



Alternative Water Source Study

Village Board Update

July 6, 2021



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WATER SUPPLY OBJECTIVES



SUSTAINABLE



**REGULATORY
COMPLIANT**



**HIGH
QUALITY**



**COST
EFFECTIVE**





Agenda

1. Review
2. Lake Michigan Supplier Options - Overview
3. CLCJAWA
4. NWC
5. NSMJAWA
6. Supplier Comparison
7. Next Steps

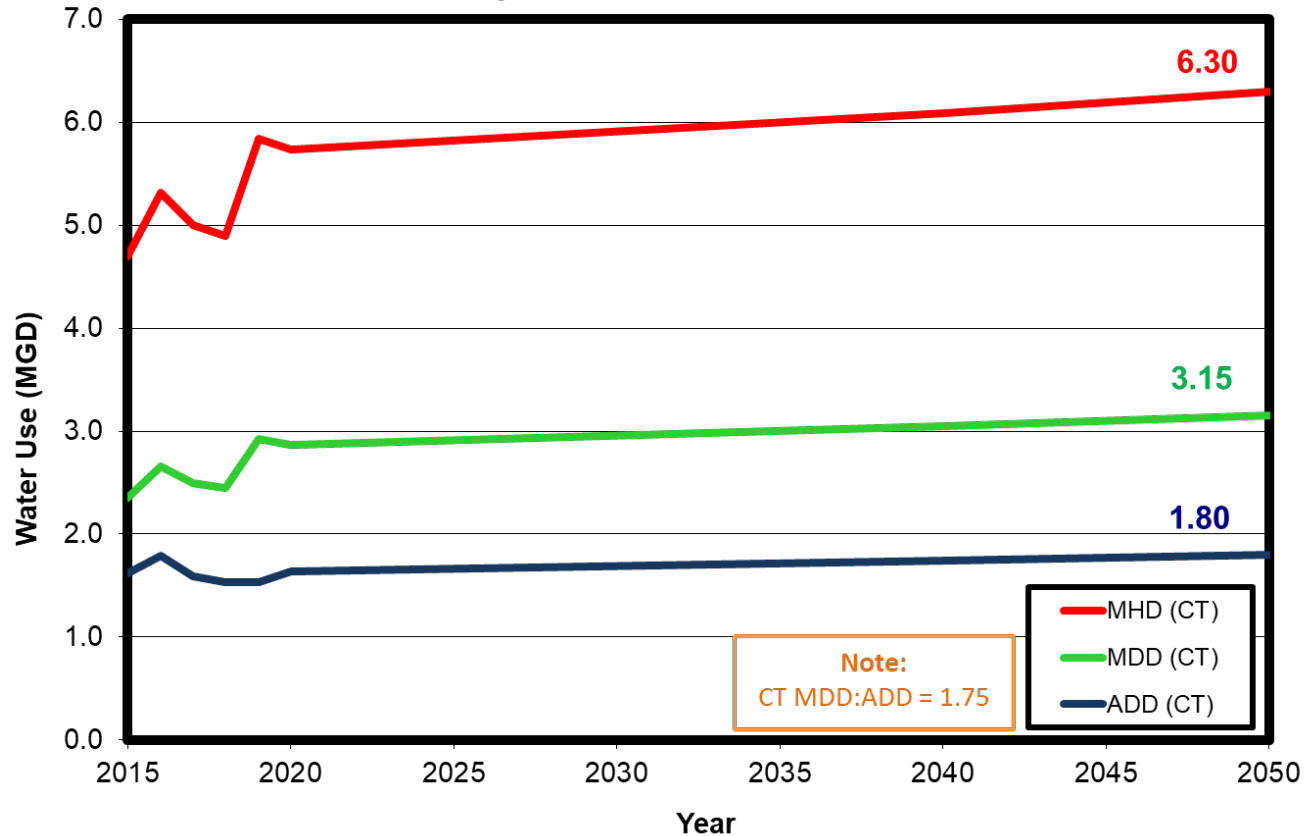




REVIEW

Historical and Projected Water Use Summary

Village of Lake Zurich, IL



Projected Water Demands

- Projected MDD:ADD Ratio: 1.75
- Projected Water Use Per Person in 2050: 75 gpcd




Regional Groundwater Aquifer

Cambrian- Ordovician Aquifer

Figure 20. The Cambrian-Ordovician aquifer system, which consists of predominantly sandstone aquifers separated by poorly permeable confining units, extends over a large part of the north-central United States.

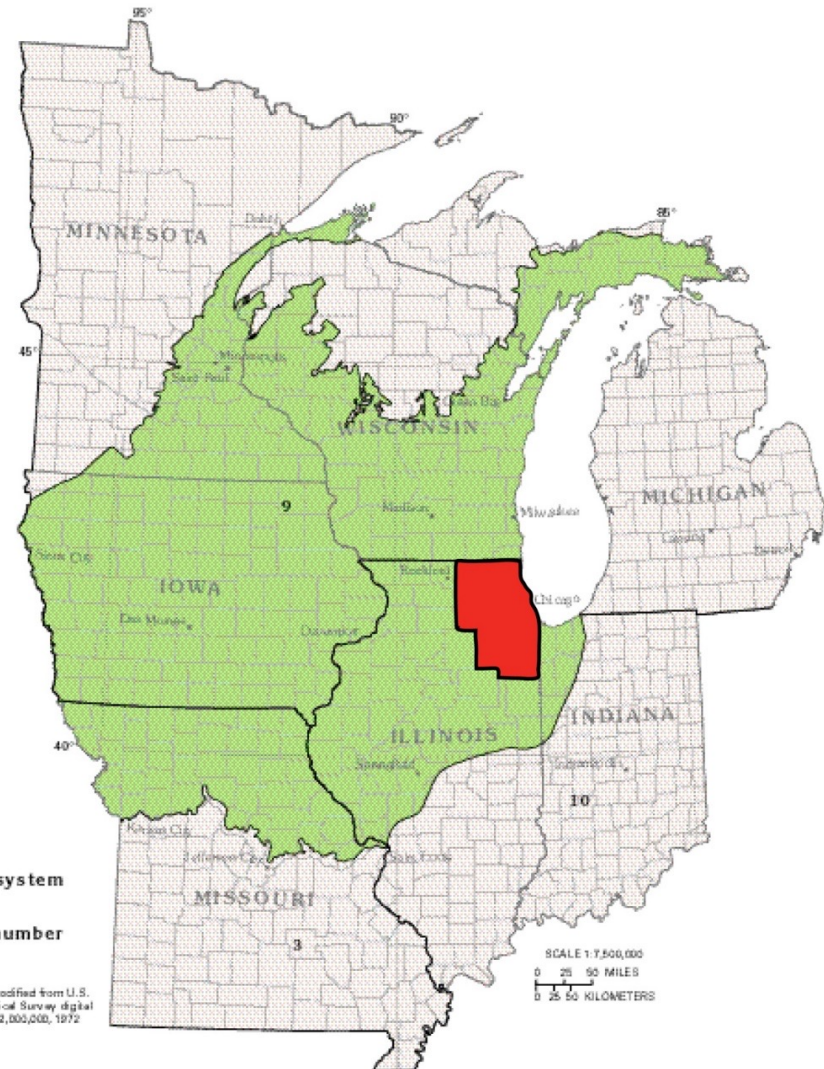
Modified from Young, H.L., 1992b, Hydrogeology of the Cambrian-Ordovician aquifer system in the northern midwest, United States, with a section on Ground-water quality by D.I. Siegel: U.S. Geological Survey Professional Paper 1405-B, 99 p.

