



# Alternative Water Source Study

Presented By:

**Michael J. Brown**

Director of Public Works

**Jeffrey W. Freeman, P.E., CFM, LEED AP**

**Stephen T. Dennison, P.E.**

Engineering Enterprises, Inc.

**Village Board Meeting**

Village of Lake Zurich, IL

October 5, 2020



# Presentation Overview



Village Introductory Comments



EEI Introduction



Village Water System History



Water System Current Status



Water System Current Considerations



Next Steps



# EEL Introduction



- **Jeffrey W. Freeman, PE, CFM, LEED AP**
  - Chief Executive Officer
  - 24 Years of Experience
  - Current Chair of the Illinois Section American Water Works Association

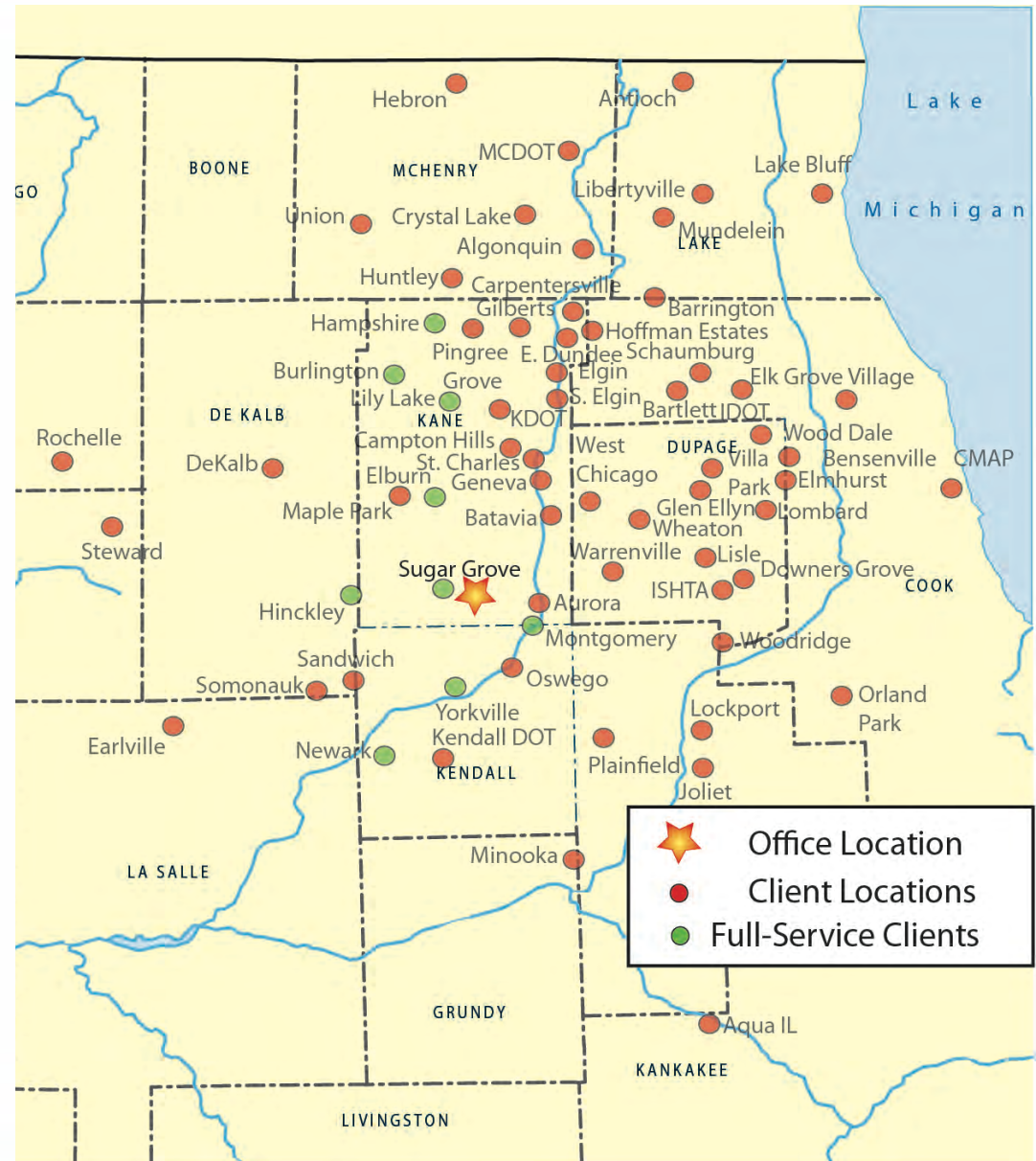


- **Stephen T. Dennison, PE**
  - Senior Project Manager / Principal
  - 17 Years of Experience
  - Leader of EEL's Environmental Group



