

Village of Sherman WWTP Improvement Project

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Village of Sherman

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Barton&Loguidice



Agenda

- About the Village
- Project Background
- Financial State of Village
- Project Plan of Finance
- Pre-Project WWTP
- WWTP Design and Construction
- Key Takeaways

What is there to learn?

- Challenges of Upgrading Infrastructure in a Small Community
- Criticality of a Plan of Finance
- Logic behind Technical Design
- An Engineer might just produce overpriced paper, while a good Consultant completes a project

About Sherman and Background

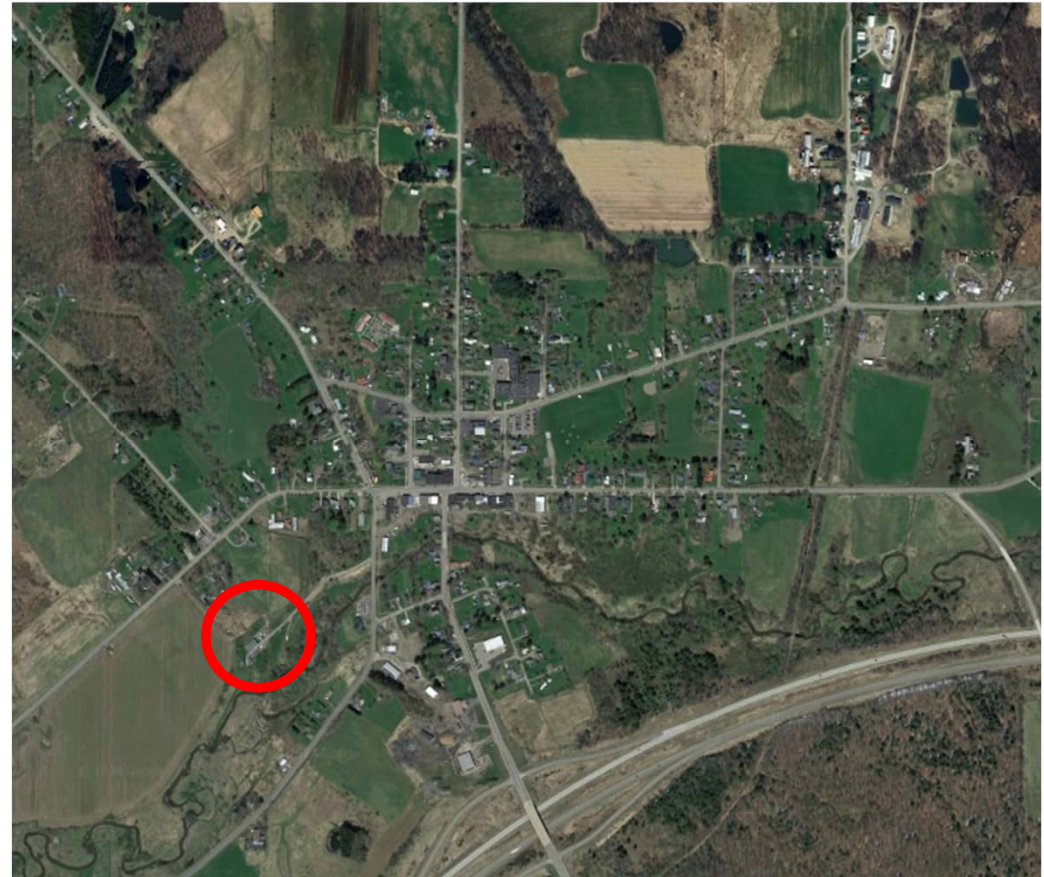
About the Village

- Small Village in Chautauqua County
- Incorporated in 1890
- Population of ~700
- ~\$40,000 MHI



