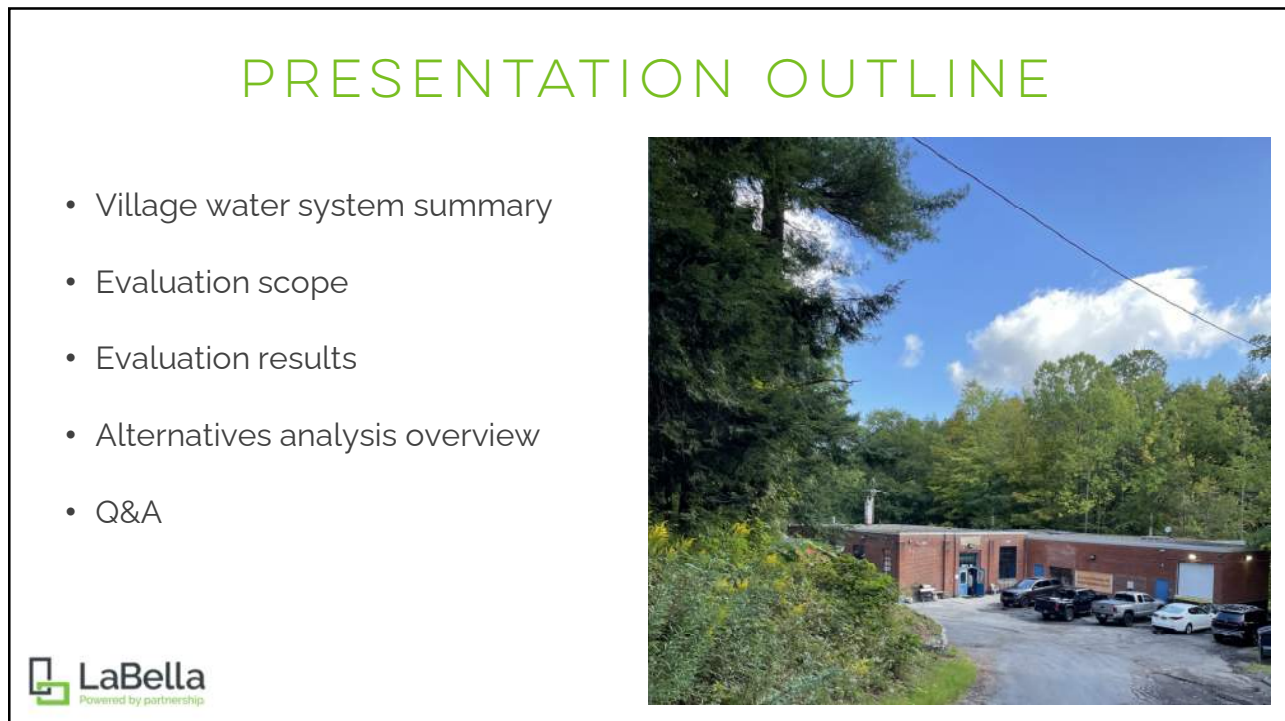
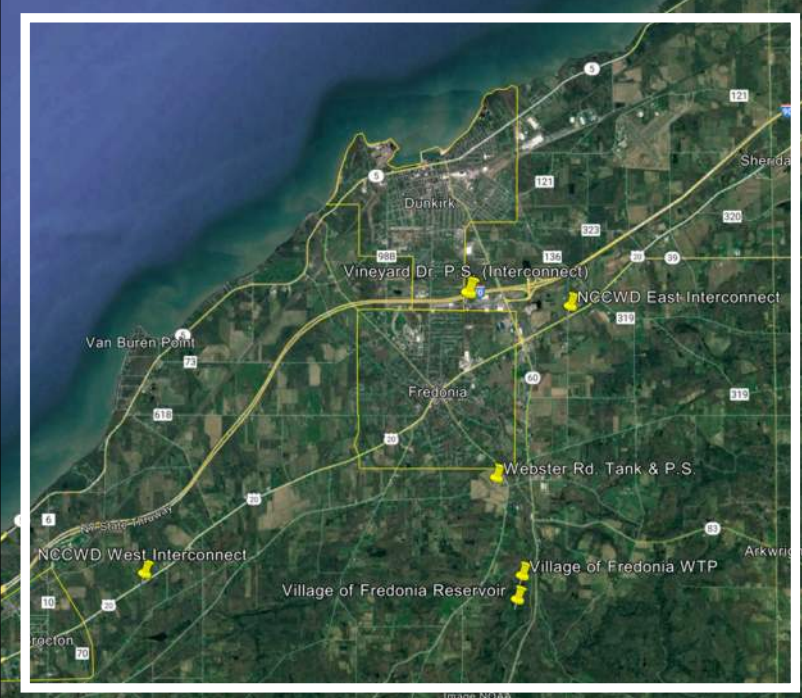





