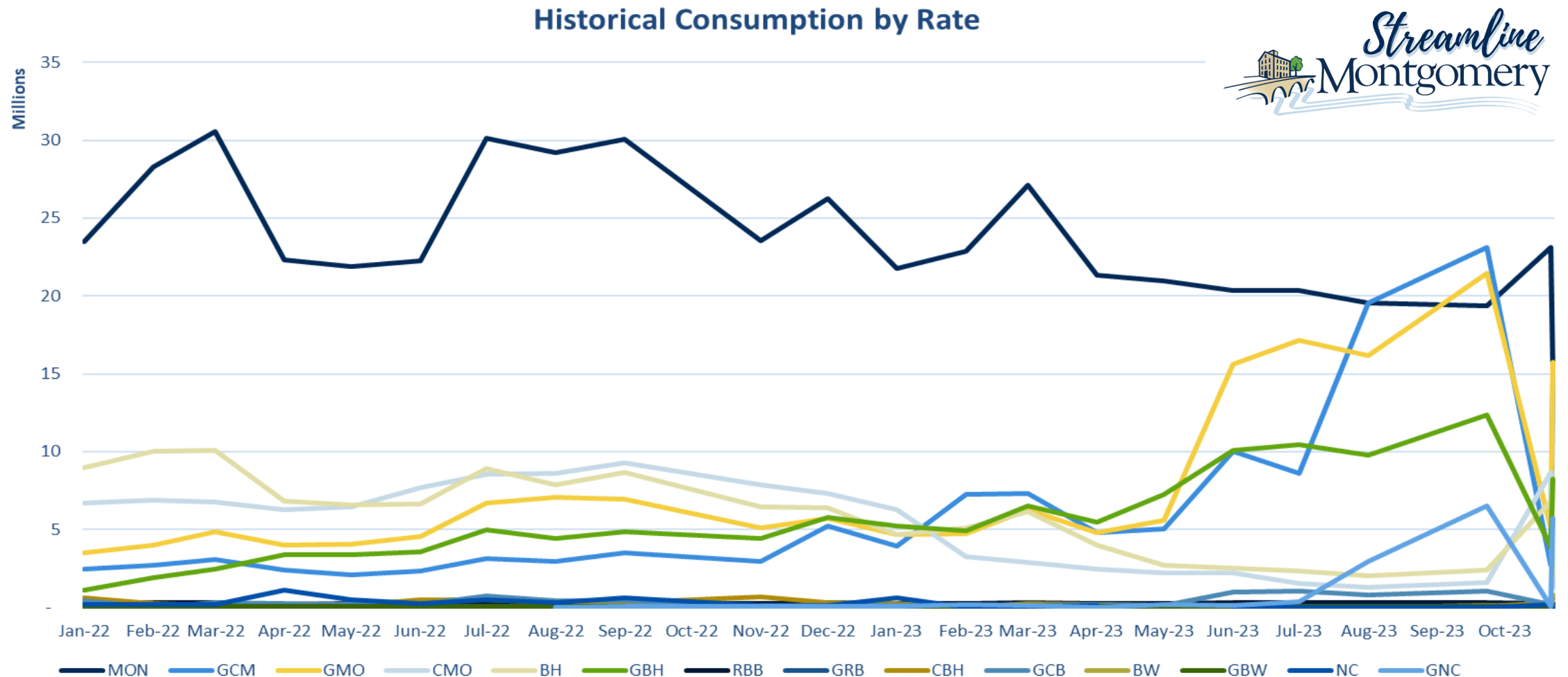




Broken Systems

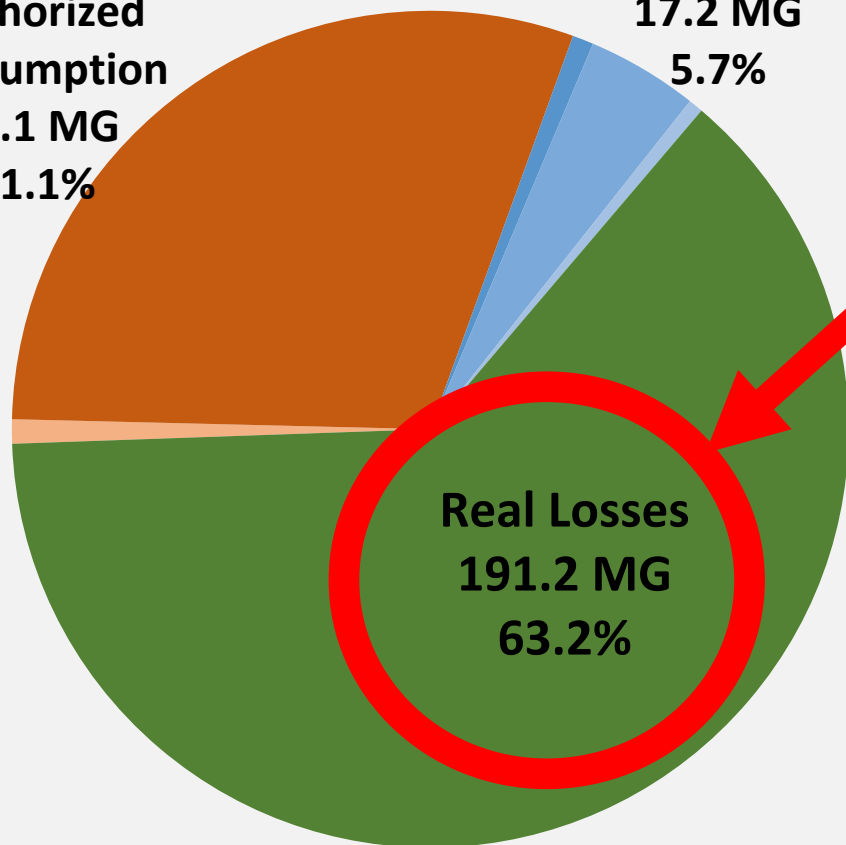
- Process Audits
 - Training
 - Communication
 - Billing Audits
 - Estimates
 - 0 Consumption
 - Commerical Meter Audits
 - Managerial Review of Billing
 - Standards of Service

Apparent Loss Trend Analysis



**Unbilled
Authorized
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94.1 MG
31.1%**

**Apparent Losses
17.2 MG
5.7%**



- Unbilled Metered Consumption
- Unbilled Unmetered Consumption