EXPLANATION

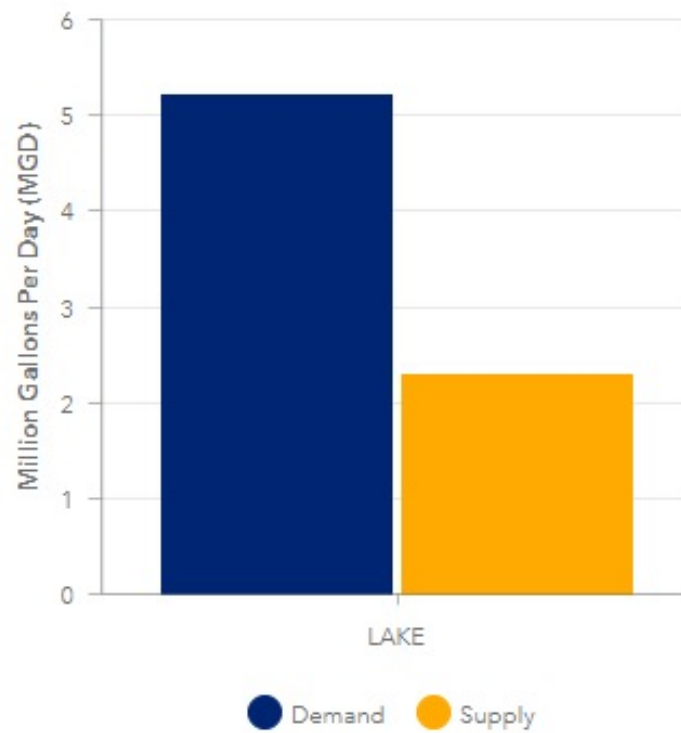
 Cambrian-Ordovician aquifer system

 9 Atlas segment boundary and number

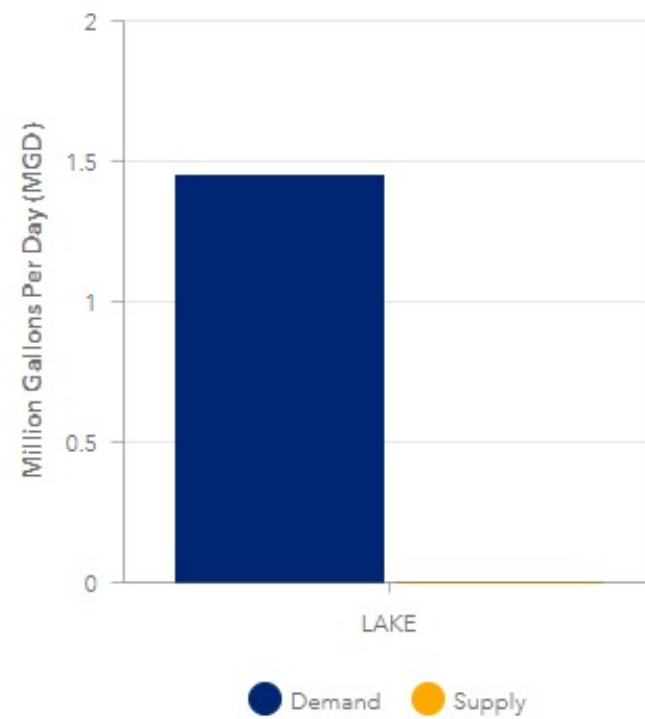
Base modified from U.S. Geological Survey digital data, 1:2,000,000, 1972



Total Sandstone Sustainable Yield



Ironton-Galesville Sustainable Yield



<https://prairie-research.maps.arcgis.com/apps/opstdashboard/index.html#/9825690df3b14da39f03bdfef69cd33e>

HISTORIC TRENDS AND CURRENT STATUS

Significant Depletion of the Water in the St. Peter and Iron-ton-Galesville Aquifers

Slight Recovery in Deep Aquifers Since 1980's Due to Decreased Usage (Increased Regional Usage of Lake Michigan)

Current Status – Aquifers Are Adequate for Village's Use



Summary and Application – Deep Sandstone Aquifer Sustainability

PROJECTED TRENDS

Water Levels in the Deep Sandstone Aquifers are Projected to Decline

Highly Dependent on Regional Development and Usage of the Aquifers

Lake County Demand for Water From Deep Aquifers is Greater Than Replenishing Supply

Implications to Village: Short-Term Sustainability Adequate, but Long-Term (30+ Years) Sustainability a Concern

Groundwater Treatment Overview

St. Peter & Ironton-Galesville Sandstone

Naturally Occurring
Radium & Barium

Village's Treatment

- Cation Exchange
- Removes Radium, Barium and Hardness (Softens Water)



Radium Removal - Regulations

- USEPA/IEPA – 5.0 pCi/L MCL
- Established in Early 2000's
- Impacted Many CWS' in NE IL

Radium Removal - Technologies

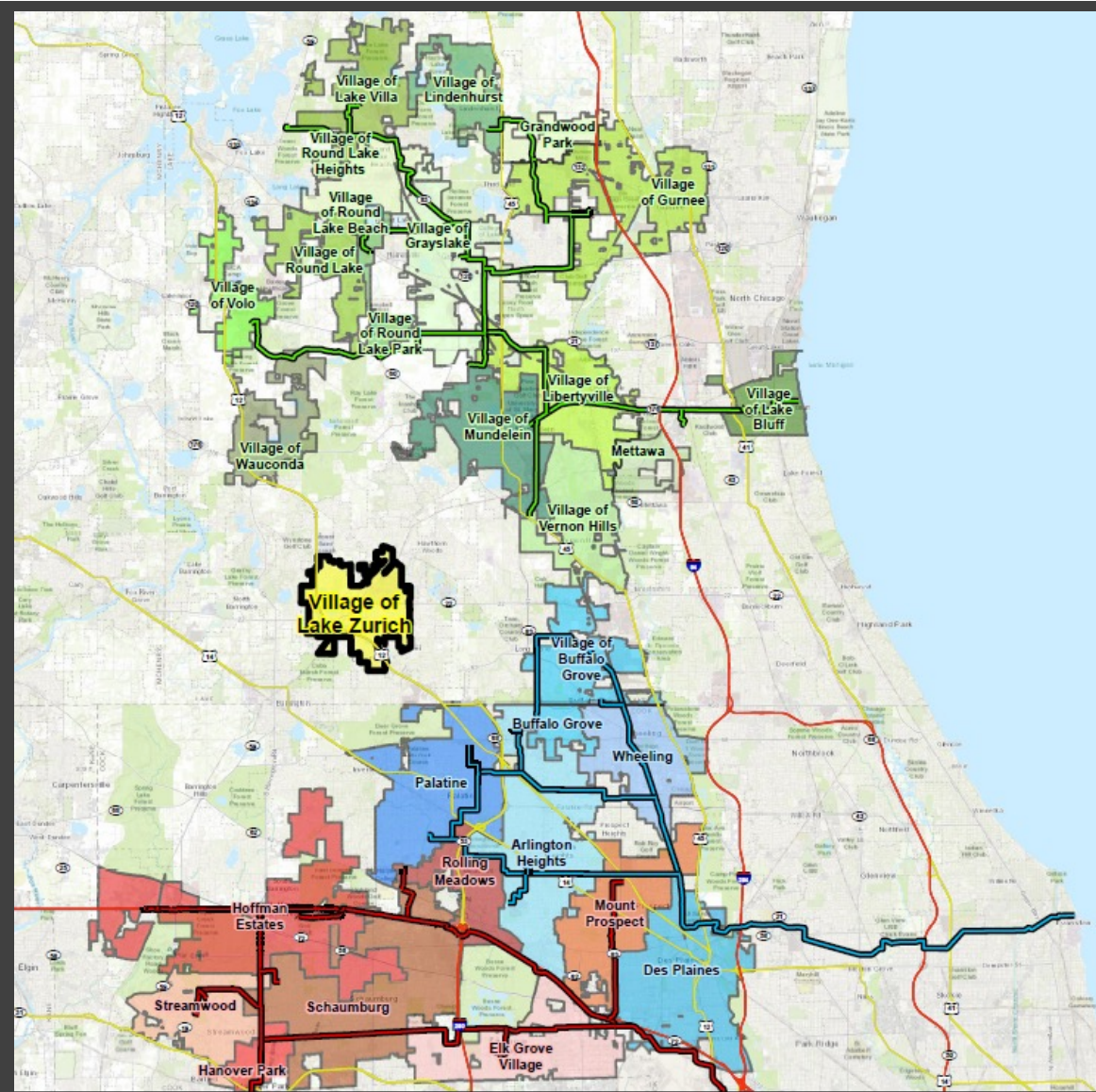
- Best Available Technologies
 - ✓ Cation Exchange
 - ✓ Lime Softening
 - ✓ Membranes (Reverse Osmosis)
- Other
 - ✓ HMO
 - ✓ Radium Selective Media



Decision Component	Pretreatment	Replacement		Treatment/Handling of Waste			
	WRT Radium Selective Media	WRT Radium Selective Media	Lime Softening	WesTech SPIRALATOR	Liquid Hauling	Solid Separation and Settling	Gilberts Solid Separation Design
Project Costs							
Capital Cost	\$\$	\$	\$\$\$	\$\$\$	\$\$\$	\$\$\$	\$\$\$
Annual O&M Cost	\$\$	\$\$	\$\$\$	\$\$	\$\$\$	\$\$	\$\$
Total Present Worth Cost	\$\$\$	\$\$	\$\$\$	\$\$\$	\$\$\$	\$\$\$	\$\$\$
Water Quality							
Anticipated Change to Finished Water Quality	↔	↓	↑	↔	↔	↔	↔
Operation and Maintenance							
O&M Responsibility	📋	📋	📋📋📋	📋📋📋	📋	📋📋📋	📋📋📋
Risk							
Implementation Difficulty (Short Term Risk/Permitting)	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Long Term Risk/Reliability/Regulatory Concerns	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓
Timing							
Piloting/Testing/Corrosion Control Study	🕒🕒	🕒🕒🕒	🕒🕒🕒	🕒🕒	NONE	🕒🕒🕒	🕒🕒🕒
Schedule of Implementation	🕒🕒	🕒🕒	🕒🕒🕒	🕒🕒🕒	🕒🕒	🕒🕒🕒	🕒🕒🕒