1



2




VILLAGE OF FREDONIA



Water system serves approx. 15,580 people:

- 10,400 in Village
- 4,700 at SUNY
- 580 in 3 WDs in Pomfret



3



RESERVOIR



4

WTP

LaBella
Powered by partnership.

5

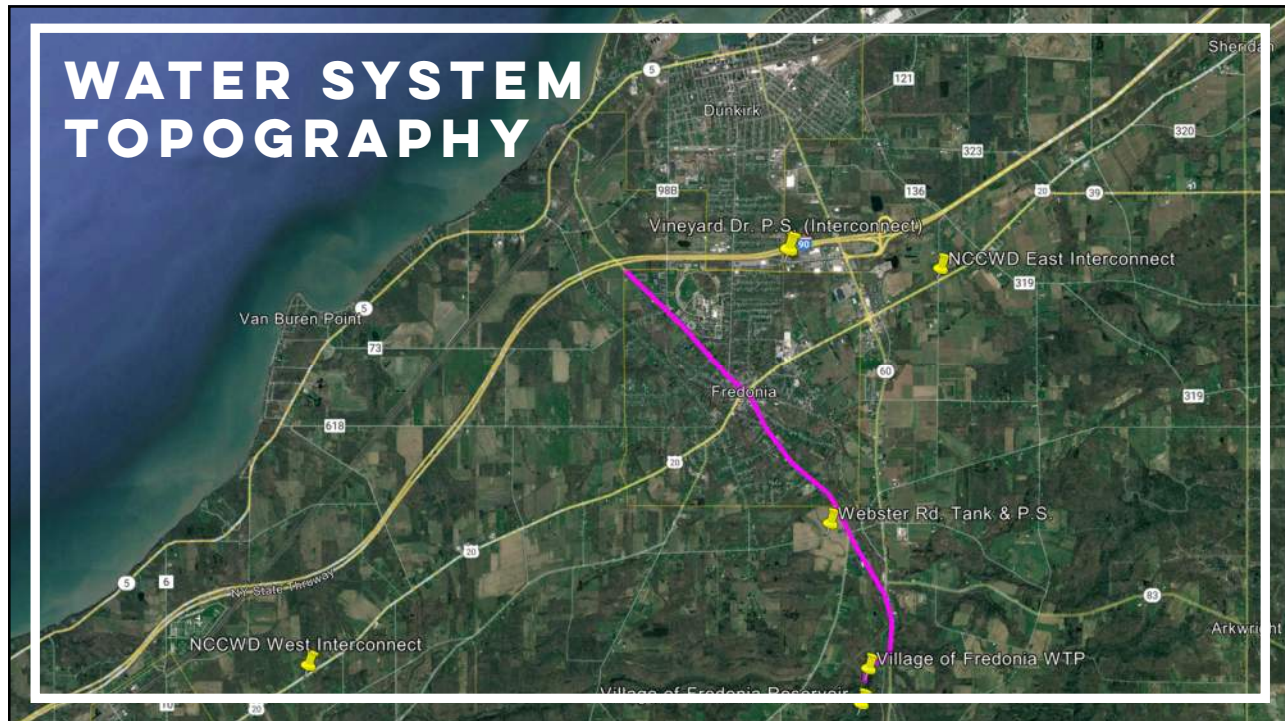
WEBSTER ROAD TANK & P.S.