- Unauthorized Consumption
- Customer Meter Inaccuracies
- Systematic Data Handling Errors
- Real Losses

**NRW:
The “Buckets” of
Water**

KEY NRW REDUCTION PLAN INITIATIVES:

REAL LOSSES

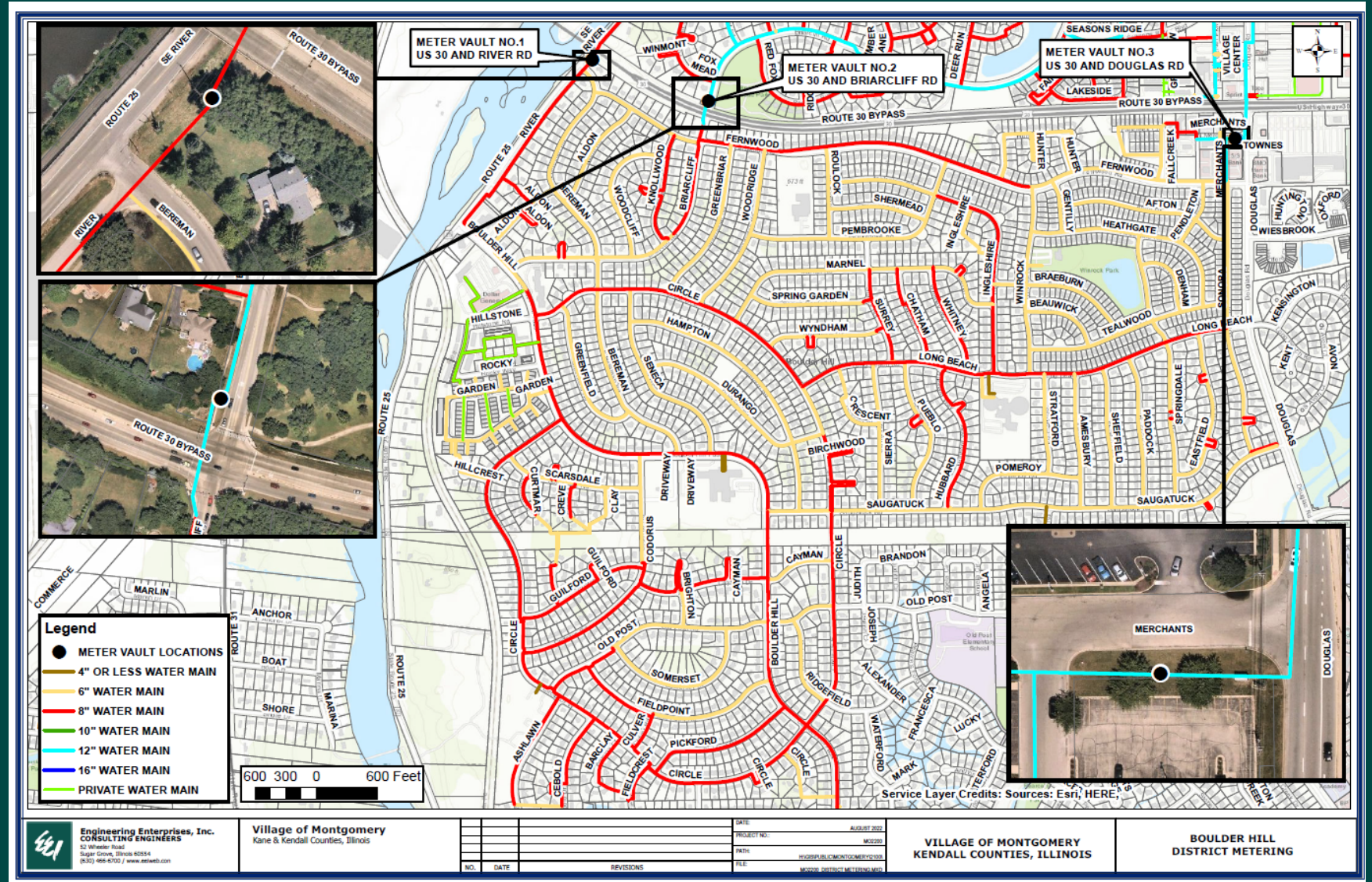
- Perform Annual Leak Detection on 100% of Distribution System Annually
- Targeted, more frequent leak detection in Boulder Hill (Unincorporated) area
- Review potential for service leaks
 - Consider pilot program to test for service leaks