LAKE MICHIGAN SUPPLIER OPTIONS - OVERVIEW



Lake Michigan (LM) Supplier Options

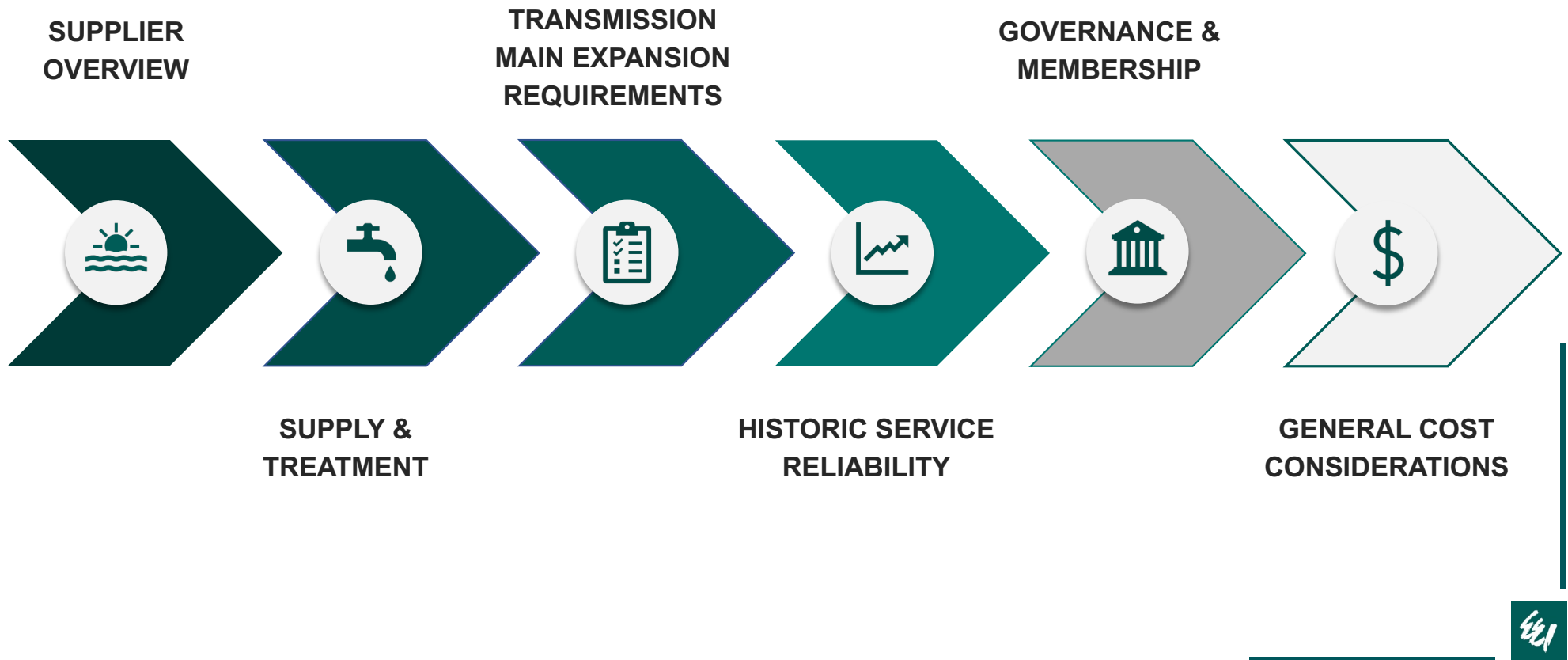
Legend

Lake Michigan Water Source

- Central Lake County JAWA (From Lake Bluff)
- Northwest Water Commission (From Evanston)
- Northwest Suburban Municipal JAWA (From Chicago)
- CLCJAWA Transmission Main
- NWC Transmission Main
- NSMJAWA Transmission Main