LaBella
Powered by partnership.

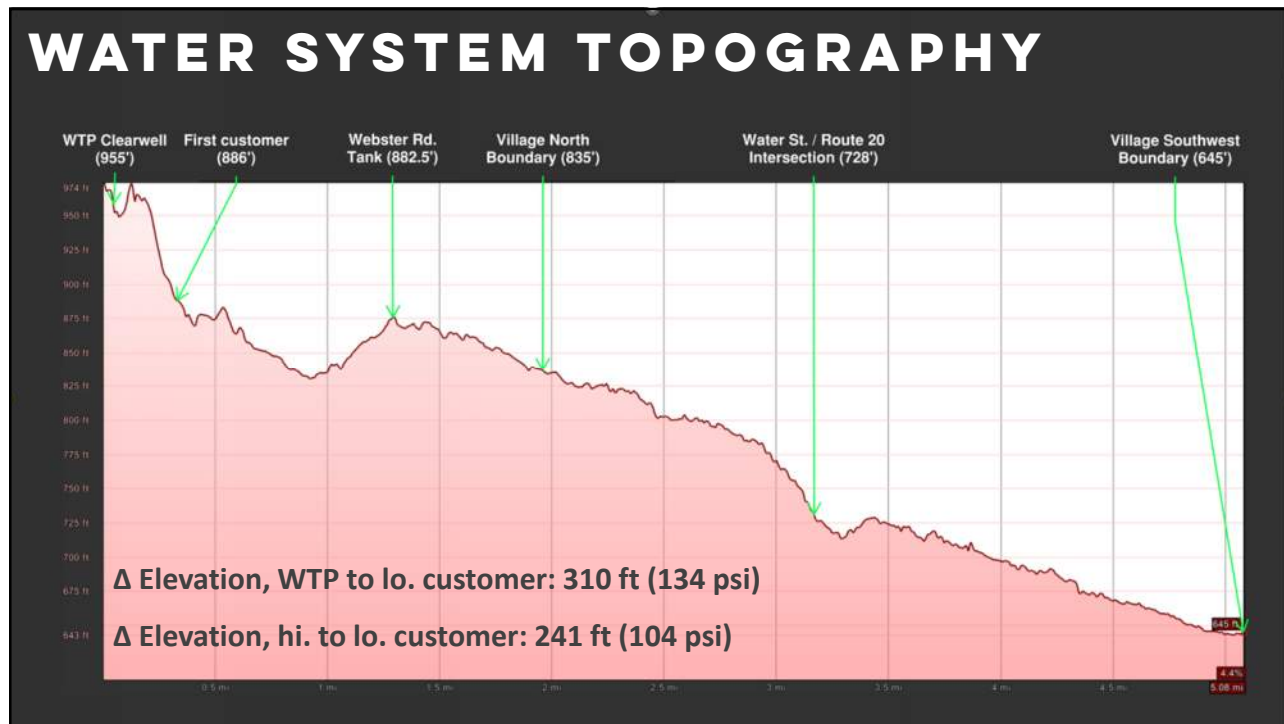
6



7



8



9

EVALUATION SCOPE

1. Engineering evaluation of:
 - Reservoir
 - WTP
 - Webster Rd. tank & pump station
 - Vineyard Dr. pump station interconnection
2. Hydrogeological evaluation of feasibility of groundwater supply
3. Preliminary engineering report
4. Funding opportunity recommendations (for selected alternatives)

10

BASIS OF EVALUATION

- Evaluation establishes compliance of existing infrastructure with established regulatory standards including (but not limited to):
 - NYSDEC Dam Safety (NYCRR Part 673)
 - Water System Federal Regulations (e.g. Surface Water Treatment Rule; Stage 2 DBP Req's)
 - Water System NYS Regulations (NYCRR Title 10, Part 5, Subpart 5-1, Ten States)
 - NFPA, ISO, AWWA - Fire Flow
 - NYS Codes (Building, Mechanical, Electrical)



