Wastewater Solutions for Villages in the Windham Region

Aug 2, 6-7:30 pm
Townshend Town Hall

Welcome & Overview
Chris Campany & Katie Buckley
Introductions

- What are your town’s wastewater needs and challenges?
  - eColi or other TMDL affecting watershed
  - Failed septic systems
  - Environmental & Physical Constraints: high ledge, poor soils, high groundwater, isolations zones, rivers & ponds, small lot sizes
  - Allow for growing or maintaining businesses/uses
  - Maintain existing development
  - Private well contamination by sewer
  - Increased discharges from new public drinking water system
Common Challenges to Onsite Wastewater Treatment

**Barriers include:**
- small lot sizes
- shallow soils
- high water table
- proximity to surface waters

Properties with barriers to onsite wastewater systems in Westford Village.
Half of Vermont’s Villages Lack Sewage Treatment Facilities

• Limits opportunities for redevelopment and revitalization
• Hard to establish water-intensive businesses like food processing, restaurants and breweries
• Limits ability to provide services like school lunches and senior housing
Basic Permitting Requirements

- Depth to Groundwater
- Percolation Rates
- Isolation Distances
- Flow & Sizing
- Strength: Domestic vs. Food
What happens on lots with pre-existing homes or businesses that are too small to meet requirements?

- Best Fix
- Advanced Treatment Systems
- Look Off-Site
- Shared System
- Holding Tank
Permit Thresholds for the 2 Onsite Wastewater Programs (Soil Based Systems)

- **Regional Office Water/Wastewater Permit** From 1-6,499 gallons per day (GPD) design flow wastewater system

- **Indirect Discharge Permit** 6,500 GPD and greater design flow wastewater system
  - 6,499 GPD = 26 residential living units/houses
Examples of Wastewater System Capacities for a Change in Use

<table>
<thead>
<tr>
<th>Building Uses</th>
<th>Original Use as a Single Family Residence Size and Design Flow</th>
<th>Original Use as a School (20,000 SF) Size and Design Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Use</td>
<td>3 Bedrooms, <strong>450 GPD</strong></td>
<td>75 pupils &amp; 25 staff, <strong>2,022 GPD</strong></td>
</tr>
<tr>
<td>Nursing Home</td>
<td>3 Beds, <strong>375 GPD</strong></td>
<td>16 Beds, <strong>2,000 GPD</strong></td>
</tr>
<tr>
<td>Restaurant Use (Also Needs Grease Tank)</td>
<td>2 meals, 15 seats, <strong>450 GPD</strong></td>
<td>60 seats, 2 meals, <strong>2,000 GPD</strong></td>
</tr>
<tr>
<td>Daycare</td>
<td>19 children, 2 staff, <strong>450 GPD</strong></td>
<td>100 children &amp; staff, 1 meal, <strong>2,000 GPD</strong></td>
</tr>
<tr>
<td>Small Dry Goods Store</td>
<td>4 small stores, <strong>400 GPD</strong></td>
<td>20 small stores, <strong>2,000 GPD</strong></td>
</tr>
<tr>
<td>Office Space</td>
<td>12 employees, 6 conference room seats, <strong>450 GPD</strong></td>
<td>55 employees, 20 conference room seats, <strong>2,020 GPD</strong></td>
</tr>
</tbody>
</table>

GPD = Gallons Per Day
Why are food & beverage businesses different?

- High BOD (Biochemical Oxygen Demand)
- High TSS (Total Suspended Solids)
- High phosphorus
- Low pH (may be below 5)
- Low dissolved oxygen
- Flow volume and strength is irregular
# Commercial vs Domestic Wastewater

<table>
<thead>
<tr>
<th></th>
<th>Domestic sewage</th>
<th>Brewery process wastewater*</th>
<th>Beer</th>
<th>Dairy process wastewater*</th>
<th>Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOD (mg/L)</strong></td>
<td>250 - 300</td>
<td>2,500 – 12,000+ 10x -48x</td>
<td>&gt;60,000 240x</td>
<td>1,500 – 3,000 6x – 12x</td>
<td>&gt;100,000 400x</td>
</tr>
<tr>
<td><strong>TSS (mg/L)</strong></td>
<td>~300</td>
<td>500 - &gt;15,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>7</td>
<td>5 - 6</td>
<td>4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oil &amp; grease (mg/L)</strong></td>
<td>300 – 800</td>
<td>~3,600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phosphorus (mg/L)</strong></td>
<td>&lt;10</td>
<td>20 - 40</td>
<td>35 - 50</td>
<td>&gt;900</td>
<td></td>
</tr>
</tbody>
</table>

* Process wastewater varies A LOT depending upon pollution prevention practices
Sewage Solutions – Likely to be Decentralized
Multiple ▪ Small-Scale ▪ Incremental ▪ In-Ground Leachfields
Typical on-site septic tank and leach field
Infrastructure Choices

• Traditional Gravity Sewers
• Septic Tank Effluent Pump (STEP)
  Low Pressure Sewers
• Advanced Treatment Technologies
  (I/A Systems)
• Soil Based Leachfields for Final
  Treatment and Dispersal
Traditional Gravity Sewers

**Force Main Sewer**
Flow has to be “forced” through the main because gravity alone is not enough to move it.

**Gravity Sewer**
Flow uses gravity to get to pump stations and treatment plants.

Pressurized flow is pushed uphill towards pumps and treatment plants.
Gravity pulls flow towards the pump station.
Septic Tank Effluent Pump (STEP) Low Pressure Sewers
Advanced Treatment Technologies (I/A Systems)

