



***The Impacts of Water Conservation On Water Works  
System Expansion Capital Expenditures  
(Less Water Demand = More Money)***

**Drinking Water 1-2-3**  
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Presented By:

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Background Information



Water Works System (WWS) Planning Overview



WWS Sustainable Master Plan Results



Water Conservation Impacts



Implementation Realities

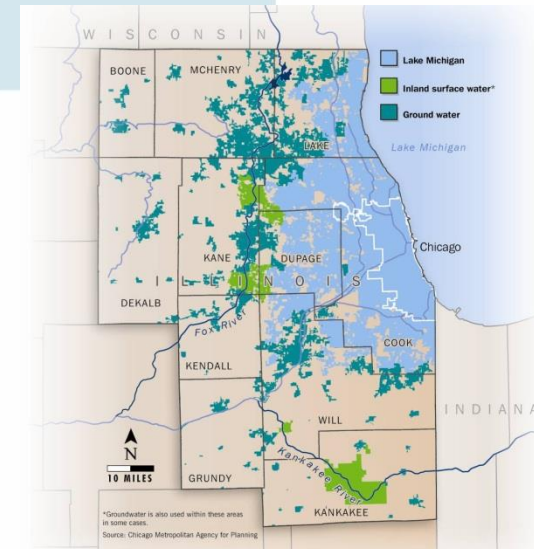
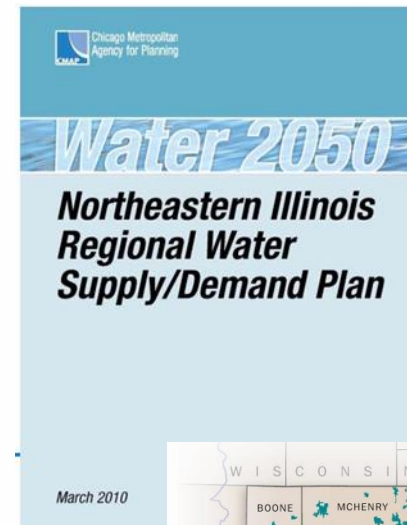


Q&A

- ◆ CMAP Coordinated Stakeholder Driven Process → 35 Delegates From NE IL
- ◆ Water Supply & Demand Analysis For 11 County NE IL Region
- ◆ Mission Statement:

*To consider the future water supply needs of northeastern Illinois and develop plans and programs to guide future use that provide adequate and affordable water for all users, including support for economic development, agriculture, and the protection of our natural ecosystems*

- ◆ **Recommended Water Demand Management To Stretch Capacity of Existing NE IL Water Supply Resources**