11

RESERVOIR EVALUATION



Existing Conditions

- Class C High Hazard Dam
- Dam condition does not meet NYCRR Part 673 requirements
 - Drawdown rate and volume
 - Spillway capacity
 - Dam Stability

Results Summary

- Multiple options to address dam
 - Improvement
 - Permanent drawdown
 - Decommissioning

12

WTP EVALUATION



Existing conditions

- Avg. demand 1.32 MGD
- Rated capacity 2.5 MGD

Results Summary

- Major needs:
 - Additional clarification capacity
 - Chemical storage & feed improvements
 - Piping & process control improvements
 - Site improvements (incl. slope stabilization)

13

WEBSTER RD. TANK & P.S. EVALUATION



Existing conditions

- Storage capacity: 1 MG (nominal)
- Pumps: two 75 HP pumps (1,650 gpm at 138 ft TDH)

Results Summary

- Additional finished water storage capacity needed
- Pump station needs pumping and piping improvements to satisfy operation intent
- Complete surge analysis

14

VINEYARD DRIVE INTERCONNECTION EVALUATION



Existing conditions

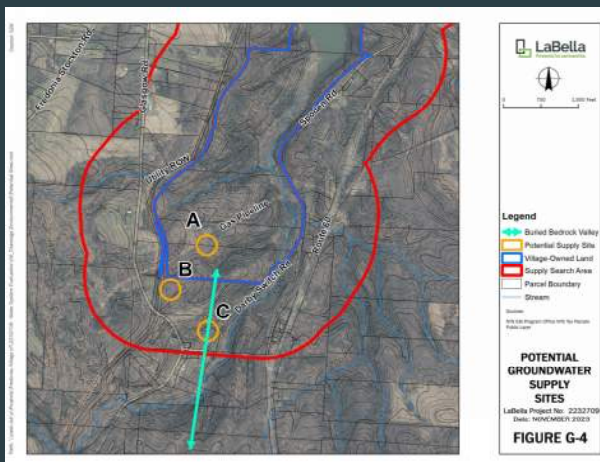
- Pumps:
- Capacity
 - Intended 800 gpm
 - Sustained 300 gpm (per City)
 - Short-term 800 gpm (per City)
- Water model needed to verify

Results Summary

- Tie-in to City is sub-optimal
 - Connected to branch line (not trunk)
 - Introduces capacity and pumping challenges
- Startup takes ~30 mins, manual only

15

HYDROGEOLOGICAL EVALUATION AND FEASIBILITY OF GROUNDWATER WELLS

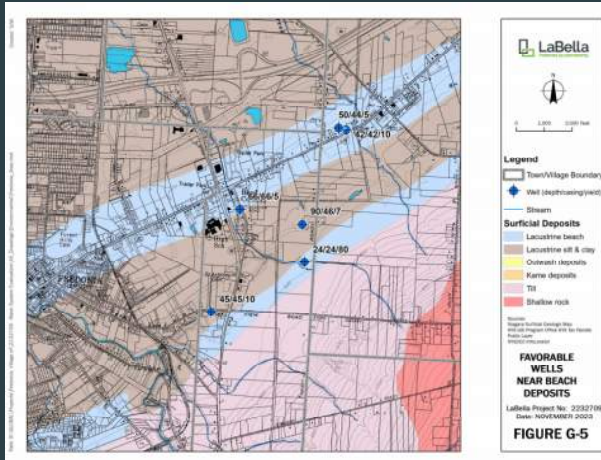


Results Summary

- Supply wells can be developed near the reservoir site and to the east of the Village to approximate the average daily demand of the system.
- Three potential supply sites are located south of the Fredonia Reservoir near Glasgow and Darby Switch Roads in a deep, confined sand and gravel aquifer.

16

HYDROGEOLOGICAL EVALUATION AND FEASIBILITY OF GROUNDWATER WELLS



Results Summary

- One potential supply site is located across a 1-2 square mile area just to the east of the Village in glacial lake beach deposits.

