Minutes for a Ticonderoga Town Board Workshop to discuss By-Pass Main Path; Defiance/Abercrombie Tank and Baldwin Road Filter Plant commencing at 9:00 a.m. on March 31, 2021

Present: Joseph Giordano, Supervisor
Mark Russell, Councilman
Tom Cunningham, Councilman
Joyce Cooper, Councilwoman
Dave Woods, Councilman
Tonya M. Thompson, Town Clerk

Others: Greg Swart, AES and virtually Mark Wright, Jocelyn Racette (AES) and Chief Hurlburt

Mr. Swart presented the board with an update of where the Town's water sources and infrastructure are at this time in their life span. There are some decisions that need to be made, some sooner than others because of environment review. He also explained that Water projects are traditionally harder to fund than sewer projects. He will be explaining to the board today the Defiance/Abercrombie Water Tank situation, he will present information regarding the Baldwin Filter Plant's future for serving the town with water and we will need to discuss to route that the Town's Main will take from the By-pass. This particular item will need a decision soon. The take away from this presentation will be that within this next year, decisions need to be made and we should be prepared to have another presentation.

The board felt that a presentation on the history leading to where we are today would be helpful within that next workshop. The Board also felt the need to get more public involved, discussion was held on how to get the public involved.

Workshop ended at 10:50 a.m.

Respectfully submitted, Tonya M. Thompson, Town Clerk

AES Northeast

Architecture, Engineering, and Land Surveying Northeast, PLLC

Town of Ticonderoga

Water Meter Project Planning

PRESENTED BY

GREGORY SWART, P.E.

Introduction/Background

- Ticonderoga is legally required by NYSDEC to install water meters.
- Ticonderoga has several other needs/liabilities in the water system.
- The Town agreed to pursue funding to remodify these issues along with the water meters, with the goal being to leverage the water meter requirement to obtain additional funding.
- The decision to move forward with additional upgrades does not have to be made until grants/funding is secured.
- However, a few decisions are needed soon in order to be able to complete funding applications.

Agenda

- Specific alternatives are outlined for each of the project components to gain a general direction from the Town
- The overall cost benefit of each option is also outlined
- Those decisions that need to be made are highlighted at the end

Contents

Mount Defiance (AKA Abercrombie) Tank

- Alternative analysis-water storage tanks
- Pros and cons
- Cost comparison-long term and short term

Baldwin Road Filter Plant

- Options for the long-term outlook for the water plant
- Water softening

Water Line

- Alternative analysis-water distribution System
- Comparison of alternatives
- Pros and cons

Mount Defiance (AKA Abercrombie) Tank

Purpose: The Tank is deteriorating and needs to be replaced to ensure the health and safety of consumers.

Primary common components:

- Dechlorination Unit
  - 2019 - NYSDEC notified the Town of Ticonderoga to install a dechlorination unit on all outfalls of water storage tanks.
  - Discharging chlorinated water directly can extremely harmful if not toxic to fauna and flora in the environment.
  - A dechlorination unit can be attached to the overflow to avoid chlorine being released into the environment.
- Tank Mixer
  - Any newly installed tank shall include a mixing system to promote uniform water age and help prevent freezing/ice lenses that can damage the tank interior.

Alternative 1: Glass-Fused-to-Steel Tank

- A water storage tank constructed of bolted sheets of steel with an interior, exterior and edge glass-fused-to-steel protective layer.
- Provides the tank enhanced strength of approximately 5,000 – 6,000 pounds per square inch (psi) as well as greater resistance against corrosion.
- Glass is an impermeable material to liquids and vapors, unlike typical steel tank epoxy paint systems. It reduces corrosion and offers higher endurance to impact an abrasion.

Alternative 1: Glass-Fused-to-Steel Tank

Pros

- Low initial capital investment cost.
- Fast construction due to premanufactured panels which would minimize reservoir downtime during construction.
- Turnkey procurement process with the manufacturer providing the design, material supply and acting as subcontractor during installation.
- Construction of by panels minimizes the construction equipment mobilization and concrete truck traffic.
- Customizable dimensions and appurtenances to meet project requirements.
- Very little regular maintenance required other than inspection, cleaning, and cathodic protection anode replacement.
- The leading manufacturer in this area is a NYS certified MWBE.