# EEI Introduction

- Serving NE IL For Over 46 Years
- 44 Professionals → PEs, PLSs, LEED APs, CFMs and Support Team Members
- Full Service Civil Engineering Firm → Water, Wastewater, Stormwater, Transportation and Land Surveying
- Award Winning Projects





# EEI Introduction

- Deep Wells with Cation Exchange Water Treatment Plant Experience
- Wastewater Treatment Facility Design & Permitting Experience
- Water Works System Master Plan Experience







# EEI Introduction

- **Montgomery, Oswego, Yorkville Alternative Water Source Study**

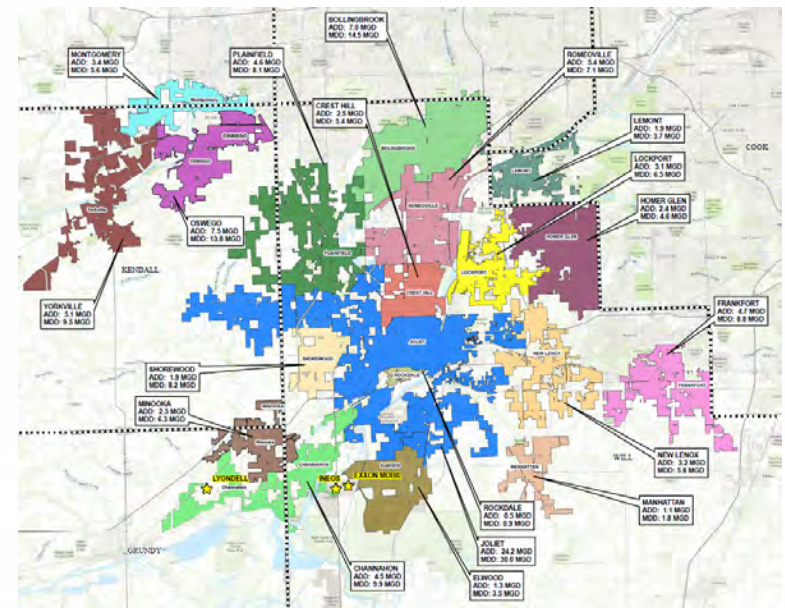
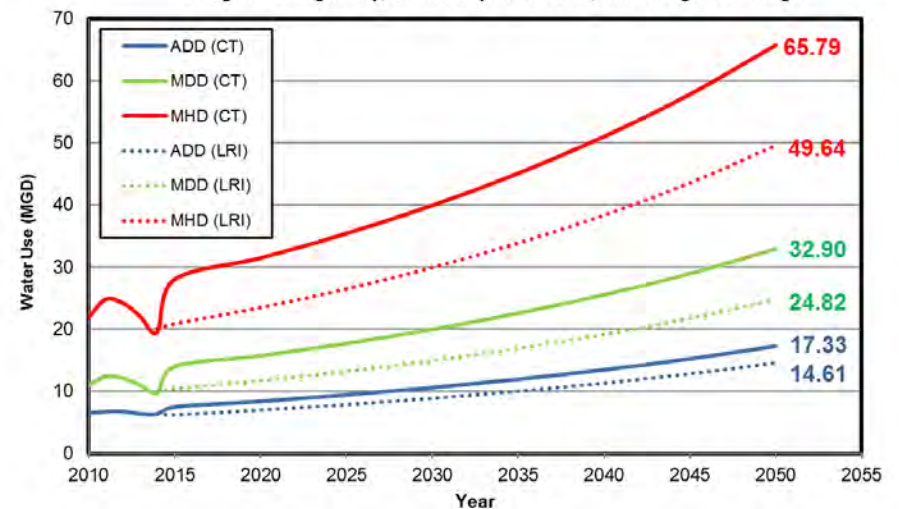
- 2050 Population Projection: 192,561
- Water Sources Reviewed: Shallow and Deep Groundwater, Fox River and Lake Michigan
- Estimated Capital Investment: ~\$200M