17

HYDROGEOLOGICAL EVALUATION AND FEASIBILITY OF GROUNDWATER WELLS



Recommended next steps

- Follow-up with further evaluation of the site(s) in and around the Village (\$3,000-\$5,000).
- Arrange for site access for test drilling and conduct exploratory drilling (\$25,000-\$50,000 for soil borings near Village, \$60,000-\$100,000 for sonic drilling south of Reservoir).
- If satisfactory results, proceed to drilling of production wells (\$100,000-\$200,000).
- Subsequent testing of wells (\$30,000-\$70,000 per test).

Timeframe

- 3-6 months

18

OVERALL ALTERNATIVES

Alternative	1	2	3	
WTP	Upgrade	Decommission	Decommission	Implement distribution system improvements (regardless of Alternative selected).
Reservoir	Upgrade	Decommission	Drawdown	
Interconnection with Dunkirk	-	Construct Interconnection	Construct Interconnection	



19

OVERALL ALTERNATIVES

Alternative	1	2	3	
WTP	Upgrade	Decommission	Decommission	Implement distribution system improvements (regardless of Alternative selected).
Reservoir	Upgrade	Decommission	Drawdown	
Interconnection with Dunkirk	-	Construct Interconnection	Construct Interconnection	
Groundwater Source Exploration	TBD	TBD	TBD	



20

ALTERNATIVES ANALYSIS RESERVOIR

1. Upgrade reservoir
 - Remove and reconstruct the spillway and intake structure
 - Continue use for potable water
2. Decommission reservoir
 - Guided removal of structures
 - Engineered implementation of habitat
 - Relinquish access to potable water
3. Drawdown reservoir
 - Drain reservoir to an elevation that allows adherence to NYS guidance
 - Minor intake and spillway modifications



21

ALTERNATIVES ANALYSIS WTP UPGRADES



Elements:

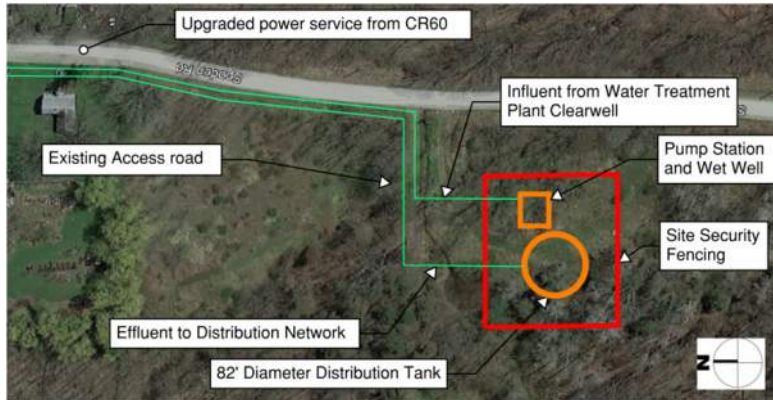
- Construct 3rd Clarifier
- Expand WTP Building
- Stabilize slope
- Construct B.W./F.F. tank
- Improve chem. facilities



22

ALTERNATIVES ANALYSIS

FINISHED WATER STORAGE (ALT 1.)



Elements:

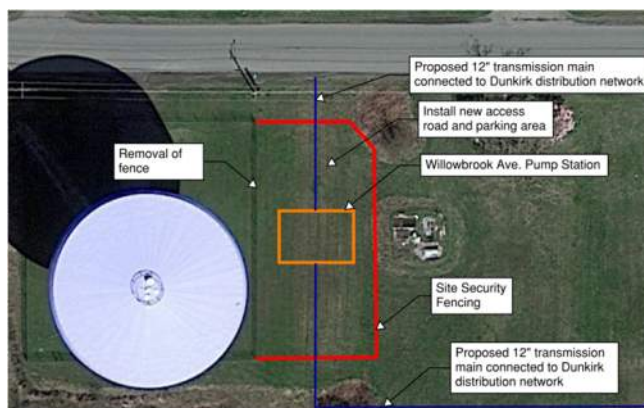
- Construct 1.35MG tank and P.S. at Spoden Rd. site
- Extend water main to serve tank.
- Decommission Webster Rd. P.S.
- Implement dist. syst. piping modifications to ensure suitable pressure