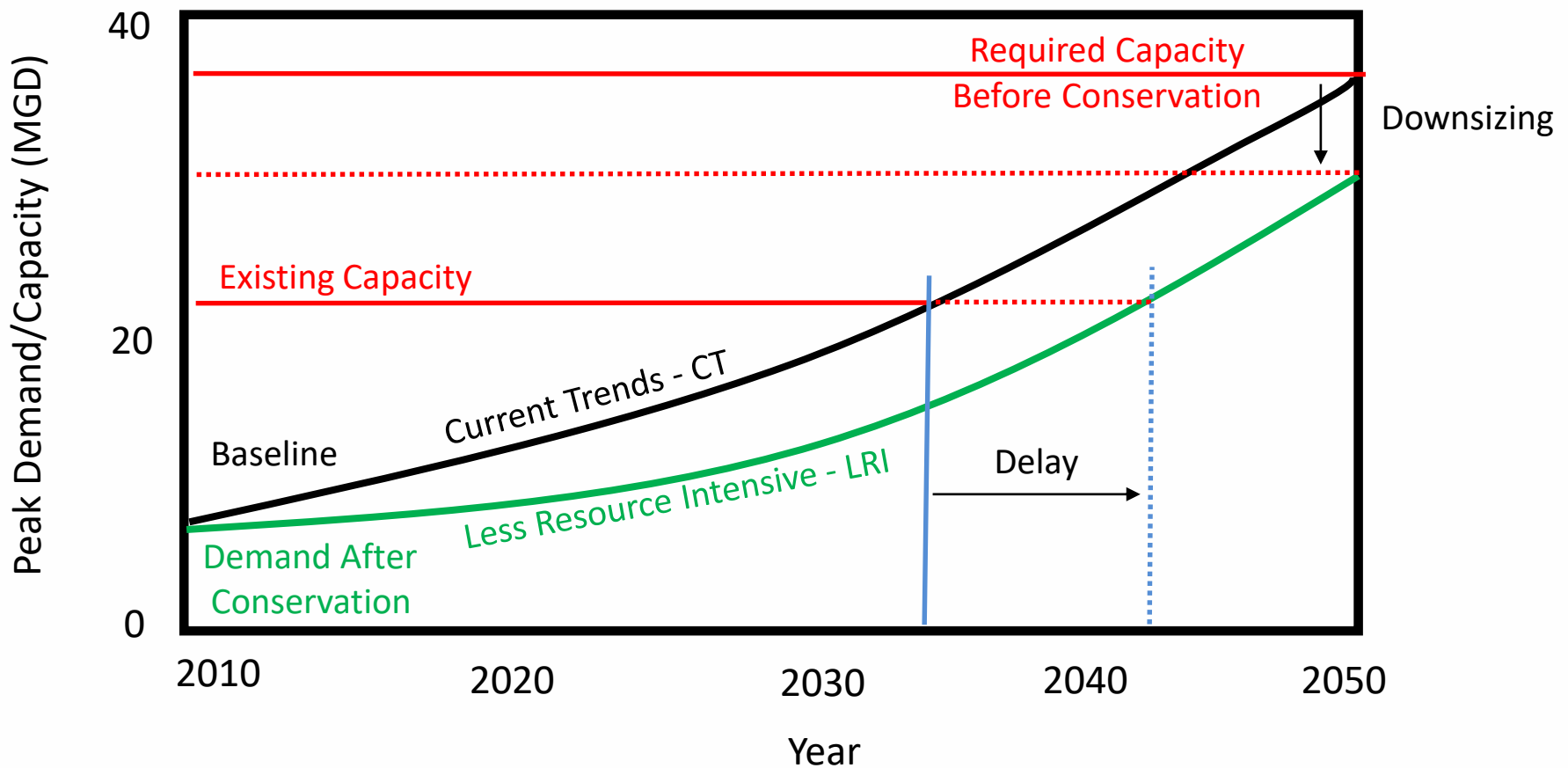




## **Water 2050 Water-Use Conservation Best Management Practices**

- ◆ Water Conservation Coordinator
- ◆ Water Survey For Residential Customers
- ◆ Residential Plumbing Retrofit
- ◆ Residential High Efficiency Toilet Replacement Program
- ◆ High-Efficiency Clothes Washing Machine Replacement Program
- ◆ System Water Audits, Leak Detection and Repair
- ◆ Metering With Commodity Rates
- ◆ Water Waste Prohibition For Residential & Non-residential Customers
- ◆ Efficient Water Use Landscaping For Large Landscape Areas
- ◆ Conservation Programs For Commercial, Industrial, and Institutional Accounts
- ◆ Public Information Programs
- ◆ Retail Conservation Pricing
- ◆ School Education Programs

## Deferred Capacity Increases Due To Water Use Reduction *Hypothetical Community*



Source: AWWA

## 💧 Supply



## 💧 Treatment



## 💧 Storage



## 💧 Distribution



- 💧 **Average Day Demand (ADD)**  
 Total water use throughout the year divided by # of days in year
- 💧 **Maximum Day Demand (MDD)**  
 Maximum daily demand within a year
- 💧 **Maximum Hour Demand (MHD)**  
 Maximum hour of demand throughout year
- 💧 **MDD:ADD Ratio**  
 Ratio of MDD to ADD



## Population Projection

Develop population projection for planning period

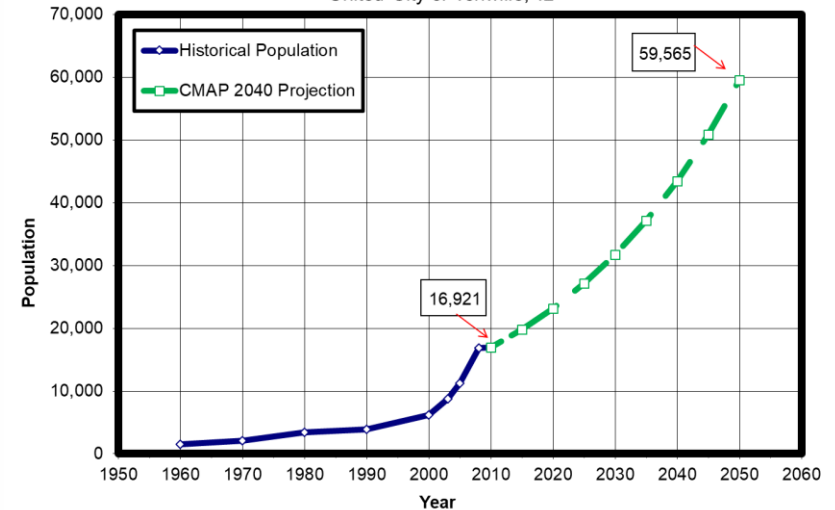
## Current Trends (CT)

### Water Use Projection

Review historical water use patterns and then develop “business as usual” water use projection for planning period