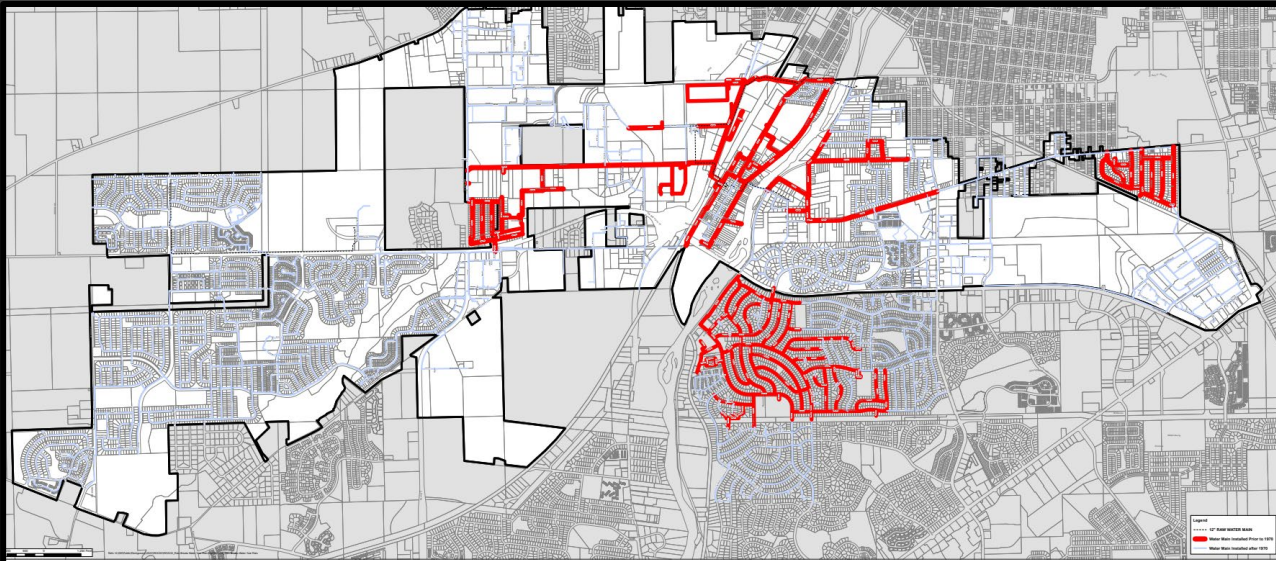
REAL LOSSES

DISTRICT METERING AREA IMPROVEMENTS

- **8" Meter at US 25 & Fernwood Road**
- **12" Meter at US 30 & Briarcliff Road**
- **12" Meter at Merchants Drive (and Douglas Road)**