23

ALTERNATIVES ANALYSIS

FINISHED WATER STORAGE & INTERCONNECTION (ALTS 2&3)



Elements:

- Construct 1.65MG tank at WTP site
- Re-purpose Webster Rd. P.S. to fill proposed 1.65MG tank
- Implement dist. syst. piping modifications to ensure suitable pressure
- Construct Interconnection P.S. in Village to draw water from Dunkirk into Village dist. syst.



24

ALTERNATIVES ANALYSIS

FINISHED WATER STORAGE & INTERCONNECTION (ALTS 2&3)



Elements:

- Construct 1.65MG tank at WTP site
- Re-purpose Webster Rd. P.S. to fill proposed 1.65MG tank
- Implement dist. syst. piping modifications to ensure suitable pressure
- Construct Interconnection P.S. in Village to draw water from Dunkirk into Village dist. syst.



25

ALTERNATIVES ANALYSIS

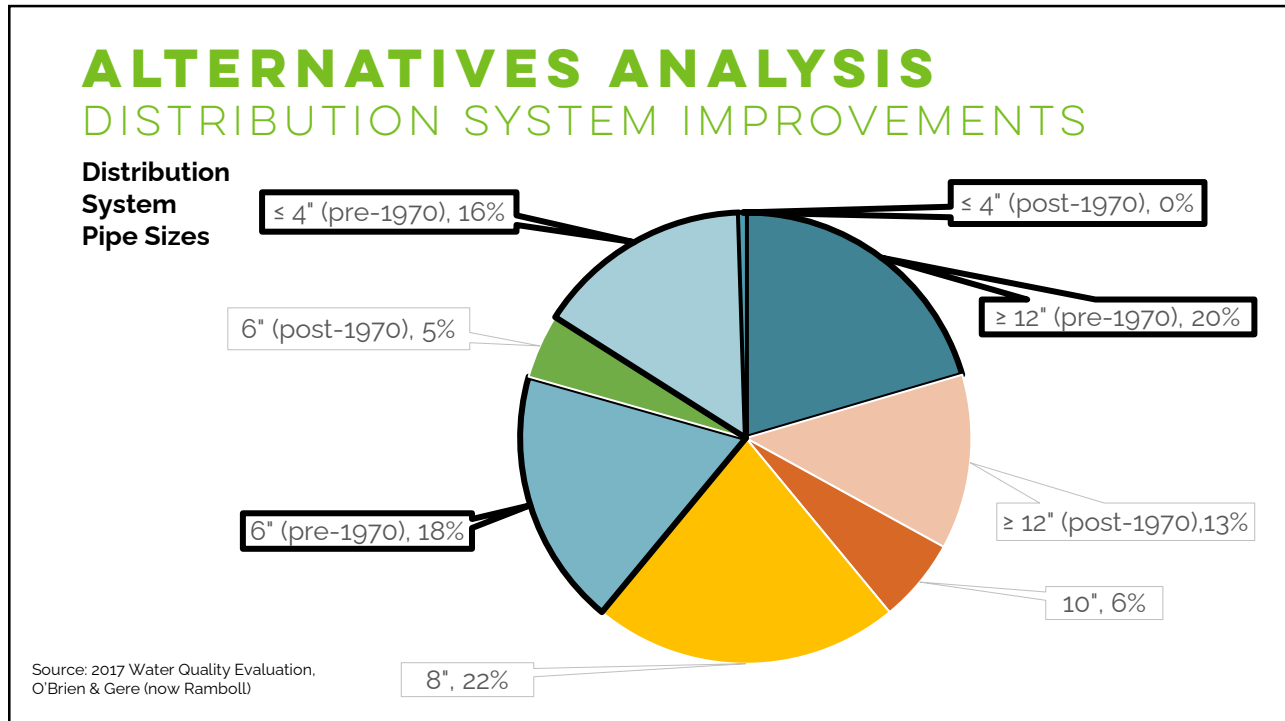
DISTRIBUTION SYSTEM IMPROVEMENTS

Water Quality Evaluation (2017) recommendations

1. Replace or line unlined cast iron pipe (installed pre-1970).
 - Evaluate lining options for pipes ≥ 8 ".
 - Replace 4" unlined cast iron pipe with 6" cement-lined ductile iron pipe.
2. Replace pipes less than 6" so that all pipes providing fire protection are ≥ 6 ".
 - Estimated cost: > \$7.5 M (excluded from upcoming cost comparison)

Source: 2017 Water Quality Evaluation,
O'Brien & Gere (now Ramboll)

26



27

OVERALL ALTERNATIVES ANALYSIS

Alternative	1	2	3
WTP	Upgrade	Decommission	Decommission
Reservoir	Upgrade	Decommission	Drawdown
Interconnection with Dunkirk	-	Construct Interconnection	Construct Interconnection
Pros	<ol style="list-style-type: none"> Independent control of PWS including rates With improvements, may be able to expand service area in future 	<ol style="list-style-type: none"> Minimizes O&M, admin., and regulatory burden Eliminates uncertainty related to reservoir & WTP future viability 	<ol style="list-style-type: none"> Minimizes O&M, admin., and regulatory burden Eliminates uncertainty related to reservoir & WTP future viability Reduced cost relative to Alt. 2 Can beneficially repurpose reservoir