- **Joliet Alternative Water Source Program**

- 2050 Population Projection: 202,559 (370,000+)
- Water Sources Reviewed: Groundwater, River Water (Multiple) and Lake Michigan (Multiple)
- Estimated Capital Investment: ~\$550M - \$1.1B

## Projected Water Use

Village of Montgomery, United City of Yorkville, and Village of Oswego





# EEI Introduction

- **Village of Algonquin Water Projects**

- Master Plan & Ongoing Water Modeling
- WTP Rehabilitation
- Pressure Reducing Valve Station Upgrades
- Interconnect Evaluations

- **Village of Barrington Water Projects**

- Lead Service Line Replacement Project Plan
- Source Water Noncompliance Advisory Consultation
- WTP Consultation

- **Village of Libertyville Water Projects**

- Emergency Water Supply Needs Assessment
- Backup Well Rehabilitations
- Booster Pump Station & Pressure Zone Interconnect

## **Water Projects:**

- **Village of Schaumburg**
- **Elk Grove Village**
- **Village of Mundelein**



# Village Water System History

- The Village's public water supply began operation in **1912** pumping untreated water from shallow wells into its first local distribution system.
- In the **early 1970's**, the Village began the move to deeper wells as it was determined that the shallow wells could not provide enough dependable water to accommodate a growing population.







# Village Water System History



- In the **late 1980's** a consent order was filed by the Illinois Environmental Protection Agency against the Village of Lake Zurich to decommission the Village's wastewater treatment plants.
- An agreement to send wastewater to the Lake County SE wastewater treatment facility was executed on **August 16, 1989**.
- Lake Zurich officially begins to discharge Wastewater to the Lake County SE wastewater treatment facility in **March of 1994**.



# Village Water System History

- In **December 2000**, the U.S. EPA determined an MCL (maximum contaminant level) of 5 pCi/L for radium in drinking water. Radium is naturally occurring in the deep well aquifer at levels above 5 pCi/L.
- In **2002**, the Village entered into a Compliance Commitment Agreement (CCA) with the Illinois EPA to have the water supply meet the radium standard **by December 2008**.
  - Ion Exchange was selected for several reasons including initial cost, well site limitations and the ability to discharge concentrated radium backwash to the sanitary sewer system.
  - At that time, an allocation of Lake Michigan water was not available from the State and limits for radium concentration in wastewater had not been established.
- By **2009**, the total cost for the Village to become compliant and meet the radium standard for drinking water was approximately \$9.5 million.
  - \$4 million of this investment was funded by the State's revolving loan fund, which will be repaid through the Village's utility enterprise fund (i.e. water/sewer user fees) **by 2029**.





# Village Water System History

- In **2011**, the Village was granted a conditional Lake Michigan water supply allocation. Studies and evaluations performed at that time determined the deep well aquifer might not be sustainable or be able to meet anticipated water needs within the next 30 to 40 years. The study recommended that the Village consider switching to Lake Michigan as its primary source of water.
  - A condition of the allocation is that the Village must show progress towards the ability to utilize the source – Village has been reducing non-revenue water, but progress has been limited
  - IDNR Reevaluates Allocations Every 10 Years (Currently Ongoing – 2020)





# Village Water System History

- From **2012 to 2015**, The Village initiated preliminary studies to identify possible suppliers and partners, necessary infrastructure, and a citizen survey to gauge public opinion.
  - Survey Results (**2015**):
    - *52%: Somewhat or Strongly Oppose Switching to LMW*
    - *48%: Somewhat or Strongly Support Switching to LMW*
- By **2016**, the feasibility of obtaining a Lake Michigan water supply somewhat favored a partnership with the Northwest Water Commission. High project costs (and the loss of a partner), combined with a lack of short-term urgency or public interest, resulted in the concept of partnering with the Northwest Water Commission being put on hold.