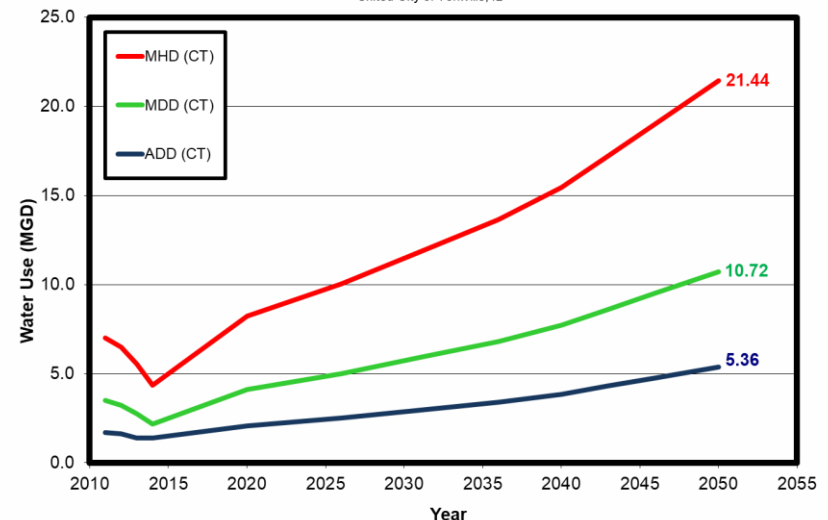
**Exhibit 1-2: Historical and Projected Population Summary**

United City of Yorkville, IL



**Exhibit 3-4: Historical and Projected Water Use Summary**

United City of Yorkville, IL





## 💧 **Water Conservation BMP Evaluation**

Evaluate water conservation best management practices applicable to your community

Quantify achievable water use reduction with heightened focus on water conservation





# WWS Planning Overview

**Table No. 3-11: Potential Estimated Water Savings  
From Water Conservation and Efficiency  
City of Batavia, Kane Co., IL**

Category		Water Saved (MGD)	% Of Total (%)
Outdoor	All Customers	0.085	2.3%
	New Landscape	0.008	0.2%
Utility Water - System Losses		0.186	5.0%
Indoor Residential	High Efficiency Toilets (HET)	0.133	3.6%
	High Efficiency Washing Machines (HEWM)	0.077	2.1%
	Retrofits	0.132	3.5%
Commercial, Industrial, and Institutional Customers		0.084	2.3%
<b>Total Estimated Savings =</b>		<b>0.706</b>	<b>19%</b>



# WWS Planning Overview

- ◆ **Outdoor Water Use Reduction**

Assume 50% of water use is wasted and 50% of the wasted amount can be saved

- ◆ **Utility Water System Losses Reduction**

Assume water loss reduced by 50% or consistent with Non-Revenue Water Reduction Plan

- ◆ **High Efficiency Toilets, Washing Machines & Fixture Retrofits**

Assume 90% of households built pre-1994 convert

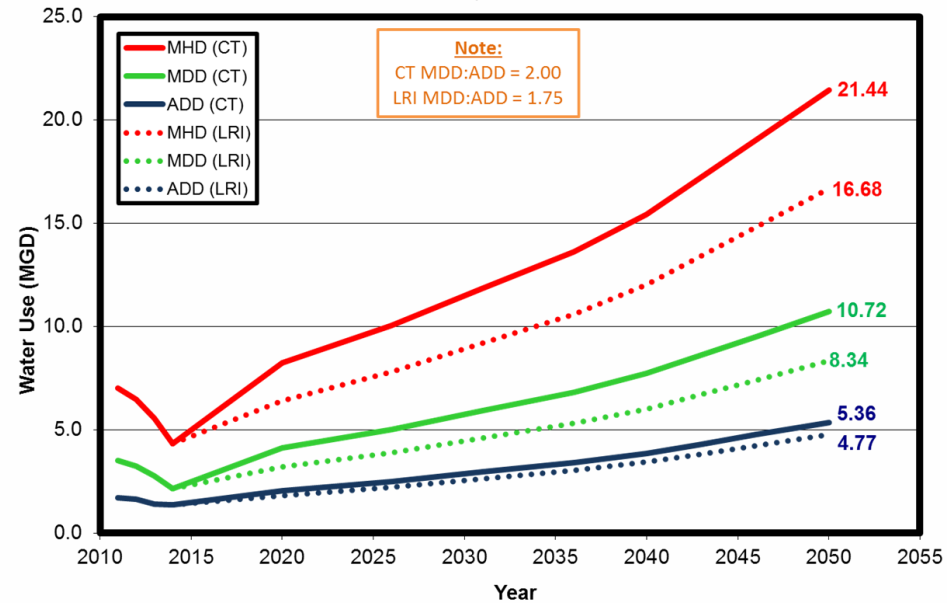
- ◆ **Commercial, Industrial & Institutional Water Use Reduction**

Assume 15% of CII water use is non-process and 50% of that water use amount would be reduced

## 💧 Less Resource Intensive (LRI) Water Use Projection

Utilize predicted water use reduction calculation to define LRI water use projection for planning period