Cons	<ol style="list-style-type: none"> Continued reliance on WTP site with challenging constraints High O&M, admin., and regulatory burden High cost (short & long-term) 	<ol style="list-style-type: none"> Reduced PWS control Minimal control over water rates High cost (short & long-term) 	<ol style="list-style-type: none"> Reduced PWS control Minimal control over water rates

28

OVERALL ALTERNATIVES ANALYSIS

Alternative	1	2	3
WTP	Upgrade	Decommission	Decommission
Reservoir	Upgrade	Decommission	Drawdown
Interconnection with Dunkirk	-	Construct Interconnection	Construct Interconnection
Capital (excl. cont.)	\$21.9 M	\$24.9 M	\$17.0 M
Contingency (30%)	\$6.6 M	\$7.5 M	\$5.1 M
Assoc. Costs	\$5.8 M	\$5.8 M	\$3.9 M
Project Cost	\$34.3 M	\$38.1 M	\$26.0 M
Avg. Annual (30-yr):			
Debt Service	\$2.6 M	\$2.8 M	\$2.1 M
Operation	\$2.4 M	\$1.0 M	\$1.1 M
Maintenance	\$0.4 M	\$0.07 M	\$0.26 M
Short-lived Asset	\$0.3 M	\$0.05 M	\$0.04 M
Purchase Water	0	\$2.96 M	\$2.96 M
Annual Cost/EDU	\$1,245	\$1,535	\$1,433

Exclusions & assumptions:

1. No grant funding.
2. Village loans "project cost" (4% interest, 30 years).
3. No phasing (see next slide).
4. \$3.87 per thousand gallons of Dunkirk water, escalated 3% annually.

29

OVERALL ALTERNATIVES ANALYSIS

Alternative	1	2	3
WTP	Upgrade	Decommission	Decommission
Reservoir	Upgrade	Decommission	Drawdown
Interconnection with Dunkirk	-	Construct Interconnection	Construct Interconnection
Capital (excl. cont.)	\$21.9 M	\$24.9 M	\$17.0 M
Contingency (30%)	\$6.6 M	\$7.5 M	\$5.1 M
Assoc. Costs	\$5.8 M	\$5.8 M	\$3.9 M
Project Cost	\$34.3 M	\$38.1 M	\$26.0 M
Avg. Annual (30-yr):			
Debt Service	\$2.6 M	\$2.8 M	\$2.1 M
Operation	\$2.4 M	\$1.0 M	\$1.1 M
Maintenance	\$0.4 M	\$0.07 M	\$0.26 M
Short-lived Asset	\$0.3 M	\$0.05 M	\$0.04 M
Purchase Water	0	\$2.96 M	\$1.48 M
Annual Cost/EDU	\$1,245	\$1,535	\$1,103

Exclusions & assumptions:

1. No grant funding.
2. Village loans "project cost" (4% interest, 30 years).
3. No phasing (see next slide).
4. \$3.87 per thousand gallons of Dunkirk water, escalated 3% annually.