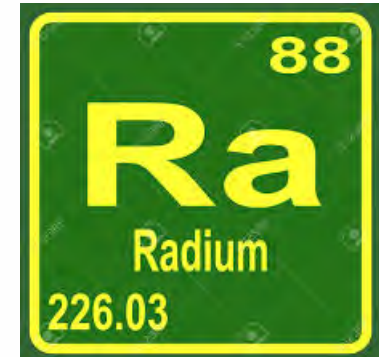






# Village Water System History

- In **December 2016**, Lake County Public Works informs the Village that the Lake County SE wastewater treatment facility was upgrading their process to include the production of a Class A biosolids. The County indicates that the wastewater treatment plant improvements will require a reduction in the volume of radium that it receives from its water production partners, including Lake Zurich, who is a significant radium contributor to the facility.
- Lake County PW is requiring radium concentration in sanitary discharge of less than 5.0 pCi/L
  - Village compliance not possible with current facilities





# Village Water System History



- From **2017 to Present**, the Mayor, Village Manager, and the Director of Public Works have met with representatives of the Central Lake County Joint Action Water Agency (CLCJAWA), including their Board and Operations Staff, to determine the viability of a potential partnership to provide an additional source option for Lake Water.
- Given the geographical proximity to Lake Zurich, CLCJAWA is a viable option if water supply capacity is available.
- CLCJAWA initiated two operational studies to determine the water capacity available for potential new members, and a redundancy study that will provide looping options for their current water source.



# Village Water System History

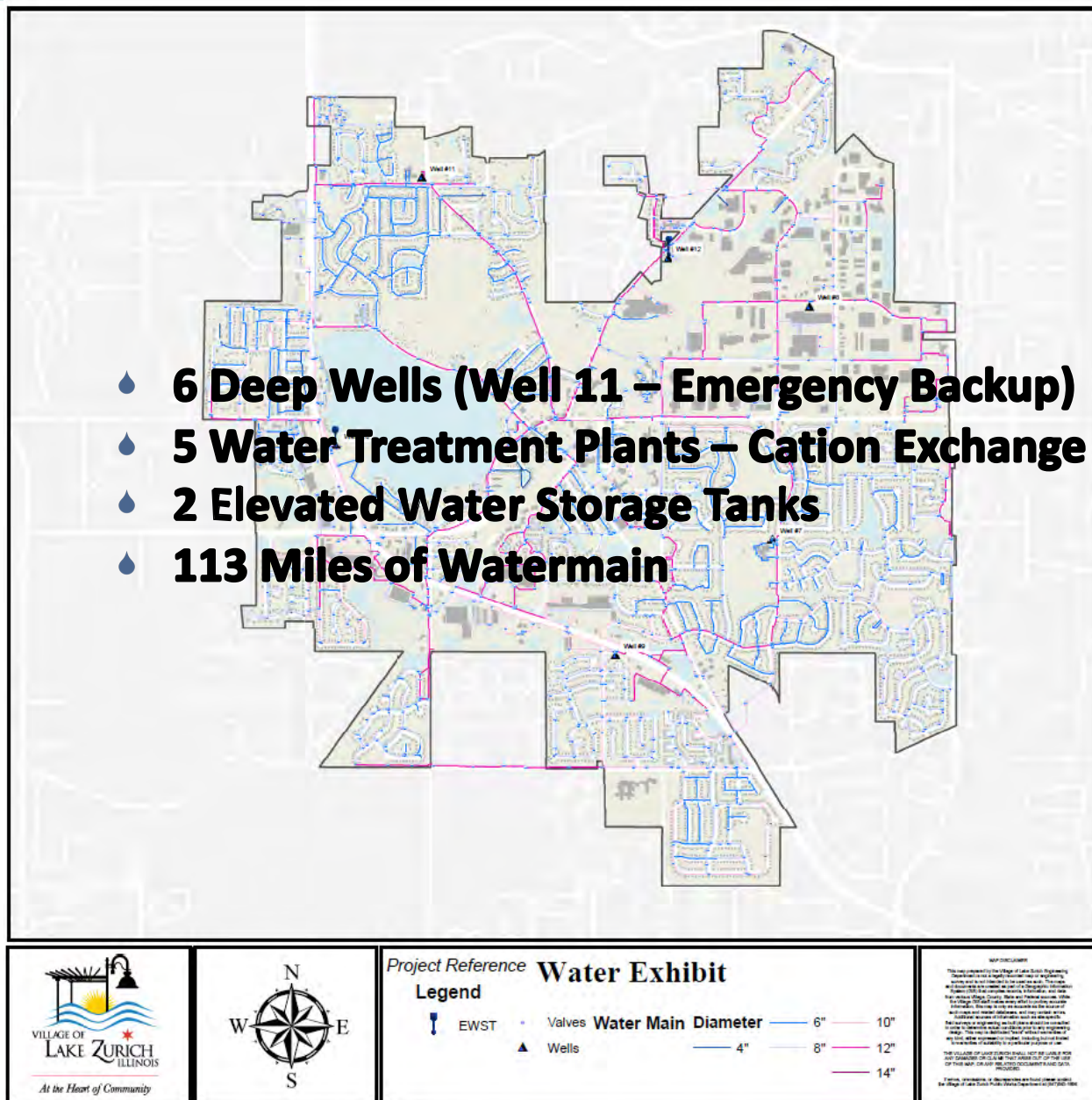
- In **2019**, Lake County revised their Pretreatment Ordinance and Sewer Use Ordinance, following the implementation of their wastewater treatment facility improvements for producing and selling Class A Biosolids.
- In **December 2019**, Lake County issued a letter asking the Village to prepare a plan for removing the radium produced by its ion exchange process from the wastewater stream sent to Lake County. The plan is to be developed by the **end of 2021**.