**Exhibit 3-4: Historical and Projected Water Use Summary**  
United City of Yorkville, IL



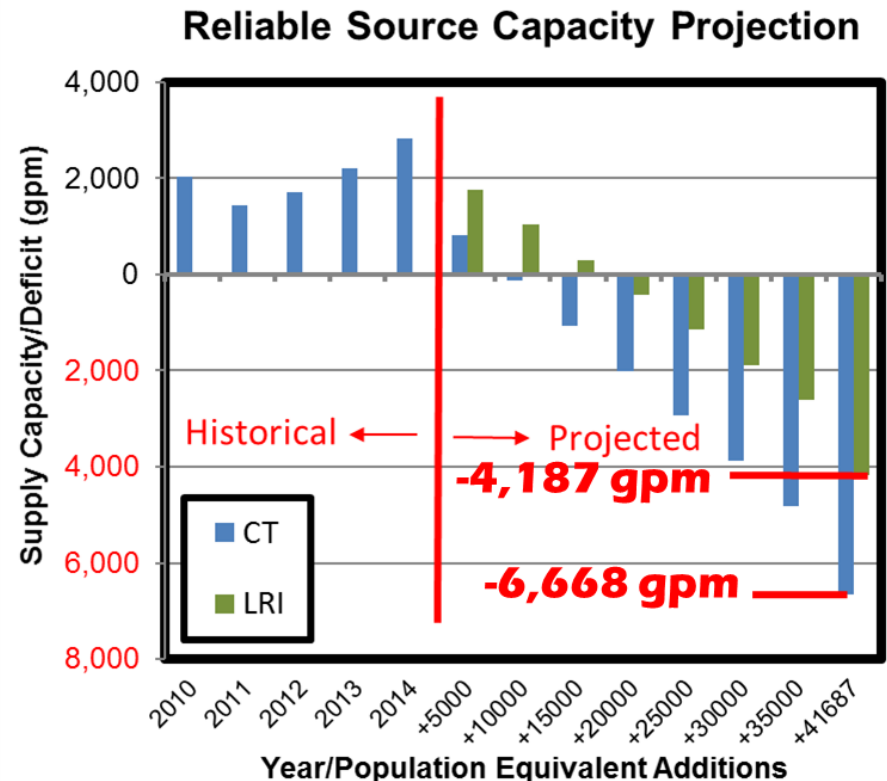
## Needs Assessment Calculation

Determine supply, treatment, storage and distribution needs for CT and LRI water use projections

## Cost Estimates

Develop cost estimates for CT and LRI improvements

Quantify cost savings for LRI commitment





## Village of Algonquin

### Population

- 2010: 30,046
- 2040: 51,656

### Water Supply System: Wells With Iron Removal WTPs

### Water Use

- Current MDD:ADD: 1.75
- CT: 95 gpcd
- LRI: 81 gpcd (15% Reduction)

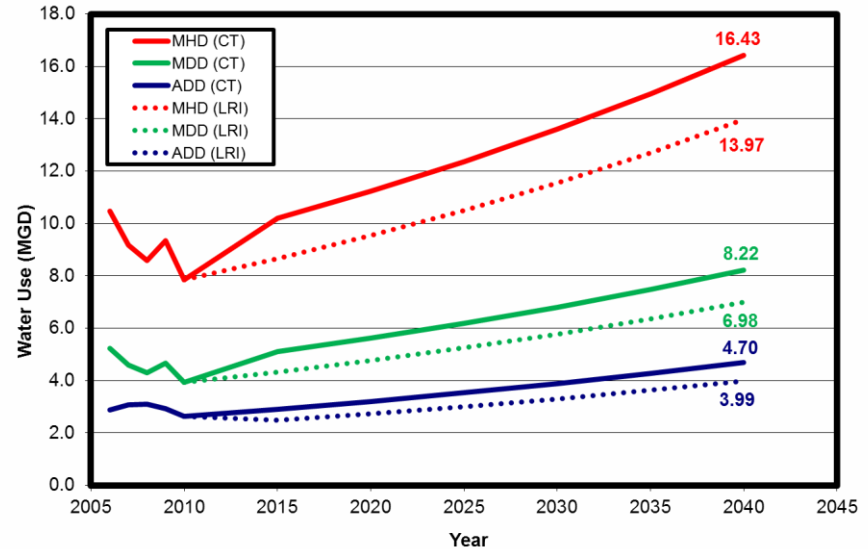
### Needs Assessment

- CT: Four (4) Wells & 2.5 MG Storage
- LRI: Two (2) Wells & 1.5 MG Storage

### Computed Capital Cost Savings: \$6.4M

Historical and Projected Water Use Summary

Village of Algonquin, IL



Potential Estimated Water Savings From Water Conservation and Efficiency

Village of Algonquin, IL

Category		Water Saved (gallons per day)	% Of Total (%)
Outdoor	All Customers	69,809	1.5%
	New Landscape	6,981	0.1%
Utility Water - System Losses		234,771	5.0%
Indoor Residential	High Efficiency Toilets (HET)	163,459	3.5%
	High Efficiency Washing Machines (HEWM)	61,529	1.3%
	Retrofits	105,874	2.3%
Commercial, Industrial, and Institutional Customers		66,558	1.4%
<b>Total Estimated Savings =</b>		<b>708,981</b>	<b>15%</b>