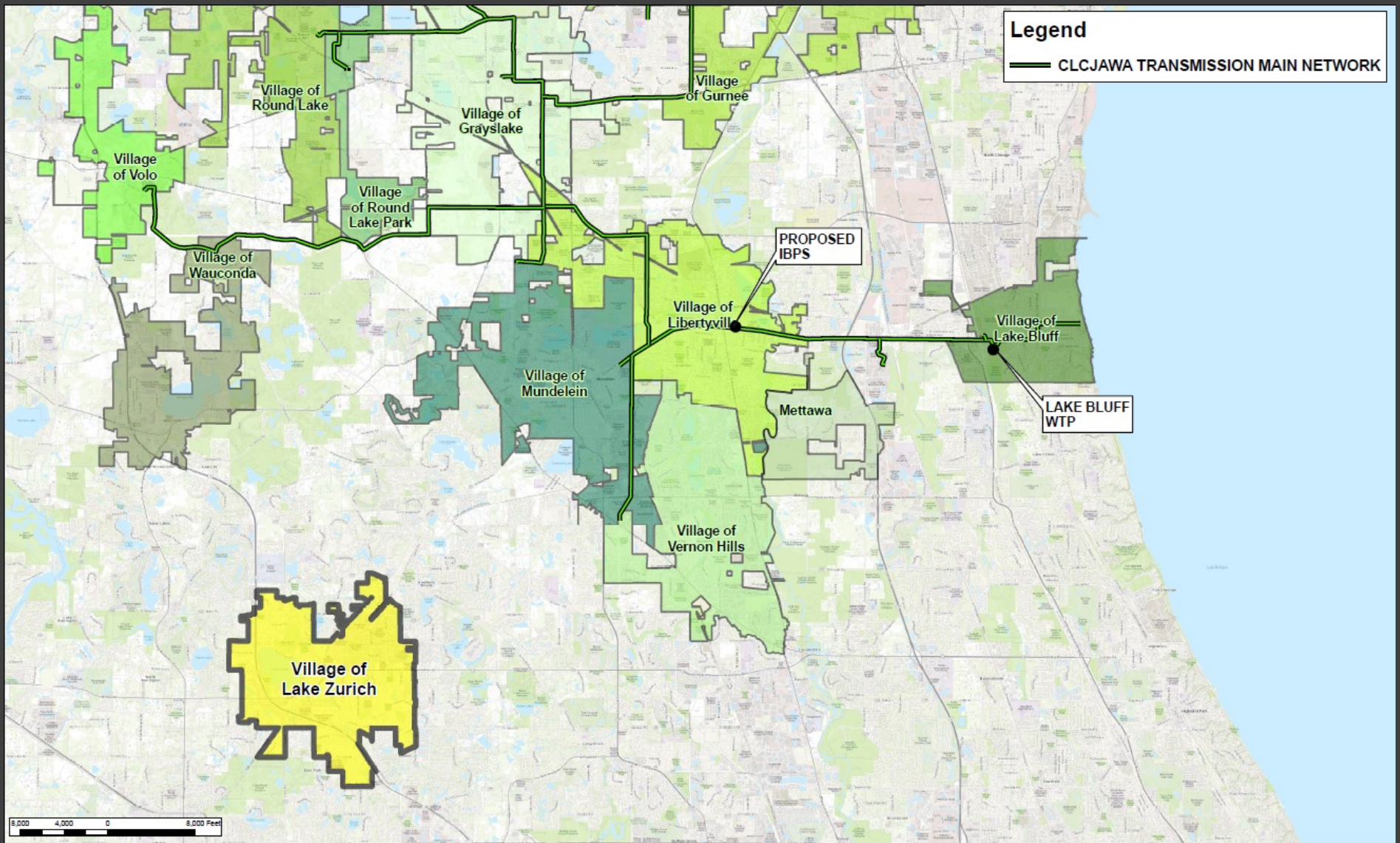
SUPPLIER COMPARISON





CENTRAL LAKE COUNTY

JAWA





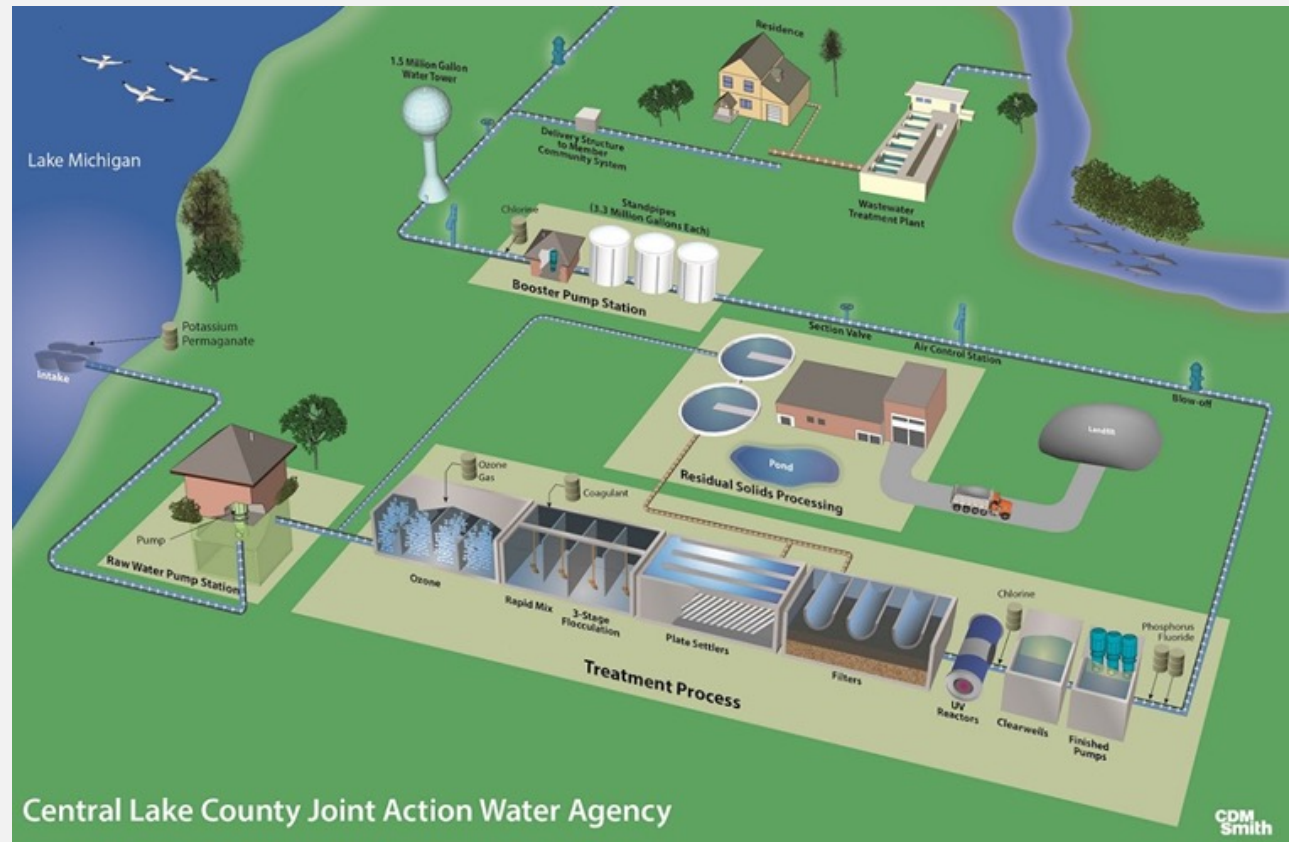
OVERVIEW

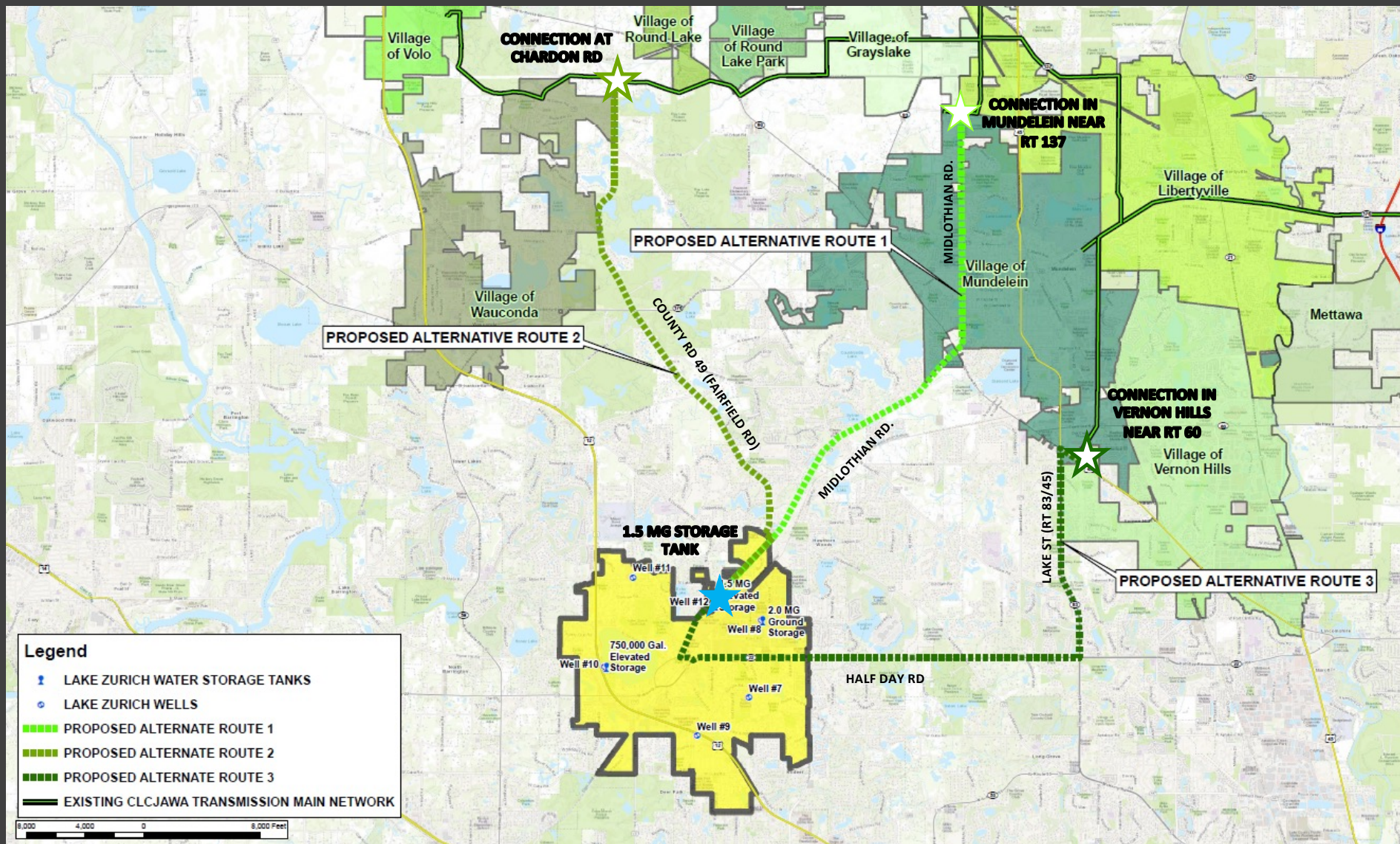
- Joint Action Water Agency
 - Organized in 1986
 - Operational in 1992
- Current ADD: **20 MGD**
- Current Peak Demand: **36 MGD**
- Current System MDD Capacity: **38 MGD**
- Current \$600,000 improvement project to increase capacity by 6 MGD in 2024
- Future System MDD Capacity: **44 MGD** (in ~3 years)
- Available Capacity for sale: **4-7 MGD**
- “North Group” and “South Group” planned expansion includes LZ



SUPPLY & TREATMENT

- Lake Michigan Source
- Intake and WTP at Lake Bluff
 - CLC Owned and Operated
- Treatment Includes:
 - Biologically Active Filtration
 - UV Disinfection
 - Ozone





TRANSMISSION MAIN EXPANSION REQUIREMENTS

TRANSMISSION MAIN

- 8 miles of 30" main extension to Forest Lake
- 24" main extension to LZ
- Booster Pump Station capacity upgraded by LZ
- Transmission main must be upsized one diameter for potential downstream customers

DELIVERY PRESSURE

- Minimum 25 psig
- 60 psig Typical

STORAGE / EMERGENCY BACKUP

- No explicit storage requirements (CLCJAWA Maintains 48-Hours Storage in System)
- Backup supply required
- Cannot augment supply with wells except for maintenance



SERVICE HISTORY RELIABILITY

- 7 service disruptions on Vernon Hills spur (26.4 hour max disruption – Emergency Supplies Not Required)
 - Last Disruption in June 2019 – 24 Hours
- Storage capacity for 48-hour full disruption
- Frazil ice occasionally problematic
- On-going zebra mussel control program



GOVERNANCE AND MEMBERSHIP

GOVERNING BODY

- Board of Directors
 - Each Community Selects Director and Alternate Director
- Executive Committee
 - Each community selects one member

RIGHTS/ REQUIREMENTS

- Pay for cost of new transmission main
- Responsible for any improvements downstream of delivery structure
- Perpetual membership
- Site on JAWA Technical Committee



13 CURRENT MEMBERS

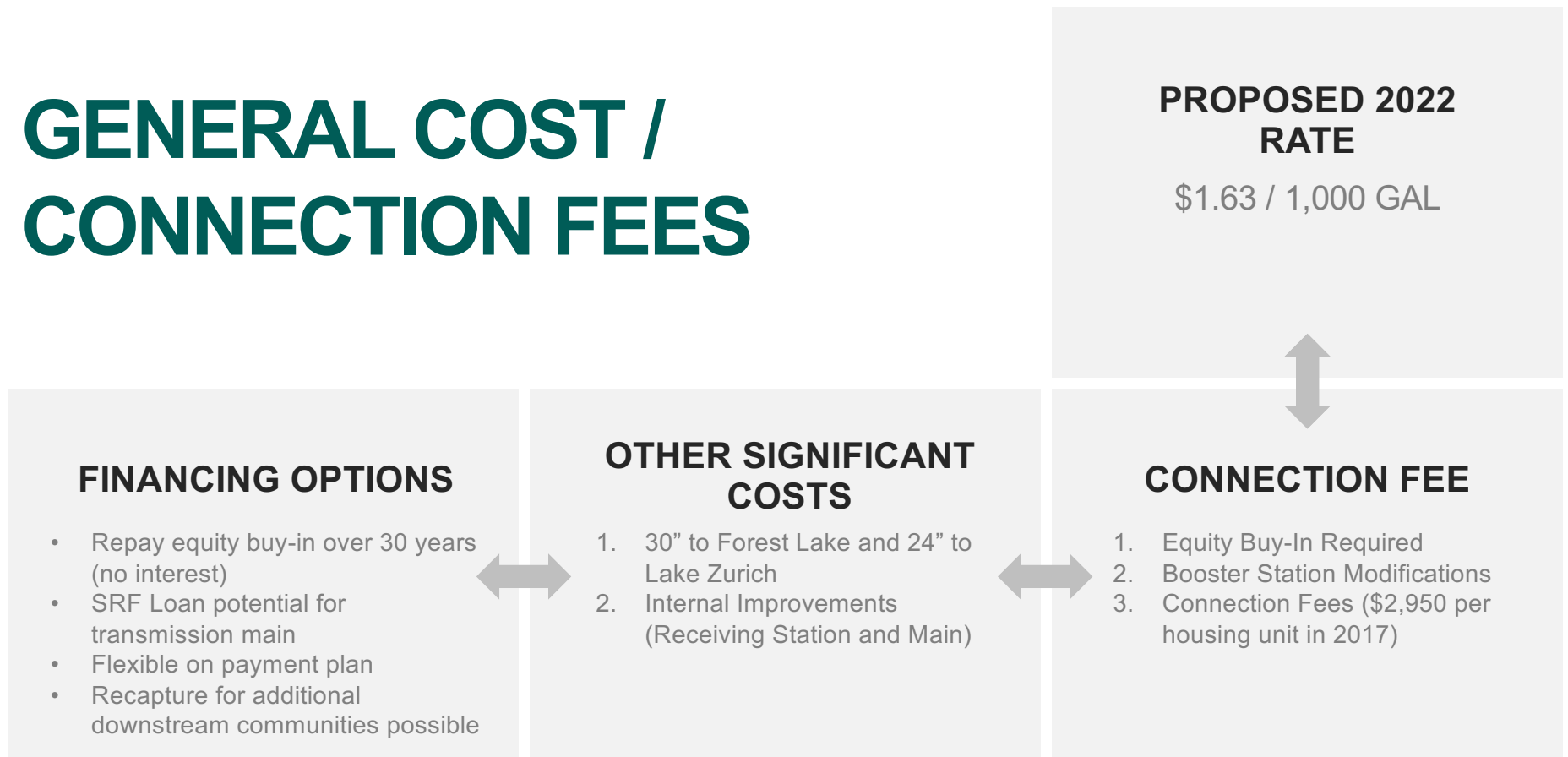
Grayslake, Gurnee, Lake County, Libertyville, Lindenhurst, Mundelein, Lake Bluff, Lake Villa, Round Lake Beach, Round Lake, Volo, Wauconda, Round Lake Consortium