# Water System Current Status

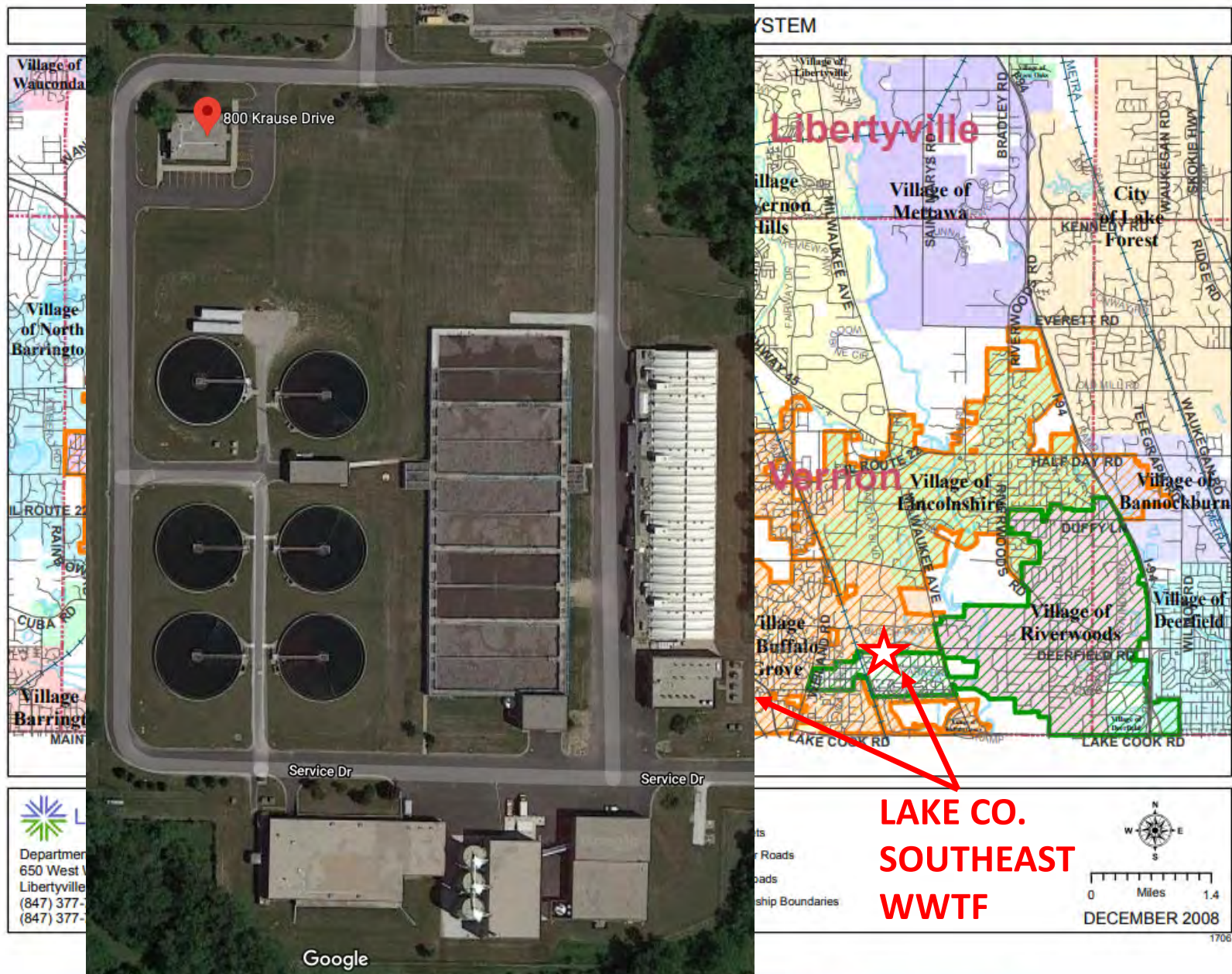
- ◆ **6 Deep Wells (Well 11 – Emergency Backup)**
- ◆ **5 Water Treatment Plants – Cation Exchange**
- ◆ **2 Elevated Water Storage Tanks**
- ◆ **113 Miles of Watermain**