Cons

- 25–50-year design life.
- Maintenance includes the replacement of cathodic protection and failure to complete maintenance can lead to expedited corrosion.
- Bolt holes and sheet seems have the potential for corrosion and need to be monitored and resealed.
- Cannot be buried and needs to be kept clear for visual observation.
- Manufacturers recommend every 10 years to replace the anodes to ensure they are working properly.
- Bolted tanks utilize thinner gauged steel panels with tapered edges compared to welded tanks. This makes them more susceptible to temperature fluctuations, particularly in cold climates where the gauge steel can contract and leak around bolt holes.
- Per AWWA, bolted steel tanks have an allowable leakage rate.

Alternative 2: Prestressed Concrete Water Storage Tank

- Constructed by specialty manufacturers or specialty contractors for the entire tank.
- Constructed of thinner wall/floor sections, and therefore typically considered to be more economical.
- Type III: Precast Panels are typically found in the North Country.
  - Streel panels are filled with concrete and lifted into place.
  - Panels are covered in alternating layers of sprayed on concrete (shotcrete)
  - Prestressed wires (wire-winding) provides continuous prestressing throughout the tank.
  - Permanent compression helps combat the results of the freeze and thaw cycles.
- Due to the site location being quite small with limited access, it would be necessary to have the wall panels filled with concrete at an offsite staging location. The panels would then need to be transported to the site and lifted into place.
- A concrete dome is added to cover the tank.

Alternative 2: Prestressed Concrete Water Storage Tank

Pros	Cons
• 100+ year design life. • The steel diaphragm and winding mitigates the risk of crack development by keeping the concrete in compression, which extends the tank service life. • Narrow wall thickness compared to cast-in-place concrete tank, which reduces material costs. • Surface finishes are highly durable and require minimal routine maintenance other than cleaning and inspection. • The concrete admixtures perform self-healing to close cracks, preventing leaking and providing resiliency. • Turnkey procurement process with the manufacturer providing the design and acting as subcontractor during installation. • Tank can be partially buried to improve site flexibility. • Per AWWA, this type of tank construction has zero leakage tolerance.	• High capital investment cost. • Specialized machinery required for prestressing of exterior circumferential strands. • Clearance around the perimeter of the tank required during construction. • Existing site constraints increase the construction cost because the panels will have to be cast offsite, which is an additional step for the construction process.

Alternative 3: Welded Steel Tank

- The existing Defiance/Abercrombie tank is this style of tank
- The tank is constructed of ¼” thick steel panels that are manufactured and then shipped to the site where they are welded together by a specialty crew from the manufacturer.
- After the tank is assembled a specialty paint crew coats the tank interior and exterior with an epoxy coating system.

Alternative 2: Welded Steel Tank

Pros

- 75–100-year useful life with proper maintenance.
- Per AWWA, this type of tank construction has zero leakage tolerance.
- Steels panels are thicker and larger than bolted tank gauged steel panels and are therefore less susceptible to temperature induced expansion and contraction.
- Tanks are maintainable and modifiable because they can be cut and welded.

Cons

- Typical capital cost is more than glass-fused-to-steel due to the thicker steel panels.
- Regular maintenance includes inspection, cleaning, and replacement of corrosion protection system anodes. Approximately every 20-25 years the tank will require interior and exterior recoating, which is costly (upwards of $300,000 +/-). If recoating is not performed on a timely schedule, then corrosion sets in and repairs get increasingly expensive until the tank is too far gone to be repairable.
- Without proper mixing, ice formation can damage the interior coating and require more frequent spot coating repairs.