TRANSMISSION OWNERSHIP

CLCJAWA owns and maintains transmission main



GENERAL COST / CONNECTION FEES



CLCJAWA

SUMMARY & KEY CONSIDERATIONS

Lake Zurich ranks high on CLCJAWA list for potential new customer (tied for first)

Lake Zurich would have to pay an equity buy-in fee that can be financed over 30 years

Excellent Water Quality from Treatment Facility

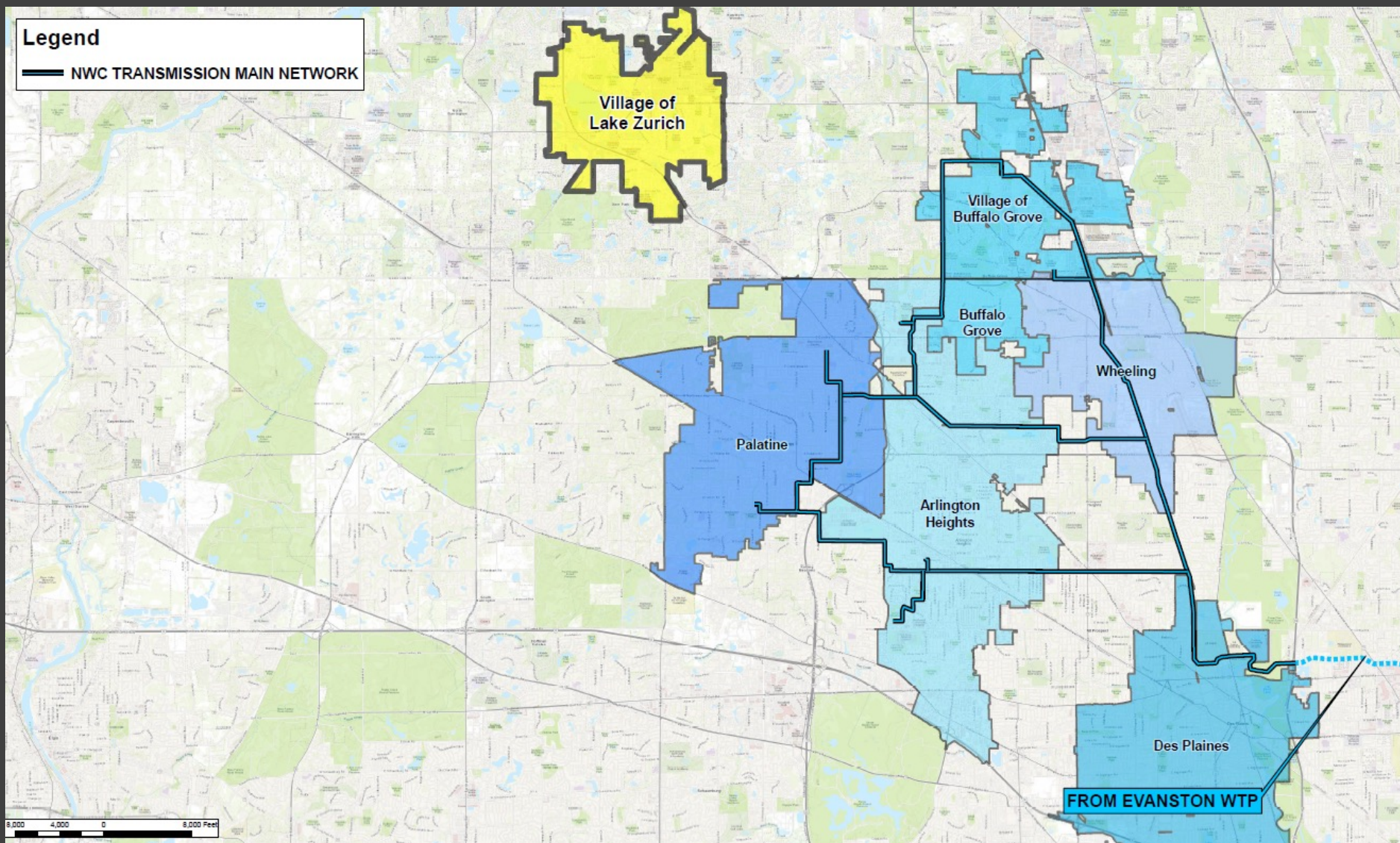
Lake Zurich would have to upsize transmission main diameter for future downstream communities

Potential for cost repayment flexibility and negotiation of fees

Would require pumping improvements to increase capacity and pressures, but NO extra storage requirements related to CLCJAWA



NORTHWEST WATER COMMISSION





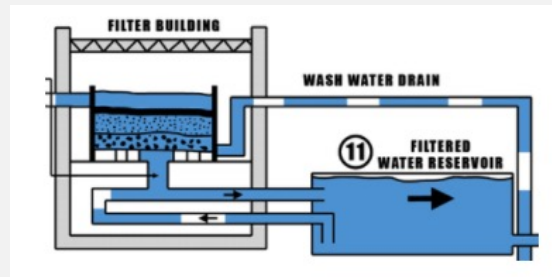
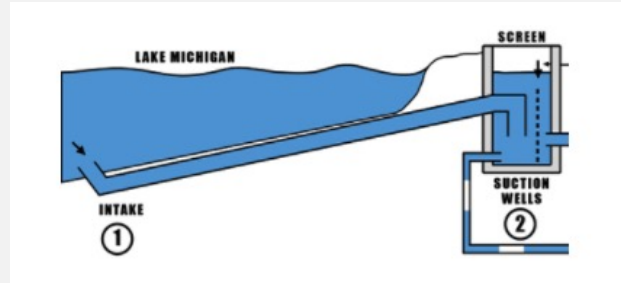
OVERVIEW