# Water System Current Status





# Water System Current Considerations



- **Action Will Be Required**
- Lake County's Pretreatment Ordinance is prompting the Village to explore options for disposing the radium produced by its ion exchange process. If the Village continues to rely on deep water wells, where radium is naturally present, these regulatory changes will require system improvements that will increase the Village's operational costs.
- State and federal water/wastewater regulations are constantly updated and made more restrictive, resulting in potential additional capital and/or maintenance costs in the future. Transitioning to Lake Michigan water may avoid costly future regulatory changes.



# Water System Current Considerations

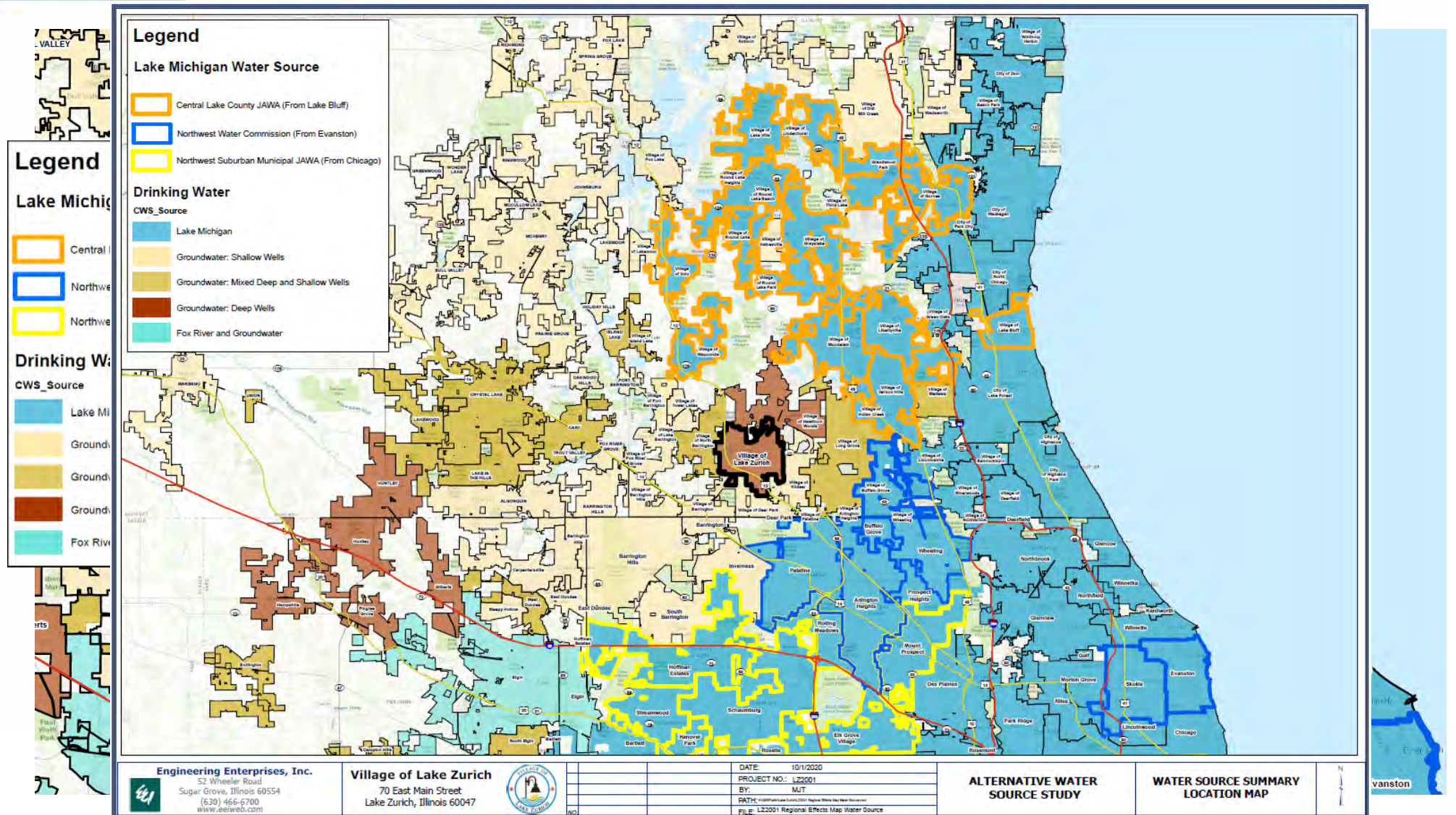
- There are alternate potential partners for a Lake Michigan water supplier. The Village currently has partnership options that were not considered in the 2012 study.
- There are also potential regional partners for receiving LMW that are currently using groundwater.
- The Lake Michigan water supply allocation can be rescinded by the State if progress for utilizing the allocation is not recognized. To date, the allocation has been in effect for 9 years with limited progress.







# Water System Current Considerations







# Next Steps

- Staff is recommending a water resource study to begin in **October 2020**. The study will examine multiple facets including operations, regulations, and water sustainability as a whole for the Village of Lake Zurich. The study will explore the pros, cons and costs of either staying on deep water wells or partnering with a water agency to connect to Lake Michigan water.