## City of Elgin

### Population

- 2010: 108,000
- 2040: 202,500

### Water Supply System: Fox River Intake, Wells & 2 – Lime Softening WTPs

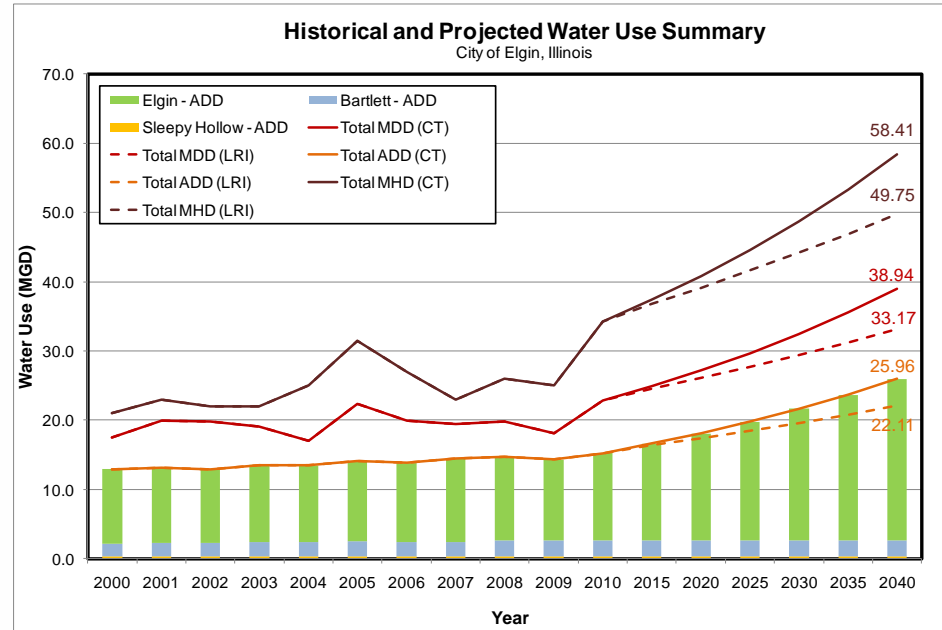
### Water Use

- Current MDD:ADD: 1.41
- CT: 115 gpcd
- LRI: 95 gpcd (17% Reduction)

### Needs Assessment

- CT: Five (5) Wells & 2.0 MG Storage
- LRI: Three (3) Wells & 0 MG Storage

### Computed Capital Cost Savings: \$16.0M



### Capital Cost Savings With LRI Water Use Commitment

City of Elgin, IL

Water Works System Component	Present Worth Capital Cost		
	CT	LRI	Savings
Supply	\$22,100,000	\$15,264,000	(\$6,836,000)
Treatment	\$12,600,000	\$12,600,000	\$0
Storage	\$6,933,000	\$2,727,000	(\$4,206,000)
Distribution	\$25,707,000 +	\$20,787,000 +	(\$4,920,000) -
<b>TOTAL:</b>	<b>\$67,340,000 +</b>	<b>\$51,378,000 +</b>	<b>(\$15,962,000) -</b>



## Village of Huntley

### Population

- 2010: 24,291
- 2040: 58,997

### Water Supply System: Wells with Cation Exchange WTPs

### Water Use

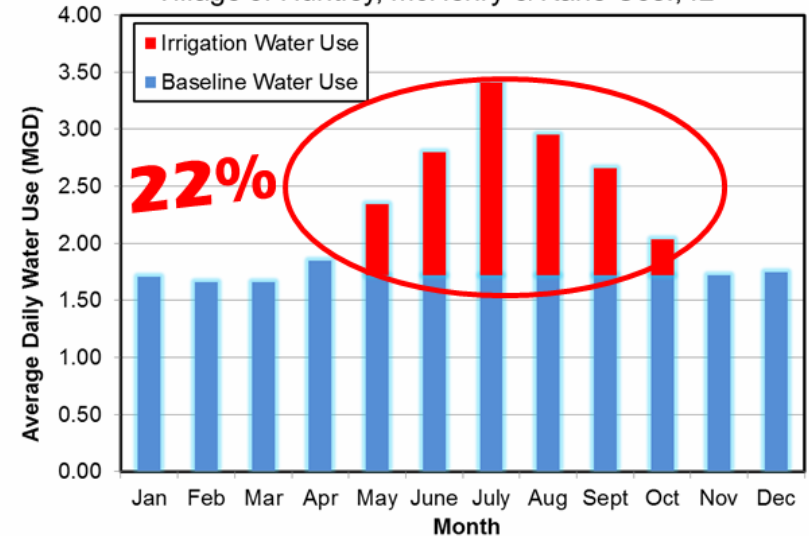
- Current MDD:ADD: 2.16
- CT: 90 gpcd
- LRI: 77 gpcd (15% Reduction)