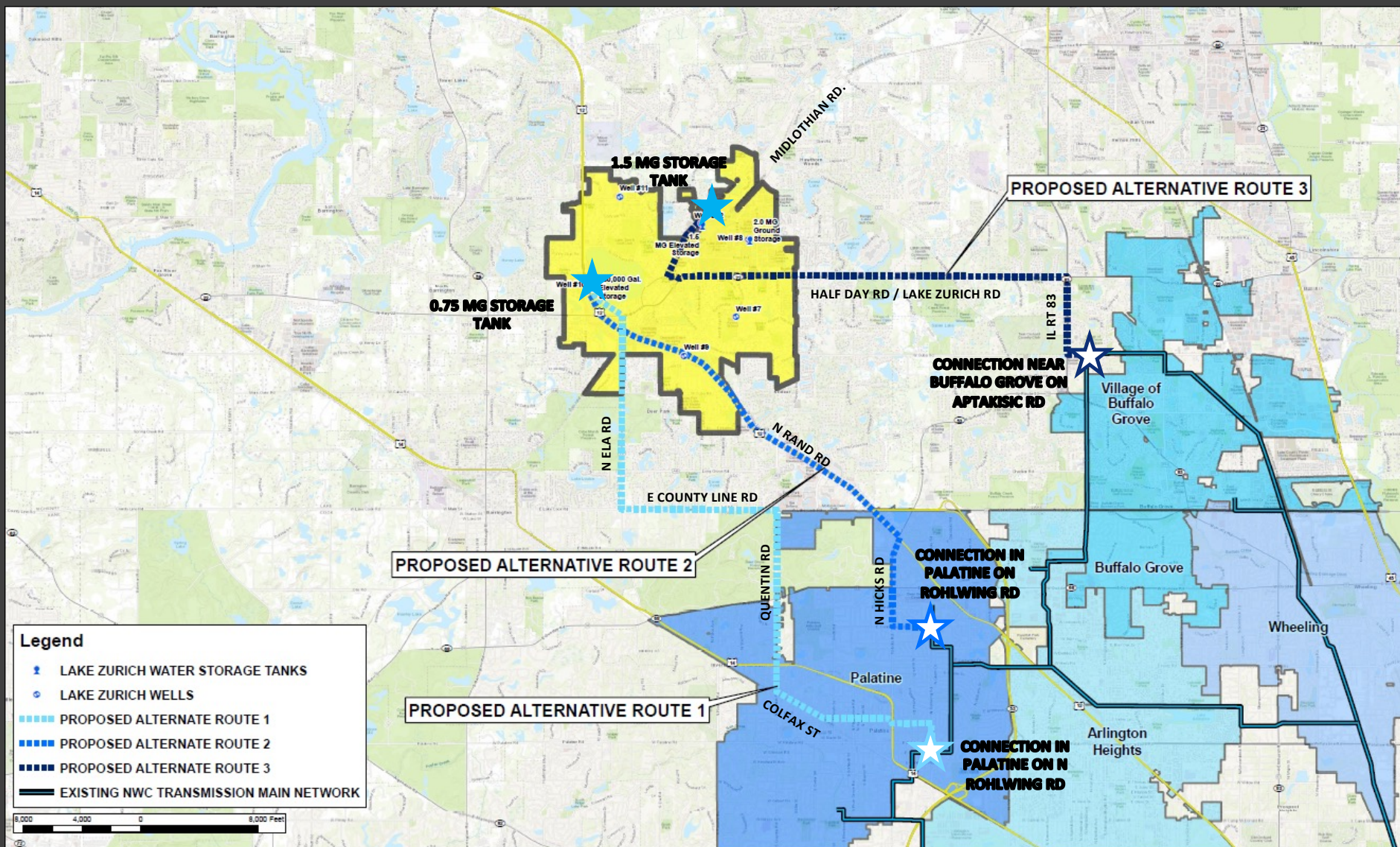
- Commission
 - Organized in 1957
 - Operational in 1985
- Current ADD: **25 MGD**
- Current MDD: **50 MGD**
- Current System MDD Capacity: **55 mgd**
- Maximum Daily Demand 2050: **50 mgd**
- Available Capacity for Sale: **5 mgd**
- Transmission system recently looped
- New 7.5 MG stand-pipe in construction
- Redundant transmission main with Evanston
 - Evanston installing new intake structure with heating



SUPPLY & TREATMENT

- Lake Michigan Source
- Intake and WTP at Evanston
 - Contract through 2035
 - New contract isn't expected to be as favorable
- Treatment (similar to NSMJAWA):
 - Intake screening, dosage with Activated Carbon
 - Chemical Coagulation, Flocculation and Settling, Fluoridation
 - Filtration
 - Chlorine Disinfection





TRANSMISSION MAIN EXPANSION REQUIREMENTS

TRANSMISSION MAIN

- Connection from Palatine, Rand Road, Buffalo Grove, or anywhere along Northern Loop
- ~8-10 miles of transmission main
- Booster station required (additional cost)

DELIVERY PRESSURE

- Minimum 25 psig
- Design pressure dependent on new booster station required to pump to LZ

STORAGE / EMERGENCY BACKUP

- 48 hours @ MDD Required
- Backup wells not required but are recommended
- Mixing/supplementing of different water supply only allowed in emergency



SERVICE HISTORY RELIABILITY

- Major disruption due to frazil ice in 2009
- Major transmission break in Palatine (poor soils area)
- No water quality issues
- 25 MG of existing storage



GOVERNANCE AND MEMBERSHIP

GOVERNING BODY

- Board of Commissioners
 - 4 commissioners representing member municipalities
 - 1 commissioner appointed by County

RIGHTS/ REQUIREMENTS

- Pay for cost of new transmission main
- Responsible for any improvements downstream of delivery structure



4 CURRENT MEMBERS
1 CURRENT CUSTOMER

MEMBERS:

Buffalo Grove, Arlington Heights,
Palatine, Wheeling

CUSTOMER:

Des Plaines

TRANSMISSION OWNERSHIP

NWC owns and operates
new transmission main



GENERAL COST / CONNECTION FEES

CURRENT RATE

MEMBER: \$1.52

CUSTOMER: \$1.96

PROPOSED RATE

Wholesale rates currently
being discussed with
Evanston; rate increase
TBD

FINANCING OPTIONS

- Open to discussion and negotiation
- Recapture for additional downstream communities allowed

OTHER SIGNIFICANT COSTS

1. Transmission Main
2. Booster Station Improvements (NWC)
3. Internal Improvements (Receiving Station, Storage, Main)

CONNECTION FEE

MEMBER: Equity buy-in required (TBD), no representation (most likely not an option)

CUSTOMER: No buy-in, no representation



NWC SUMMARY & KEY CONSIDERATIONS

Connection points are relatively close to Lake Zurich (Transmission Main Requirements)

Potential construction conflicts with proposed routes

No buy in costs since Lake Zurich is anticipated to join as a customer, but no member representation on Board

Significant Storage addition required

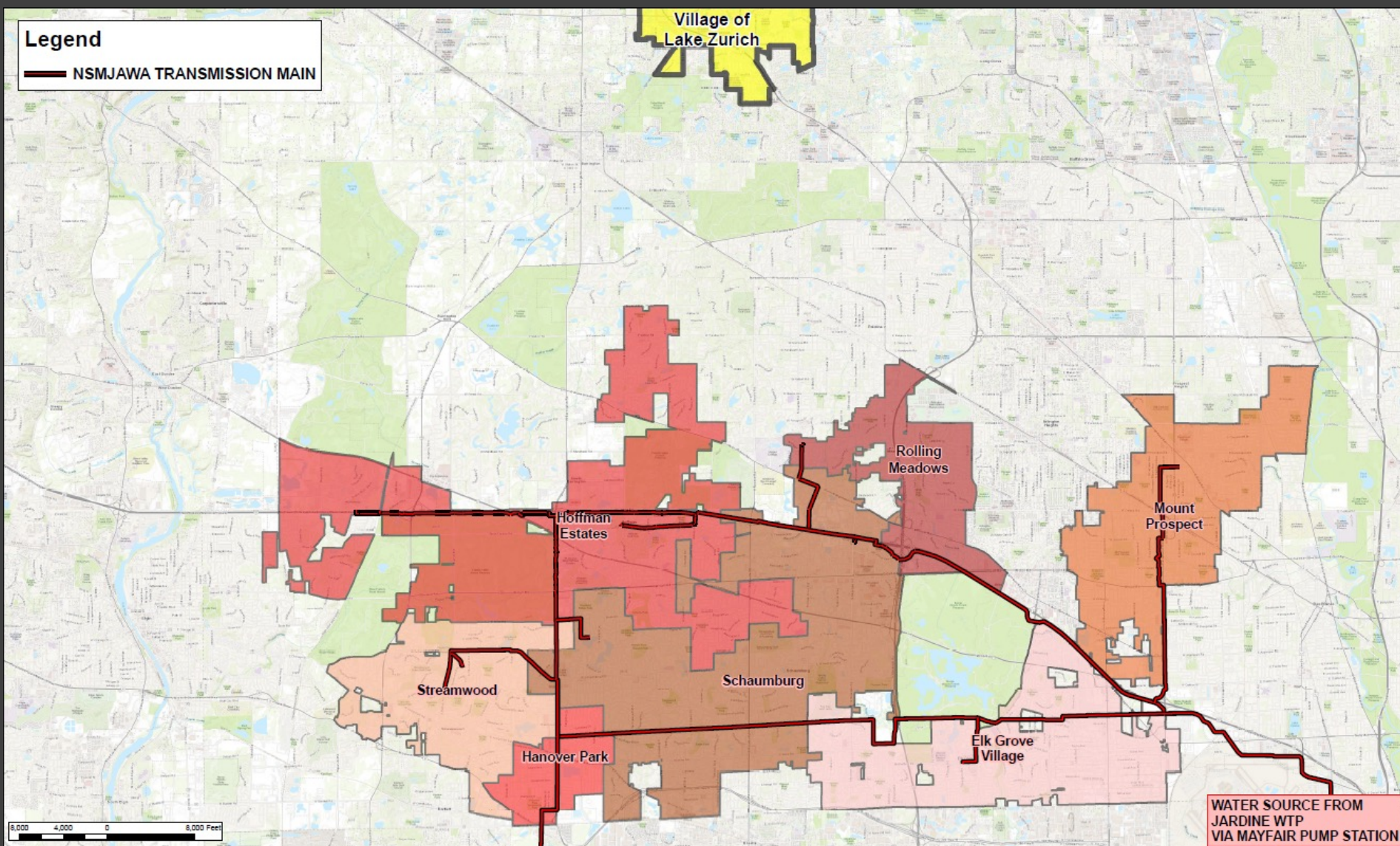
Usage is decreasing so open to adding new customers