  - Scope of Study Includes:
    - Water Use Projections to 2050
    - Evaluation of Options for Continuation of Groundwater Treatment
    - Evaluation of Lake Michigan Supply Sources
      - CLCJAWA
      - Northwest Water Commission
      - NSMJAWA
    - Cost Estimates and Water Rate Impacts for All Options
    - Report and Four (4) Presentations to Village Board



# Next Steps

- Village representatives will continue communication with regional JAWA agencies to explore partnership options.
- **Evaluation Process Will Be Collaborative – Presentations and Discussions at Milestones**
  - Four (4) Presentations and Discussions at Village Board Meetings
    1. After Water Use Projections and Preliminary Evaluation of Groundwater Treatment Options
    2. After Preliminary Evaluation of LWM Suppliers
    3. After Final Evaluations and Preparation of Cost Estimates for Options
    4. After Evaluation of Water Rate Impact Analyses for Options and Preparation of the Draft Report
- Report Complete – October 2021





## Q&A

**Michael J. Brown**

Director of Public Works

**Jeffrey W. Freeman, P.E., CFM, LEEP AP**

Chief Executive Officer  
Engineering Enterprises, Inc.

[jfreeman@eeiweb.com](mailto:jfreeman@eeiweb.com)

(630) 466-6700

**Stephen T. Dennison, P.E.**

Senior Project Manager / Principal  
Engineering Enterprises, Inc.

[sdennison@eeiweb.com](mailto:sdennison@eeiweb.com)

(630) 466-6700