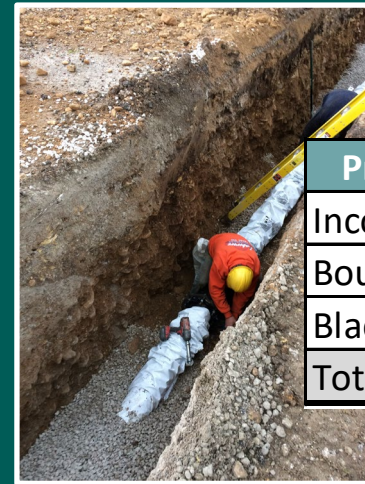


KEY NRW REDUCTION PLAN INITIATIVES: WATERMAIN REPLACEMENT



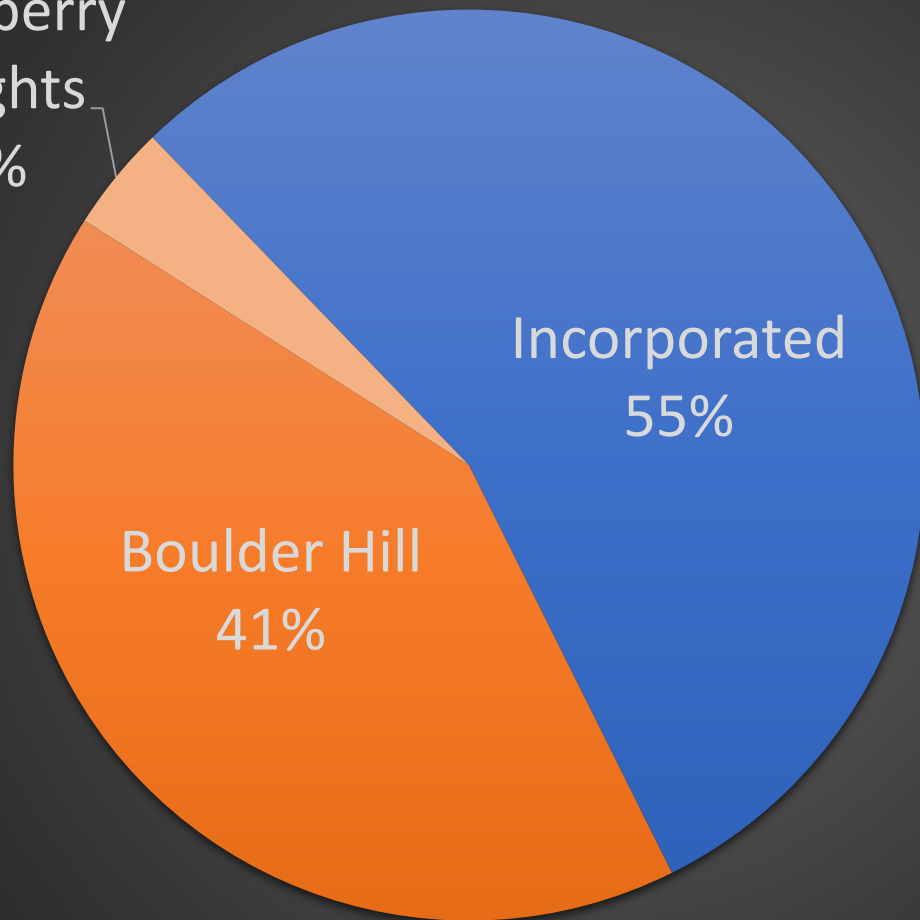
Replacing 21% of the 137 miles of water mains total in the system

- Replace 3% of water main per year (average)
- Replace all pre-1970s water main by 2030
- **\$75 million total**



Pre-1970s Water Main Length Summary		
Incorporated	82,229	15.6
Boulder Hill	62,001	11.7
Blackberry Heights	5,636	1.1
Total	149,866	28.4