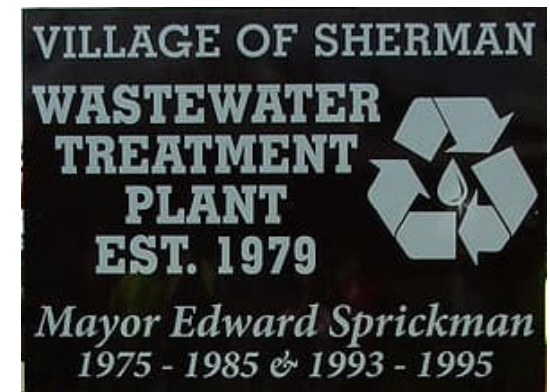
Major Village Infrastructure

- Sanitary Sewer System
 - WWTP
 - Gravity Collection System
- Drinking Water System
 - Groundwater Wells
 - Treatment Building
 - Distribution System
 - Storage Tank
- Storm Sewer System
- Village Roads



State of Utility Systems (2019)

- Sanitary Sewer System
 - Plant meeting SPDES Permit, but equipment rapidly failing
 - Collection system in decent shape (PVC piping)
 - Engineering study estimated \$6.5 million in upgrades
- Water System
 - DOH violations required addressing
 - Engineering study estimated \$2.4 million in upgrades
- Storm Sewer System
 - Flooding issues throughout Village
 - Engineering study estimated \$3.2 million in upgrades



For Comparison (Sewer Project Only)



Village of Sherman Sewer System

- Services ~700 people
- \$6.5 million / 700 = ~\$9,285/person

Comparing to:



City of Buffalo Sewer System

- Services ~550,000 people (Buffalo and surrounding Towns in system)
- Per person equivalent project cost would be **\$5.1 billion**

2019 Village Financials

The Positive

- Existing Capital Debt will Soon Expire
- Low Sewer Rates

The Negative

- Sewer budget in Debt
- Sewer rates too Low
- No Reserve Savings
- Previous consultants and Village officials were convinced the project was unaffordable.

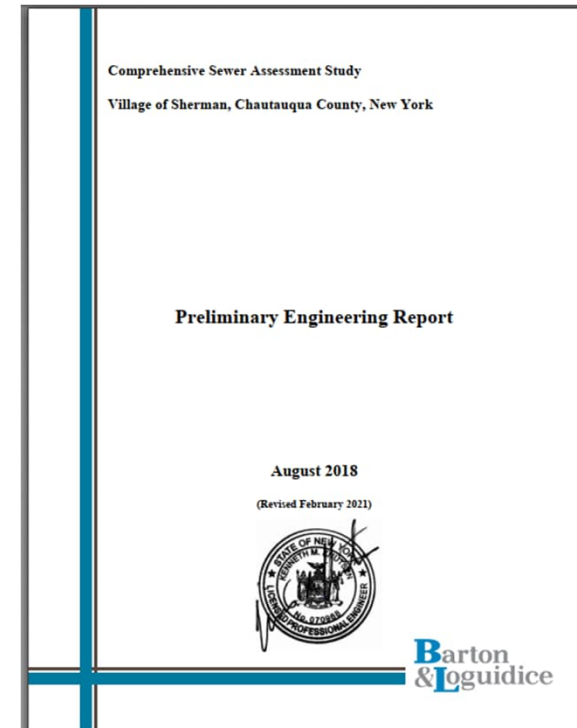
Key Note: Analyze your sewer rates before a project. Artificially low rates, will cost you grant funding.

The Plan and Funding

High Level Funding Plan

Steps:

1. Get Sewer Rates in Order
2. Understand Available Funding
3. Discuss Project with Funding Agencies
4. Create a Plan of Finance Strategy
5. Have Faith in your Plan
6. Execute!



Key Note: If you need funding, you need to learn it or work/partner with someone who does.

Developing the Plan of Finance

Major Programs at time of Project

1. NYSEFC Managed Programs

- A. 0% Interest Loan... Unlikely, due to meeting permit/watershed.
- B. CWSRF Grant ... Unlikely, due to meeting permit/watershed.
- C. WIIA Grant... Likely, due to project scope and hardship status.

2. USDA Rural Development Managed Programs

- A. WEP Program Loan ... Likely, due to project scope/poverty status.
- B. WEP Program Grant... Likely, due to project rate impacts.

3. NYSHCR Managed Programs

- A. CDBG Public Infrastructure... Likely, due to Village LMI and project rate impacts.