Lowest available capacity out of all three suppliers





NORTHWEST SUBURBAN MUNICIPAL JAWA



Legend

— NSMJAWA TRANSMISSION MAIN

Village of
Lake Zurich

Rolling
Meadows

Mount
Prospect

Hoffman
Estates

Streamwood

Schaumburg

Hanover Park

Elk Grove
Village

8,000 4,000 0 8,000 Feet

WATER SOURCE FROM
JARDINE WTP
VIA MAYFAIR PUMP STATION

OVERVIEW

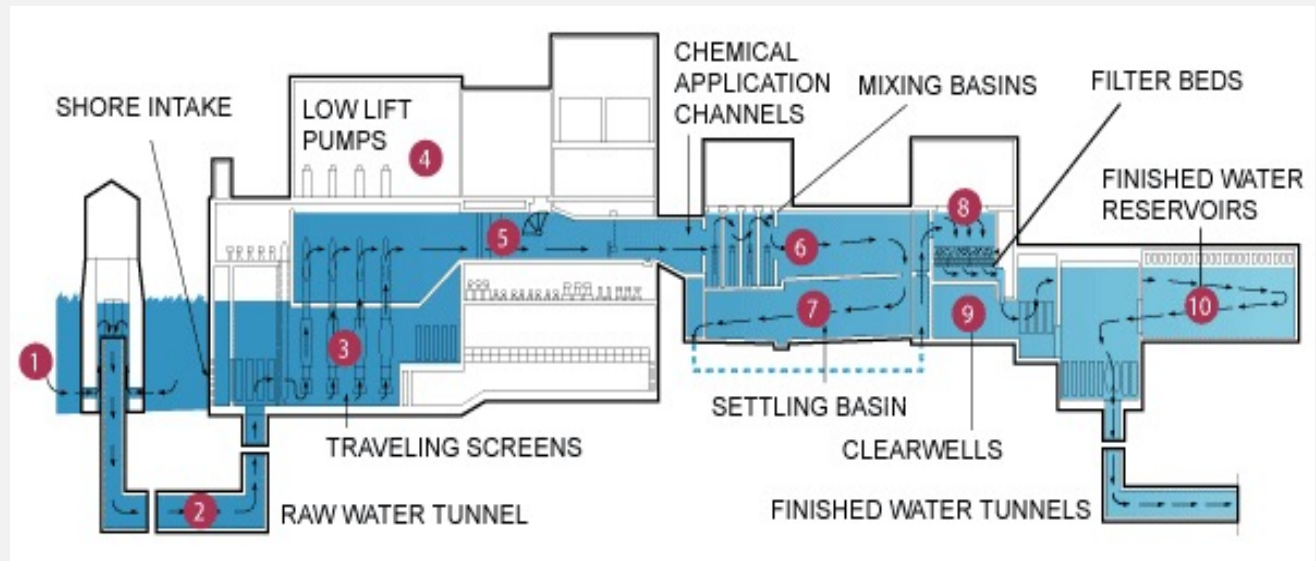


- Joint Action Water Agency
 - Organized in 1982
 - Operational in 1985
- Current System Capacity: **100 MGD**
- Current ADD: **30 MGD**
- Current MDD: **55 MGD**
- Maximum Daily Demand 2050: **55 MGD**
- Available Capacity for sale: **50 MGD**
- Significant available capacity
- Updating stand-by generators
- System is relatively new and reportedly in very good condition



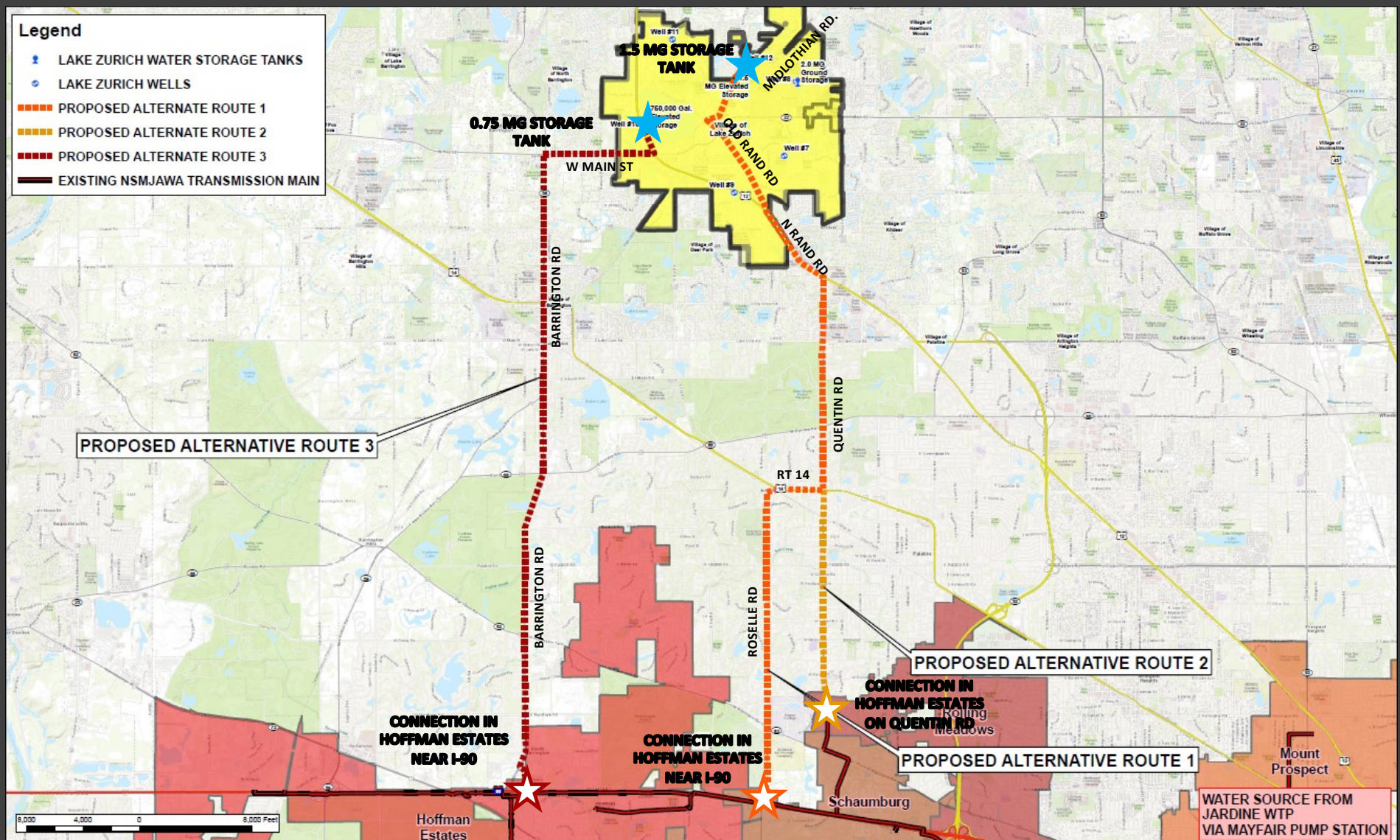
SUPPLY & TREATMENT

- Lake Michigan Source
- Intake and WTP in COC
 - COC treats and conveys directly via two pipelines to NSMJAWA storage and pumping location near O'Hare
- Treatment (Similar to NWC):
 - Intake Screening
 - Chemical Coagulation, Flocculation, and Settling
 - Sand Filtration
 - Chlorine Disinfection and Fluoridation



Legend

- LAKE ZURICH WATER STORAGE TANKS
- LAKE ZURICH WELLS
- PROPOSED ALTERNATE ROUTE 1
- PROPOSED ALTERNATE ROUTE 2
- PROPOSED ALTERNATE ROUTE 3
- EXISTING NSMJAWA TRANSMISSION MAIN



TRANSMISSION MAIN EXPANSION REQUIREMENTS

TRANSMISSION MAIN

- 16" branch North (requires booster pump station)
- 8 – 10 miles of 30" branch to Hoffman Estates (booster pump station modifications required at extra cost)
- Requires 10-12 miles of transmission main

DELIVERY PRESSURE

- Minimum 25 psig
- 60 psig Typical
- Have supplied to other communities at system operating (tower pressure)

STORAGE / EMERGENCY BACKUP

- 0.55 x allocation +3.3 mgd
 - 5.2 mgd for LZ
 - Potentially negotiable
- Emergency backup supply not required but recommended
- No mixing of water supplies unless emergency



SERVICE HISTORY RELIABILITY

- No major service disruptions from COC or NSMJAWA
- Occasional short duration restrictions due to routine maintenance
- O'Hare site has 30 MG of storage for COC requirements



GOVERNANCE AND MEMBERSHIP

GOVERNING BODY

- Board of Directors
 - 7 Mayors or Designated Appointee
- Executive Committee
 - 7 Village Managers

RIGHTS/ REQUIREMENTS

- Pay for cost of new transmission main
- Responsible for any improvements downstream of delivery structure



7 CURRENT MEMBERS

Hoffman Estates, Streamwood, Schaumburg, Rolling Meadows, Mount Prospect, Hanover Park, Elk Grove Village

TRANSMISSION OWNERSHIP

NSMJAWA owns and maintains transmission main



GENERAL COST / CONNECTION FEES

CURRENT RATE MEMBER / CUSTOMER \$5.70

Customers DO NOT have a set rate;
floats each year based on expenses
and depends on cost to delivery,
includes capital cost and debt service
with debt free by 2032

PROPOSED RATE

Potential for future rate of
~\$1.50, pending
negotiations/timing with
COC

FINANCING OPTIONS

- Financing options unknown at this time but could be explored
- Recapture for additional downstream communities possible

OTHER POTENTIAL COSTS

1. Transmission Main
2. Booster Station upgrade or new Booster Station required (NSMJAWA)
3. Internal Improvements (Receiving Station, Storage, Main)

CONNECTION FEE

MEMBER: Equity buy-in required (TBD), most likely not an option

CUSTOMER: No buy-in, no board/committee representation

NSMJAWA

SUMMARY & KEY CONSIDERATIONS

More than adequate capacity to supply Lake Zurich & very interested in obtaining new customers.