Hypothetical scenario: New Village groundwater supply provides 50% of service area flow

30

OVERALL ALTERNATIVES ANALYSIS

Alternative	1	2	3
WTP	Upgrade	Decommission	D Hypothetical scenario: New Village groundwater supply provides 50% of service area flow
Reservoir	Upgrade	Decommission	D
Interconnection with Dunkirk	-	Construct Interconnection	Construct Interconnection
Pros	<ol style="list-style-type: none"> Independent control of PWS including rates with improvements, may be able to expand service area in future 	<ol style="list-style-type: none"> Minimizes O&M, admin., and regulatory burden Eliminates uncertainty related to reservoir & WTP future viability 	<ol style="list-style-type: none"> Minimizes O&M, admin., and regulatory burden Eliminates uncertainty related to reservoir & WTP future viability Reduced cost relative to Alt. 2 Can beneficially repurpose reservoir
Cons	<ol style="list-style-type: none"> Continued reliance on WTP site with challenging constraints High O&M, admin., and regulatory burden High cost (short & long-term) 	<ol style="list-style-type: none"> Reduced PWS control Minimal control over water rates High cost (short & long-term) 	<ol style="list-style-type: none"> Reduced PWS control Minimal control over water rates

31

OVERALL ALTERNATIVES ANALYSIS

Significant current unknowns	Dependent upon
Possibility for phasing	Village feedback, CCDOH requirements
Groundwater Supply	
Village desire to undertake field investigations	Village feedback
Ability to complete field investigations prior to advancing detailed design	CCDOH requirements
Ability to satisfy all service area demand	Field investigation results
Grant funding awards	Grant application(s) and award(s)
Distribution system	
System hydraulics	Water model update
Need for chemical addition at interconnection (Alternatives 2 & 3)	City raw water quality

32

FUNDING OPPORTUNITIES

	Improve Village WTP & Reservoir	Interconnect with City of Dunkirk; Decommission Village WTP & Reservoir	Interconnect with City of Dunkirk; Decommission Village WTP; Modify Reservoir for another use
EFC Drinking Water State Revolving Loan Fund (DWSRF)			
EFC Drinking Water Infrastructure Improvement Act (WIIA)			
EFC Bipartisan Infrastructure Law (BIL)	Eligibility dependent Income Survey	Eligibility dependent Income Survey	Eligibility dependent Income Survey
Community Development Block Grant	Eligibility dependent Income Survey	Eligibility dependent Income Survey	Eligibility dependent Income Survey
ARC Area Development Grant (ARC)			
USDA RD Water and Waste Loan and Grant Program (USDA)	Eligibility dependent Economic Conditions	Eligibility dependent Economic Conditions	Eligibility dependent Economic Conditions
EPA DWS Infrastructure Resilience and Sustainability Grant			
EPA Water Infrastructure Finance and Innovation Act (WIFIA)			
DEC WQIP - Dam Safety Repair /Rehabilitation			
DEC High Hazard Dam Rehabilitation Grant			
DEC WQIP - Aquatic Connectivity Restoration			
FEMA Building Resilient Infrastructure & Communities			
USACE Grant			
NFWF Sustain Our Great Lakes Grant			
GLC Great Lakes Sediment and Nutrient Reduction Program			
NOAA Restoring Fish Passage through Barrier Removal Grant			
USFWS National Fish Passage BIL			

33

Q & A

**VILLAGE OF FREDONIA
WATER SYSTEM EVALUATION
VILLAGE BOARD MEETING
NOV. 13, 2023**

34