4. NYSDEC Managed Programs

- A. WQIP ... No chance based on scoring criteria

The Plan of Finance

1. NYSEFC WIIA Grant

- A. To Apply: Complete PER, SEQR, and Bond Resolution
- B. Result: 25% Net Grant, \$871,250



2. USDA Rural Development

- A. To Apply: Complete PER, SEQR/NEPA/Env. Report, and Bond Resolution
- B. Result: Poverty Rate Loan, \$2,265,000 Grant



3. NYSHCR

- A. To Apply: Complete PER, SEQR/NEPA, Bond Resolution, and sometimes Design
- B. Result: \$1,250,000 Grant



Total Grant - \$4,386,250 (~63% of project cost)

The Village got Creative

When grant wasn't good enough... Think outside the box!

- New sewer plant ideally required additional property
- Purchased farm next door and lease for a solar farm
- ~\$19,000/year toward debt, Discounted Electrical Rates



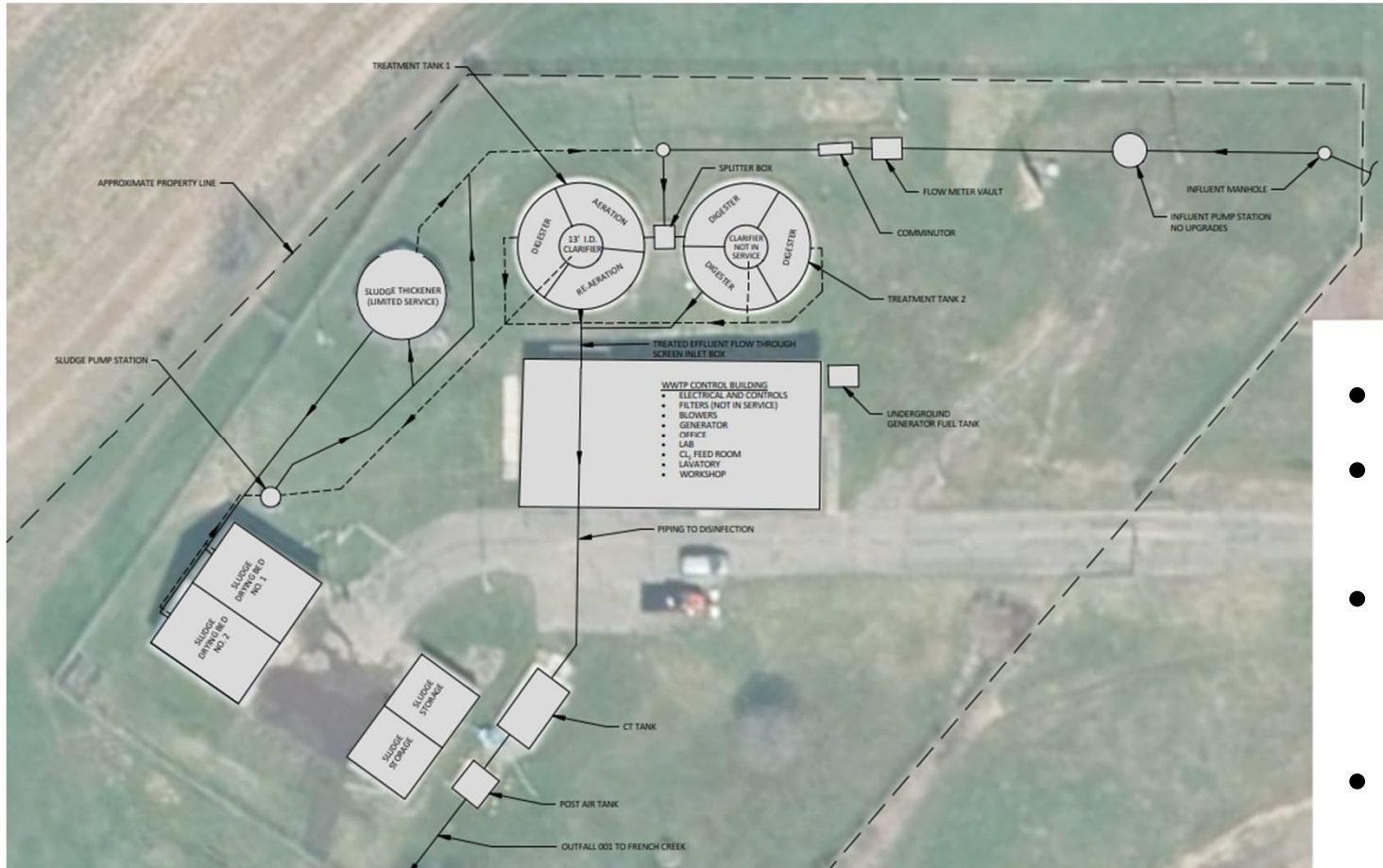
How it turned out?