Alternative Comparison

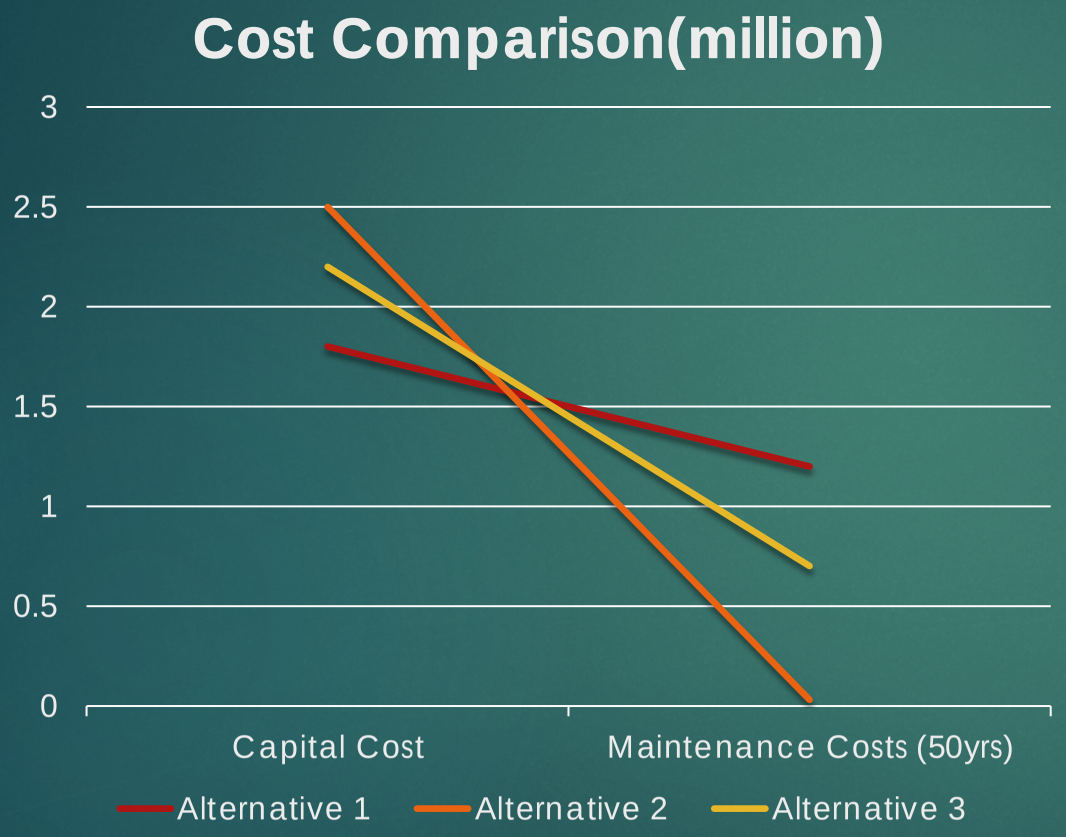
Short Term

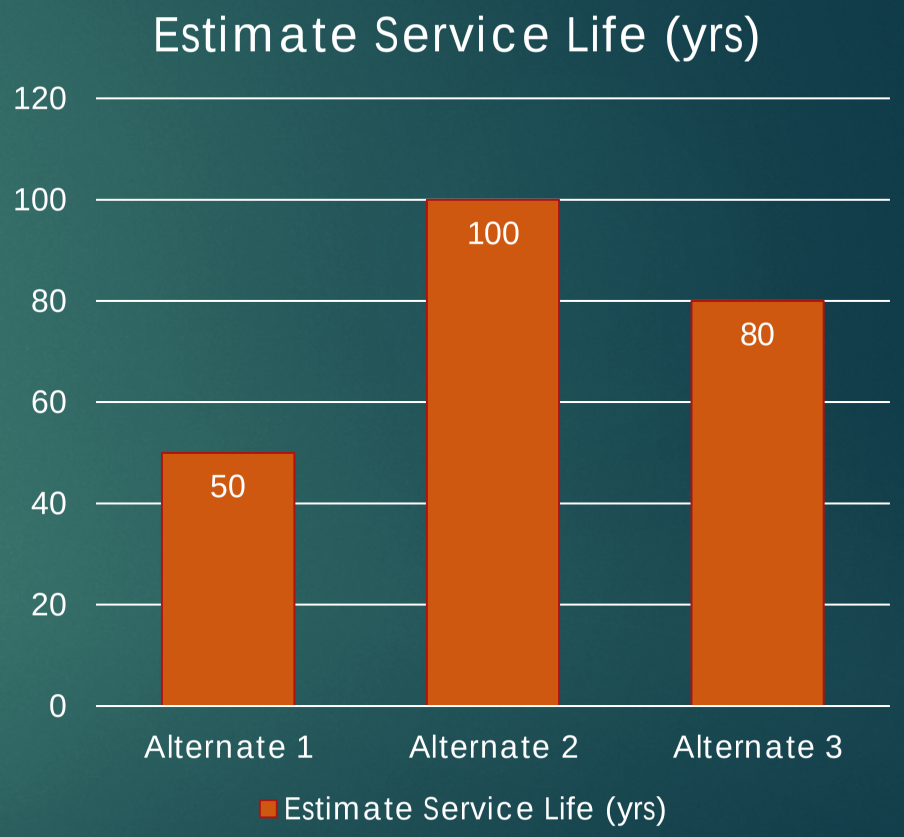
Mount Defiance Storage Tank Alternative Cost Comparison			
Description	Glass-Fused-to-Steel Tank	Prestressed Concrete Tank	Welded Steel Tank
Total Construction Costs	$1,395,000.000	$1,955,000.00	$1,674,000.00
Engineering, Construction Observation, Legal and Bonding fees @ 20%	$279,000.00	$391,000.00	$334,800.00
Project Contingencies @ 10%	$139,500.00	$195,500.00	$167,400.00
Total Cost	$1,813,500.00	$2,541,500.00	$2,176,200.00