### Needs Assessment

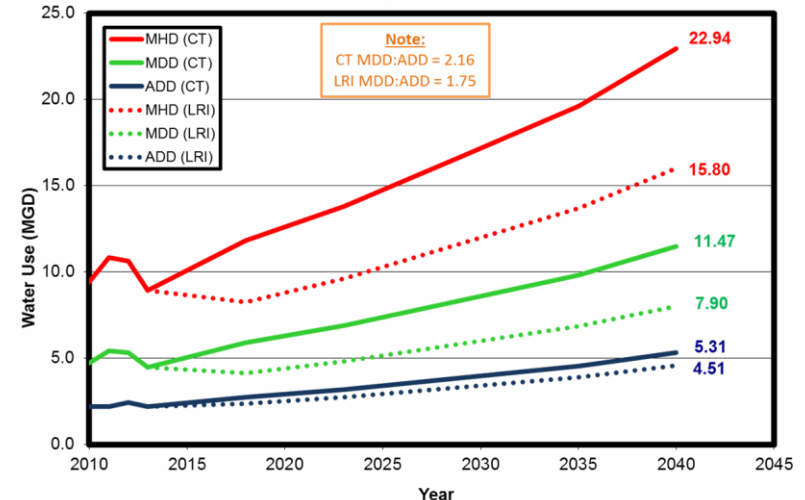
- CT: Eight (8) Wells/WTPs & 4.3 MG Storage
- LRI: Four (4) Wells/WTPs & 2.0 MG Storage

### Computed Capital Cost Savings: \$32.8M

**Average Daily Water Use - Baseline & Irrigation**  
Village of Huntley, McHenry & Kane Cos., IL



**Exhibit 5-3: Historical and Projected Water Use Summary**  
Village of Huntley, IL







# Water Conservation Impacts

## City of Aurora Water Conservation Ordinance (WCO)

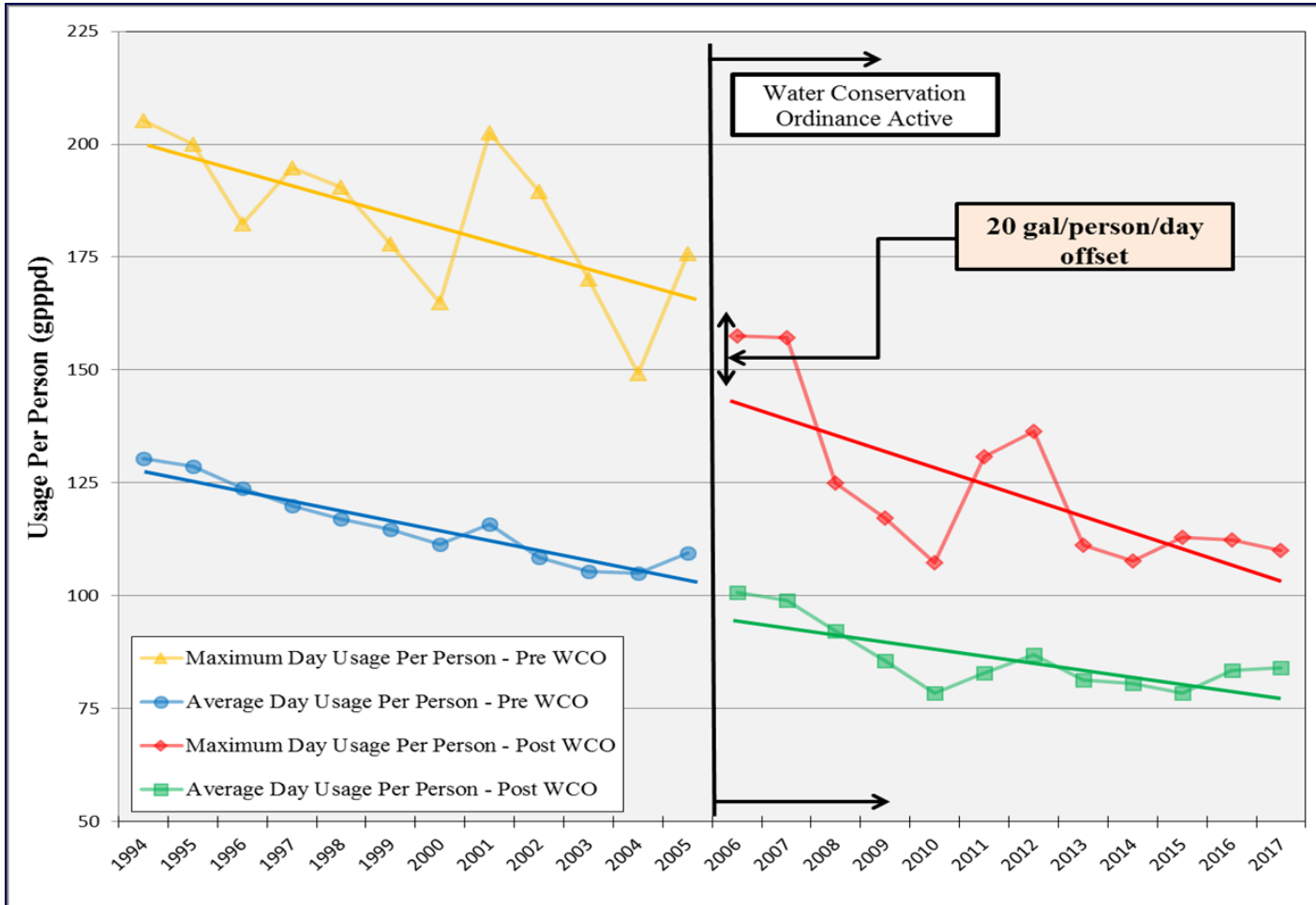
### 💧 Section 48-31 of Code

- Even/Odd Water Restriction Based on Home Address
- Watering Permitted 6:00 AM – 9:00 AM & 6:00 PM – 9:00 PM On Day
- Permanently Installed Systems Follow Same Times
- Sod Installation Prohibited In July and August (Special Sod Watering Permit Allowed Rest of Year)
- Watering Not Permitted On July 31<sup>st</sup> and August 31<sup>st</sup>