1. Design and construction went great. Minor issues:
 1. COVID material shortages
 2. Inflation
 3. Funding agencies working together
2. Sewer rates remained affordable
3. Reserve funds are being stocked
4. Asset Management Plan underway
5. One happy Operator



Pre-Project WWTP

Existing WWTP



- Late 1970's
- Activated Sludge Process
- Extended Aeration / Contact Stabilization
- No redundancy

Influent Pump Station



Replaced internally by Village (with some oversight).

Headworks



Biological Process



Tertiary Filters



Disinfection and Post Aeration



Sludge Handling



Electrical



WWTP Design and Improvements

WWTP Plant Improvements

- New Headworks Facility
- New Sequencing Batch Reactor Biological Process
- New Disc Filters
- UV Disinfection
- Aerobic Digester Upgrades
- Trailer mounted Screw Press
- Upgraded Electrical and Controls



Headworks

Improvements Overview

- Mechanical Bar Screen with washer compactor (Duperon Flexrake)
- Parallel Manual Grit Channels
- New Headworks Room (Class 1 Division 1)



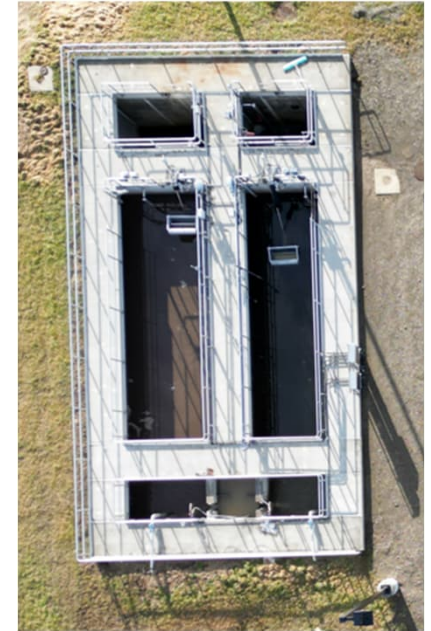
Headworks

Design Decisions

- Placed higher than SBR to reduce pumping (involved purchasing property)
- Wanted high quality screen with automatic raking
- Manual Grit Channels – Low enough plant flow, save on cost
- Removable compactor chute section for winter operation



Sequencing Batch Reactor



Improvements Overview

- Continuous flow Sanitaire Sequencing Batch Reactor
- Precast, Post Tensioned Dutchland Tank
- Post SBR Equalization

Sequencing Batch Reactor

Design Decisions

- Built offline - Ease of construction
- Buried into hill- No stairs, Better for Process
- Operator friendly/familiar and automated process
- More energy efficient aeration
- Good with flow variation
- Tank choice – Quality and ease of construction
- Post SBR EQ - Reduce downstream equipment sizing



Tertiary Filtration

Improvements Overview

- Kruger Hydrotech Disc Filters
- Required to guarantee permit would be met

Design Decisions

- Fit into existing filter room



Disinfection

Improvements Overview

- Glasco Non-Contact UV to replace chlor-dechlor process

Design Decisions

- Cost
- Ballast Weight
- Easily fit into minor building expansion



Post Aeration

Improvements Overview


- New air source (previously used old blowers)
- New small 120V pond aerators located near post air tank



Design Decisions

- Cost
- Air requirements
- Far distance from new blower building



 **HIBLOW HP-80 Pond Aerator/ Septic Linear Air Pump**
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Amazon's Choice in Water Garden & Pond Pumps by Hiblow
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Aerobic Digestion