Tank Alternative Comparison Matrix:

Criterion	Alternative 1 (Glass Fused To Steel Tank)	Alternative 2 (Prestressed Concrete tank)	Alternative 3 (Welded steel Tank)
Resilience			
Estimate Service Life	50 yrs.	100+ yrs	75-100 yrs
Meets Minimum Seismic Design	☑	☑	☑
Minimize Damage from Seismic Event	☒	☑	☒
Maximize Durability of Finished Surface	☒	☑	☒
Constructability			
Material Re-Use or Remobilization	☑	☒	☒
Minimize Construction Operational Impacts	☑	☒	☑
Minimize Construction Schedule	☑	☒	☑
Local Expertise and Experience	☒	☒	☒
Maximize Locally Sourced Materials	☒	☑	☒
Maintenance			
Minimize QA/QC Issues	☒	☑	☒
Minimize Maintenance Requirements	☒	☑	☒
Ability to Self-Heal Leaks	☒	☑	☒
Method of Manual Leaks Repair	Replace	Patching	Patching
Costs			
Capital Cost	$1.8M	$2.5M	$2.2M
Maintenance Costs	$1.2M/50yrs	Minimal	$350K/25yrs

Long term


Cost Comparison(million)
3
2.5
2
1.5
1
0.5
0
Capital Cost
Maintenance Costs (50yrs)
Alternative 1
Alternative 2
Alternative 3


Estimate Service Life (yrs)
120
100
80
60
40
20
0
50
100
80
Alternate 1
Alternate 2
Alternate 3
Estimate Service Life (yrs)

Diatomaceous Earth Filter Plant (Lake George Water System)

O&M COSTS – $100,000/YEAR

BACK WASH – SEWER SYSTEM IS ONE OF THE MAIN LIMITING FACTOR FOR UPGRADES

ONLY FEEDS HALF OF THE TOWN & THEREFORE IS NOT A TRUE BACKUP SYSTEM

Options to Consider

Does the Town want to maintain this plant?

If not, the best option is to install a new water main for better system operation and to reduce the usage of the plant