# Water Conservation Impacts



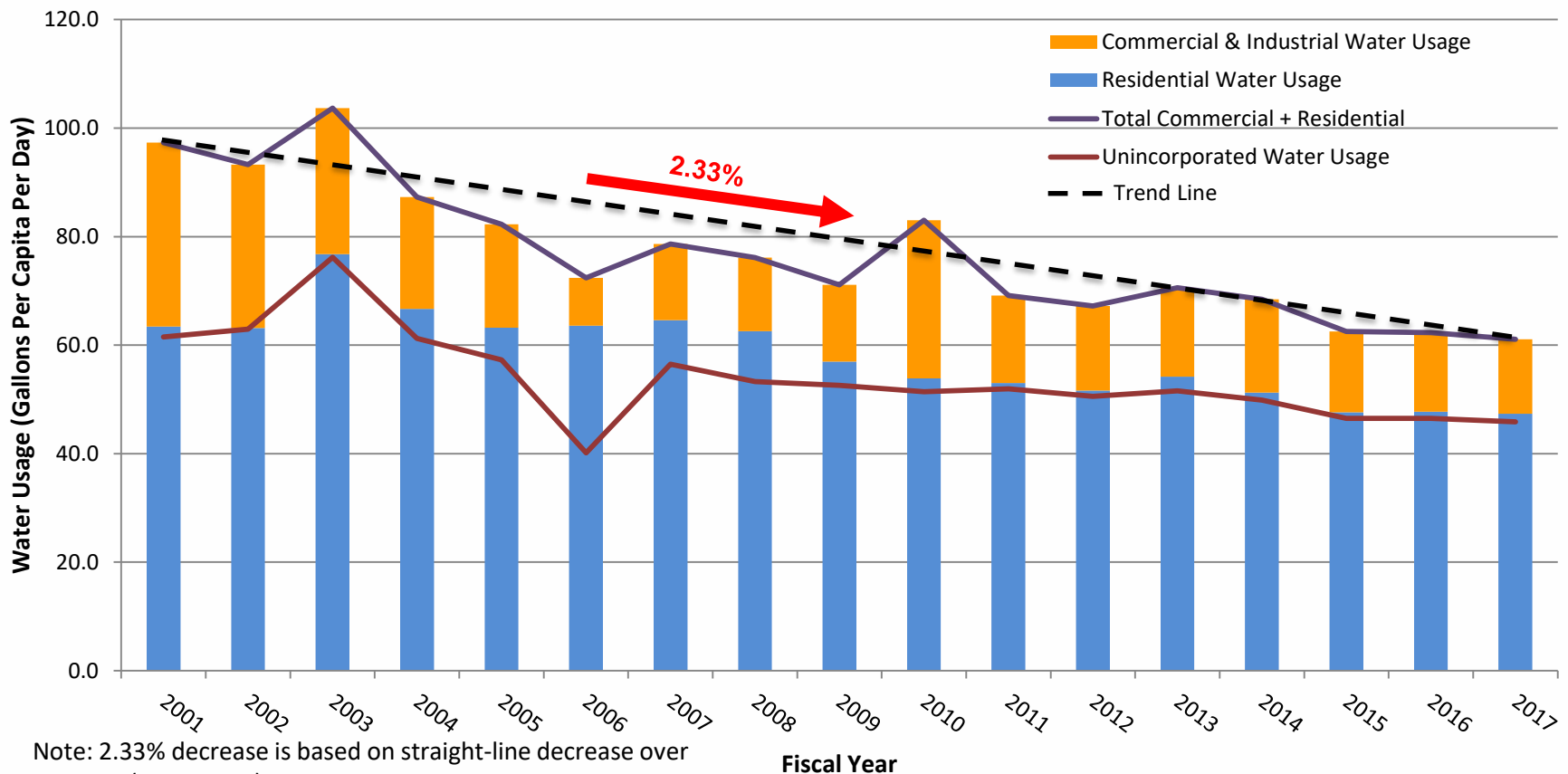
**Summer Water Use Reduced By 20 gpcd (4.0 MGD) → \$7.5M Capital Cost Savings**

- 💧 **Planned Water Use Reduction Per Demand Management Strategy**
- 💧 **Unplanned Water Use Reduction Trend**