Blackberry
Heights
4%



Incorporated
55%

Boulder Hill
41%

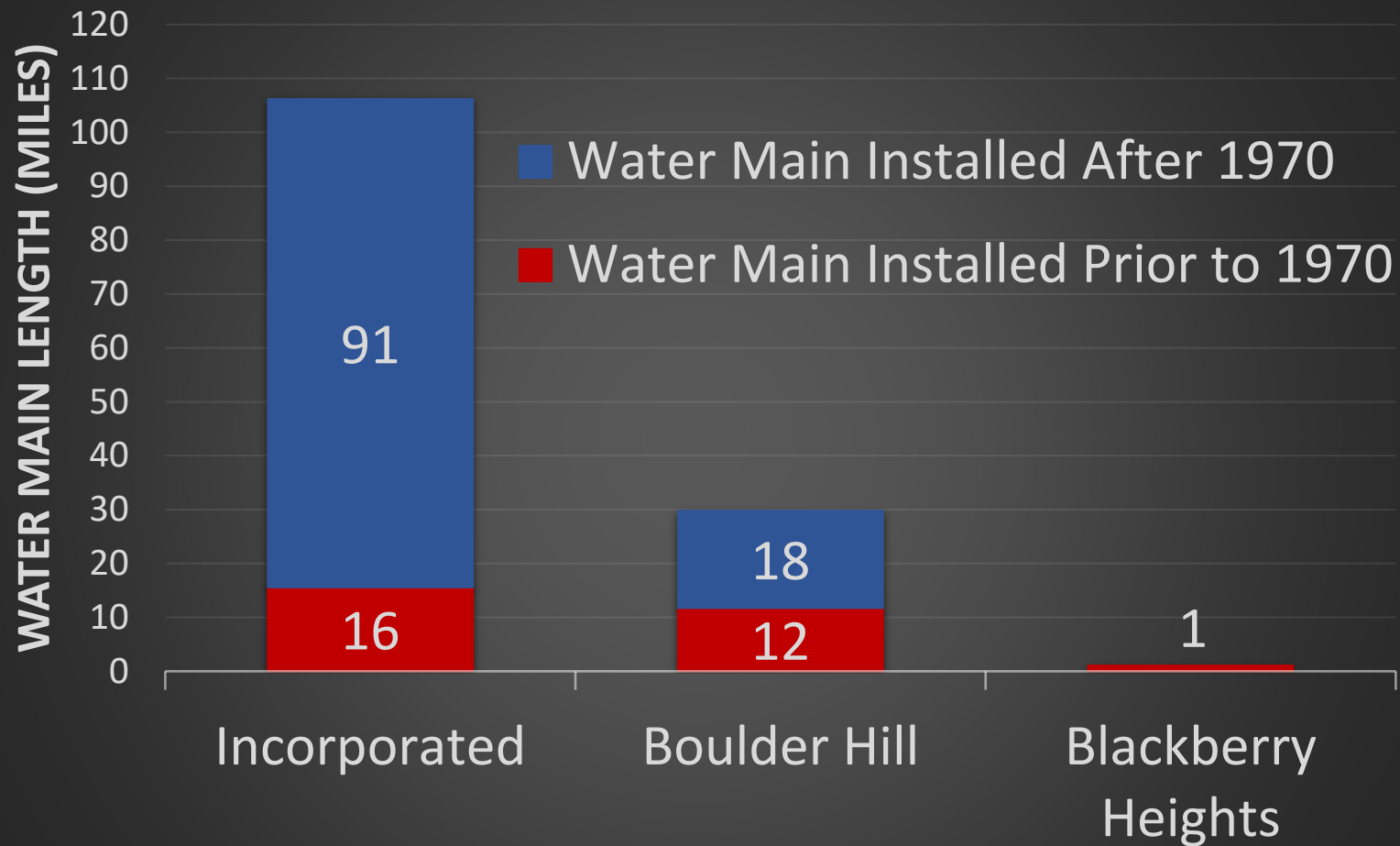
■ Incorporated

■ Boulder Hill

■ Blackberry
Heights

Pre-1970s Water Main by Location

28+ Miles Total



Pre and Post 1970s Water Main by Location

137+ Miles Total



OBSERVATIONS / NEXT STEPS

Observations / Next Steps

- Defaults and estimates for Unbilled Authorized Assumption and Apparent Losses tend to be low which often results in Real Losses being shown as the largest contributor to NRW
 - It is critical to refine the assumptions. Real losses are the costliest to repair. This will also increase the Data Validity score.
- It will be critical to monitor the impact of the NRW initiatives regularly and pivot as necessary
- Funding and Budgeting Considerations



Projected Implementation Schedule

Observation of full impacts of NRW Reduction Initiatives will be delayed by a year

- Water main replacement may take longer to see the impacts
- Educate your bosses and elected officials early on that the impacts will not necessarily be immediate

Completion
pre-1970's
Water Main
Replacement

Obtain
Lake
Michigan
Water



IDNR Submittal	YEAR										
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Montgomery Schedule											

Begin Replacing pre-1970's Water Main
(Average 3% Annually)

NRW < 10%



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THANK YOU!

For Attending This Educational Session!



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