Alternative Analysis: Water Distribution System

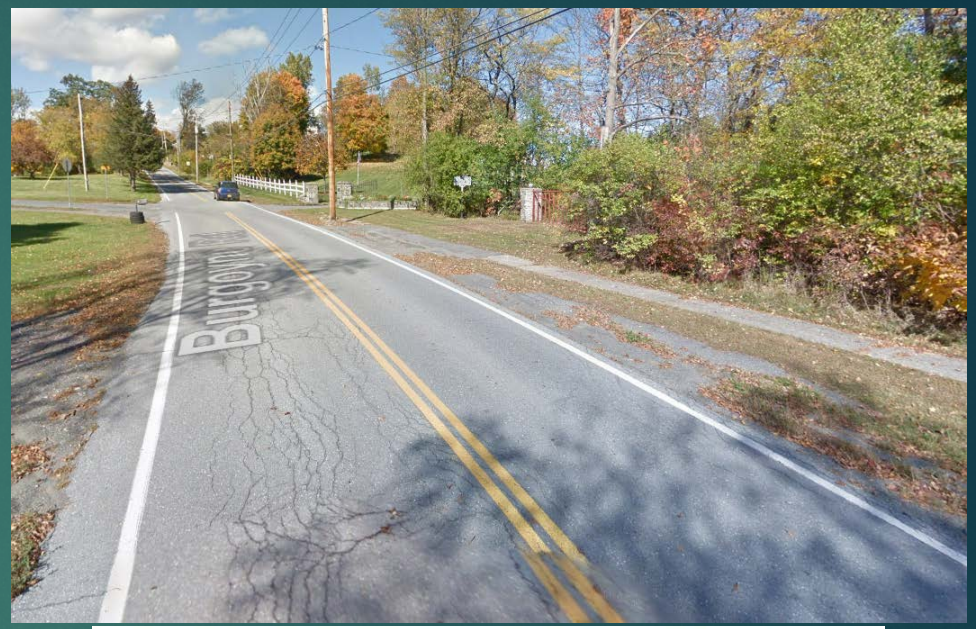
- Alternative 2: NYS Route 74
  - Starting on the NY74-NY22 and Burgoyne Rd. to the northern end of The Portage.
  - New fire hydrants.
  - PRV stations at key locations
  - Larger diameter provides the required flow to fill the Mount Defiance Tank.

NYS Route 74 Ex. Pipe Breakdown		
Street	Pipe Type	Approx. Length
Montcalm St.	6" CI	3400ft
The Portage	8" CI	400ft

Alternative Analysis: Water Distribution System

- Alternative 2: Burgoyne St.
  - Starts at the Burgoyne St. and NY74-NY22 intersection, runs along Burgoyne St. to the northern end of The Portage.
  - New fire hydrants.
  - New valves
  - Larger diameter provides the required flow to fill the Mount Defiance Tank.

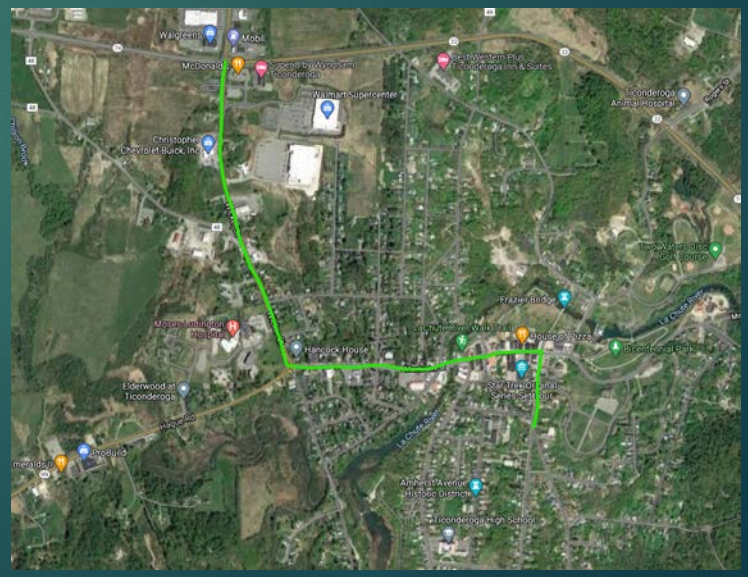
Burgoyne St Ex. Pipe Breakdown		
Street	Pipe Type	Approx. Length
Burgoyne St	6" or 8" CI	4500ft
Tower St	10" DI	800ft
Montcalm St.	12" CI	400ft