## Exhibit 4-3: Historical Billed Water Use by Fiscal Year With Trend Line (GPCPD) (2001-2017)

Village of Montgomery, Kane & Kendall Cos., Illinois

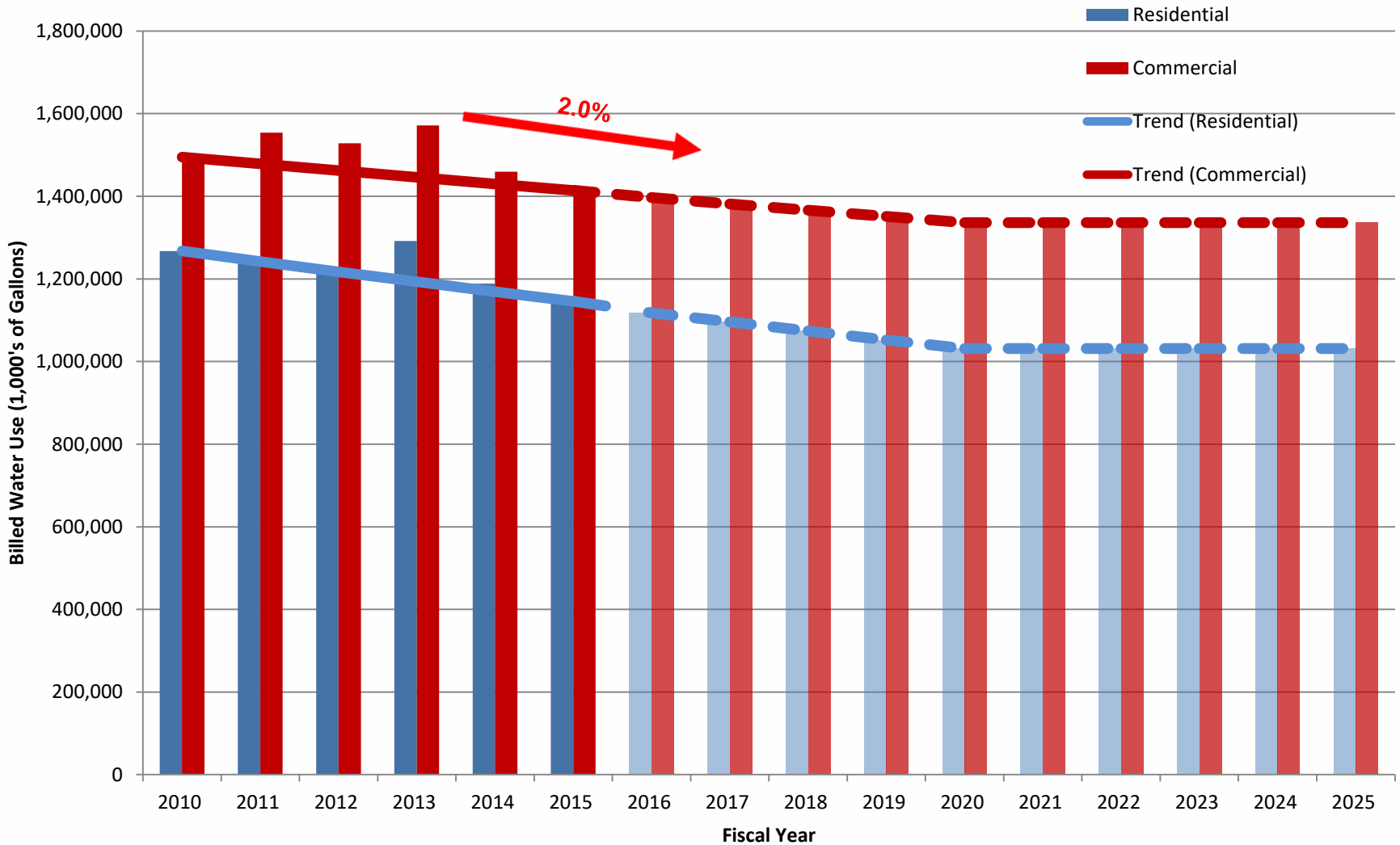


Note: 2.33% decrease is based on straight-line decrease over 16 years (2001-2017).



# Implementation Realities

## Historic and Projected Billed Water Use



## The Great Conundrum

- ◆ **Demand Management Success**
  - ◆ Long Term Capital Savings
  - ◆ Short Term Revenue Reduction
- ◆ **Items to Consider**
  - ◆ Be Prepared to Adjust Rates
  - ◆ Education



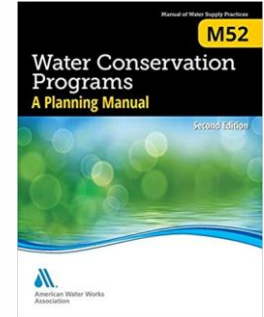


# Implementation Realities

## 💧 Resources

Water Conservation Programs – A Planning Manual (M52)

(<https://store.awwa.org/store/productdetail.aspx?productid=61841578>)



Alliance for Water Efficiency

(<http://www.allianceforwaterefficiency.org/>)



Alliance  
for Water  
Efficiency

IEPA Water Sense

(<https://www.epa.gov/watersense>)



EPA  
WaterSense

Water Research Foundation

(<http://www.waterrf.org/Pages/Index3.aspx>)



THE  
Water  
Research  
FOUNDATION

Northwest Water Planning Alliance

([www.nwpa.us](http://www.nwpa.us))



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