Improvements Overview

- Convert one existing “donut” tank into two aerobic digesters



Design Decisions

- Cost
- Reuse of existing tankage
- Reuse of existing sludge lines



Sludge Dewatering

Improvements Overview

- Design allowed for continued use of drying beds (if desired)
- New mechanical sludge dewatering screw press trailer

Design Decisions

- Difficulty of managing beds
- Cost of building vs trailer
- Mobility and potential for revenue source



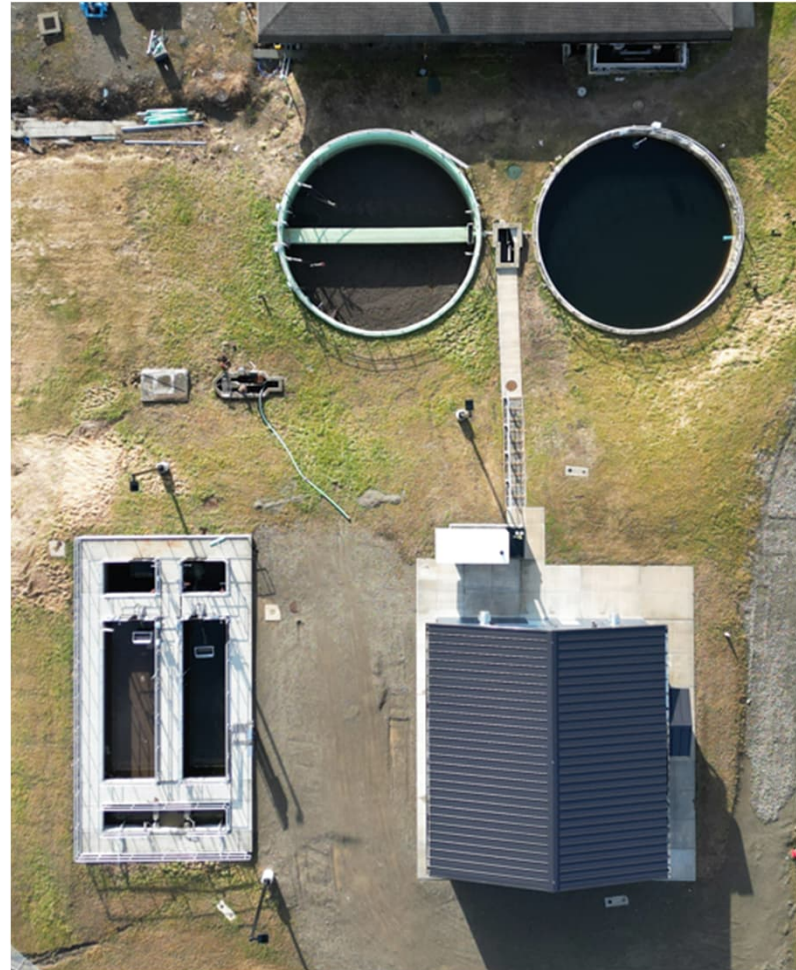
Extra Equalization

Improvements Overview

- Last minute add on
- Convert second “donut” tank into an equalization tank

Design Decisions

- Minimal Cost
- Weekend Sampling
- Labor Reduction
- Extra storage is always good



Electrical and Controls

Improvements Overview

- New electrical service, motor control center, and all new control panels

Design Decisions

- 480V over 208V
- Utilized stock manufacturer provided controls to furthest extent
- Single source of responsibility



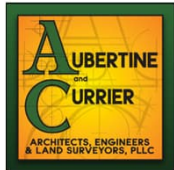
Key Takeaways

Key Project Takeaways

- Small communities require Significant Funding
- Get your Sewer Rates in Order
- Obtaining Funding requires Strategy and Program Knowledge
- If you need funding, learn it or partner with someone that knows.
- Free money is slow money. Start planning now!
- Multiple Funding Agencies create project Complexity
- Design to your Client and Budget. Don't create overpriced Paper.
- Operators should be part of your Design Team.

Thank you to Project Partners

Consultants



Funding Agencies



Contractors



Suppliers and Manufacturers



Thank
you!

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