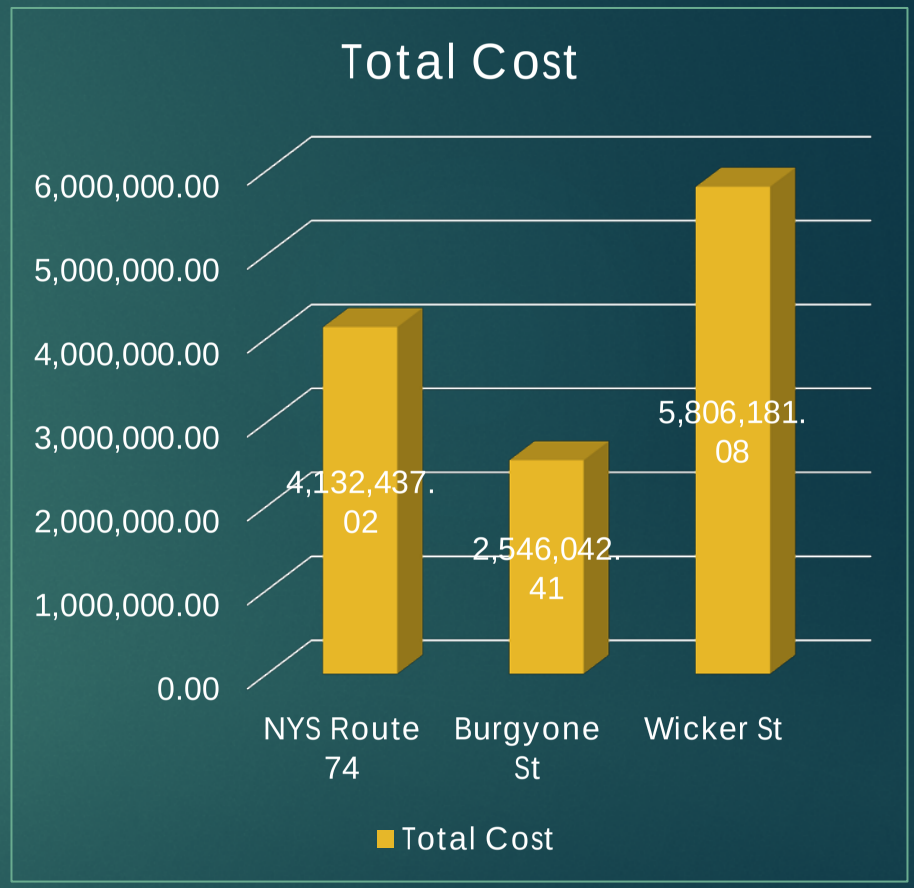
Alternative Analysis: Water Distribution System

- Alternative 3: Wicker St
  - Starts at the Wicker St and NY74-NY22 intersection, runs along Wicker St to the northern end of The Portage.
  - New fire hydrants.
  - New valves
  - Larger diameter provides the required flow to fill the Mount Defiance Tank.

Wicker St Ex. Pipe breakdown		
Street	Pipe Type	Approx. Length
Wicker St	8" CI	2800ft
Montcalm St	12" CI	3048 ft
The Portage	8" CI	400 ft



Alternative Cost Comparison: Water Distribution System			
Description	NYS Route 74 10,000’	Burgoyne St 6,400’	Wicker St 13,500’
Total Construction Costs	$3,178,797.71	$1,958,494.17	$4,466,293.17
Engineering, Construction Observation, Legal and Bonding fees @ 20%	$635,759.54	$ 391,698.83	$893,258.60
Project Contingencies @ 10%	$317,879.77	$195,849.41	$446,629.31
Total Cost	$4,132,437.021	$2,546,042.41	$5,806,181.08



Water Softening

- Option 1
- Chemical Treatment at Water Plant
  - Works by Sequestration
  - Will improve water quality
  - Does not really change taste and may not reduce precipitation
  - Adds phosphorus loading to the WWTP
  - Relatively easy to implement
  - Estimate: $100,000

Water Softening

- Option 2
- Water Softening
  - Works by removing hardness
  - Will reduce hardness by approximately ½
  - Should reduce the majority of the complaints
  - Requires fairly large building and storage for salt
  - Increases O&M costs for additional labor and purchasing salt
  - Must be located near the sewer system
  - Estimate: $2-3 million

Decisions Required

- Selection of new Water line routing among the alternatives discussed.