All connection points are far from Lake Zurich and run along major highways and state routes (IDOT complications)

No major service disruptions in the past 5 years

Additional storage required and would need to be placed within Village limits.

Could possibly partner with neighboring community to share transmission main costs.

Highest present water rates per 1,000 gallons.



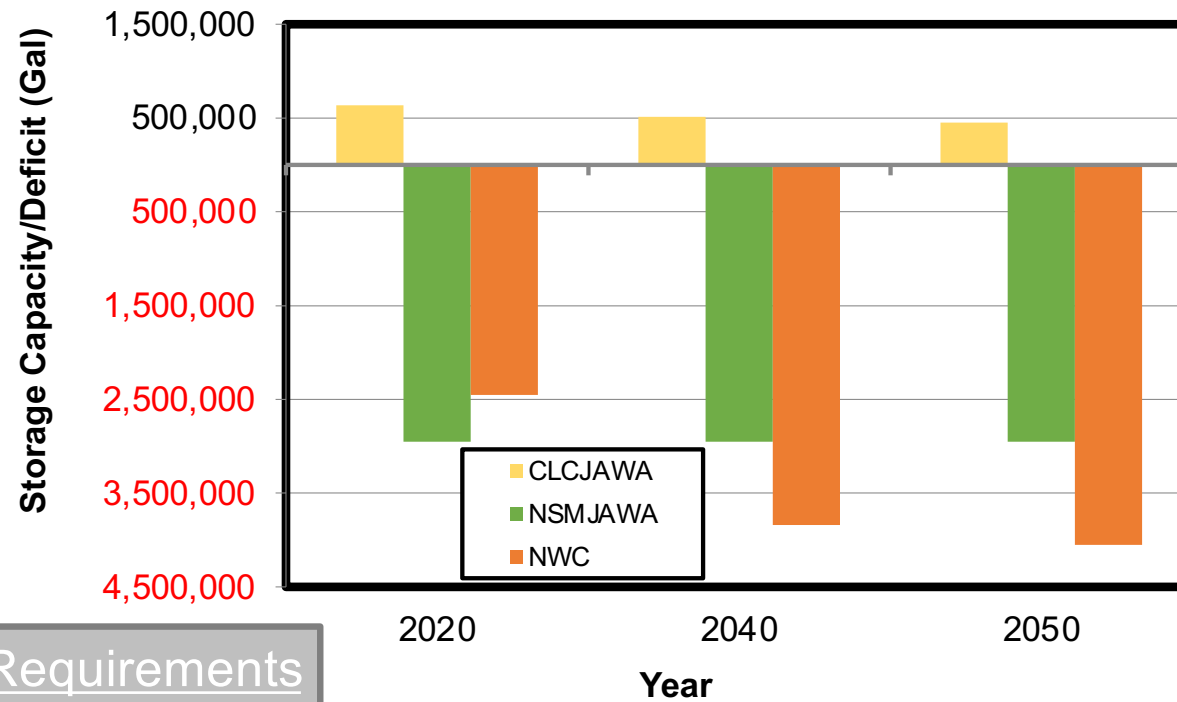


SUPPLIER COMPARISON

GENERAL CONSIDERATIONS

- Each Option Would Require a Detailed Corrosion Control Study to Determine Impacts of Changing Water Source on Lead/Copper
- Each Option Would Require Modifications to the Village's Water Infrastructure
 - Receiving Station – Storage/Pumping/Chlorination
 - Internal Transmission Main Modifications
 - Decommission WTP's

Storage Days Capacity Projection



Storage Capacity Requirements

CLCJAWA: 1X ADD

NWC: 5.2 MGD

NSMJAWA: 2X MDD

Decision Component	CLCJAWA	NWC	NSMJAWA
Project Costs			
Capital Cost (Including Equity Buy-In)	\$\$\$	\$\$	\$\$
Annual O&M Cost (Including Rates)	\$	\$	\$\$\$
Total Present Worth Cost	\$\$\$	\$\$	\$\$\$
Water Quality			
Anticipated Change to Finished Water Quality	↑↑	↑	↑
Proximity			
Distance to Anticipated Connection Point(s) and Treatment Source	↖	↖	↖↖
Reliability			
Historic and Anticipated Future Reliability for Supply (Disruptions)	✓✓	✓✓	✓✓
Expendability/Capacity			
Supplier's Available Capacity	▮▮▮	▮	▮▮▮
Control			
Village's Control Over System (Member vs. Customer)	👤👤	👤	👤

MATRIX RANKING CRITERIA

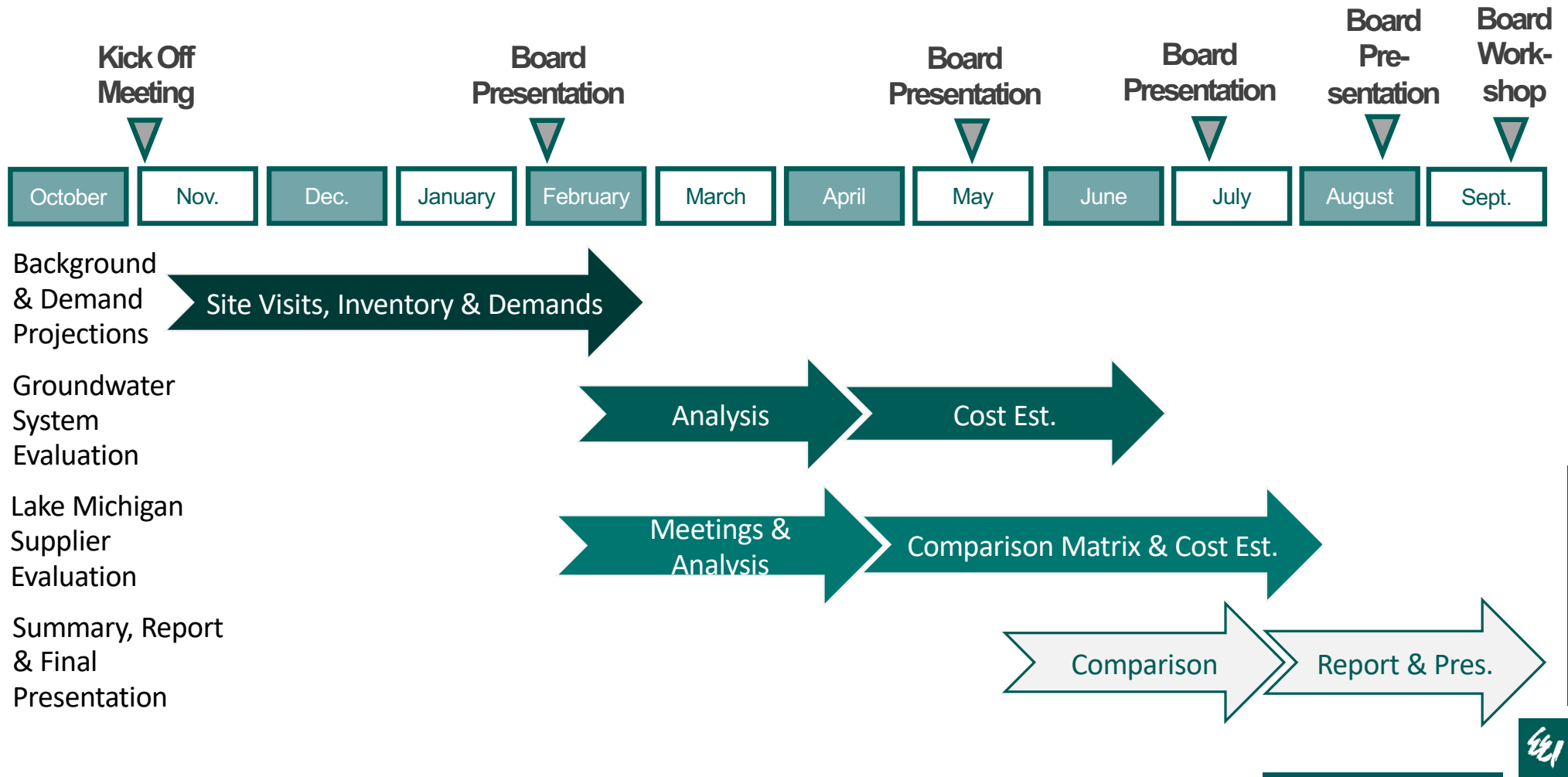
- Project Costs
 - Capital (implementation) Costs
 - Annual O&M Costs
 - Total Project Costs
- Anticipated Finished Water Quality
- Implementation Difficulty (Short Term Risk)
- Operation & Maintenance
- Long Term Risk and Reliability
- Expendability / Partners
- Control

[illegible]

Next Steps



PROJECT SCHEDULE





**Questions or
Comments?**

THANK YOU

We value your time and appreciate the opportunity to present this evening.



**Engineering
Enterprises, Inc.**



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