Advanced treatment systems incorporate a treatment step between solids separation and final dispersal of effluent. Pumps, timers, and floats are used to control the flow of wastewater from one component of the system to the next.
Soil Based Leachfields for Final Treatment and Dispersal
Aquapoint Bioclore Installation at Irasville Business Park
Engineering Options

• Connection to nearby sewer or Indirect Discharge system
• Land available with good soils for leach fields
  • Public Lands
  • Private Lands
• Existing underused septic systems
  • Public Systems
  • Private Systems
Case Study:
2016 Brownsville, Vermont

- Ascutney Mountain Ski Area was going bankrupt
- Purchased Ascutney Mountain sewer system with CWSRF loan
- Irene damaged village septic systems
- Constructed village collection system & refurbished mountain sewer
- Debt repayment split between grand list & user fees
- Population growth!
Case Study:
2003 Warren, Vermont

- Community Decentralized Project
  - 5 individual system refurbishments
  - 7 individual system replacements
  - 2 small cluster systems with 2-4 properties
  - 24 properties to a shared system
  - 46+ properties to a 20,000 GPD Indirect Discharge leachfield at school’s recreational field
  - First permitted Innovative/Alternative treatment system at school
  - Still adding new hook-ups & building expansions

- Community Management of Systems
Case Study: 2012-Present Waitsfield, Vermont

- 2012 Constructed a new drinking water system (DWSRF & STAG)
- 2012-present - Created a community loan program
  - Built indirect discharge system for Winterpark (industrial park)
  - Built 4 wastewater systems for individual businesses
  - Built wastewater system for new town offices

Lawson’s Finest – a new home for the future

Here’s news that will thrill beer lovers near and far! Sean and Karen Lawson, proprietors of the award-winning microbrewery Lawson’s Finest Liquids, are in the process of purchasing the warehouse buildings and property located at 155 Carroll Road in Waitsfield, VT with a goal of closing in the summer of 2017. Sean says, “It is our hope that this will become the expanded home of Lawson’s Finest in the Mad River Valley.” The craft beer company plans to open a new larger brewery, a tasting room and offer retail sales.
Case Study: 2018 Rochester, Vermont

- Has 3 community soil based system sites & 1 reserve site
- Originally built in 1970’s for 66,150 GPD to end straight pipes
- Rebuilding disposal field 2018
- Maintaining a vital village area

### Step Costs Funding Source

<table>
<thead>
<tr>
<th>Step</th>
<th>Costs</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>$11,068</td>
<td>CWSRF</td>
</tr>
<tr>
<td>Design</td>
<td>$35,996</td>
<td>CWSRF</td>
</tr>
<tr>
<td>Construction</td>
<td>$463,072</td>
<td>CWSRF</td>
</tr>
<tr>
<td>Other</td>
<td>$11,000</td>
<td>CWSRF</td>
</tr>
<tr>
<td>Total</td>
<td>$499,000</td>
<td>$249,500</td>
</tr>
</tbody>
</table>

### Summary of Financial Status – FY2017

- Average annual single family home bill: $340
- Annual amount billed: $35,377
- Current long-term outstanding debt*: $649,642
- Current annual debt payment (through 2040)*: $54,060
- Current annual operation and maintenance costs: $38,476
- Annual dedicated reserve contribution: $0 to $4,000

*Debt service is financed by the entire town tax base.
# Path to Wastewater Solutions for Villages

## Typical Engineering Studies

<table>
<thead>
<tr>
<th>Pre-Engineering Tasks</th>
<th>Feasibility Study</th>
<th>Preliminary Engineering Report (PER)</th>
<th>Other Tasks - Depending on Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help for a local wastewater steering committee</td>
<td>Hire an engineering firm</td>
<td>Engineer completes a PER if project will involve public funds for construction</td>
<td>Additional work may be necessary before proceeding to final design</td>
</tr>
<tr>
<td>What do you want?</td>
<td>Determine existing conditions:</td>
<td>Report on work so far:</td>
<td>Secure land</td>
</tr>
<tr>
<td>• Identify community vision for future of village</td>
<td>• Review work to date</td>
<td>• Existing conditions</td>
<td>• Legal agreements with landowners, land trusts and other entities</td>
</tr>
<tr>
<td>• Survey businesses &amp; residents on plans for future</td>
<td>• Conduct soil tests and other site investigations (obtain archeological review)</td>
<td>• Need for project</td>
<td>• Preliminary purchase and sale</td>
</tr>
<tr>
<td>What do you need?</td>
<td>• Conduct environmental review</td>
<td>• Alternatives considered</td>
<td>• Zoning and other land use permitting issues</td>
</tr>
<tr>
<td>• Survey locations and status of existing wells and septic systems</td>
<td>Identify alternative wastewater solutions</td>
<td>Recommend a wastewater (or drinking water) project:</td>
<td>Secure funding</td>
</tr>
<tr>
<td>• Identify permitting and enforcement concerns including archeological</td>
<td>• Propose 3 or more alternatives</td>
<td>• Preliminary design</td>
<td>• Coordinate with business and housing projects that need wastewater</td>
</tr>
<tr>
<td>• Test wells to determine if there is contamination</td>
<td>Evaluate alternatives</td>
<td>• Project schedule</td>
<td>• Income surveys to qualify for USDA-RD funds</td>
</tr>
<tr>
<td>What solutions are possible?</td>
<td>• Identify pros and cons of each alternative</td>
<td>• Permit requirements</td>
<td>• Apply for public funds</td>
</tr>
<tr>
<td>• GIS analysis of soils and environmental constraints</td>
<td>• Develop cost estimates</td>
<td>• Sustainability</td>
<td>• Engage public in preparation for bond vote</td>
</tr>
<tr>
<td>• Preliminary soil tests</td>
<td>• Identify finance strategies and possible fee structures</td>
<td>• Financing</td>
<td>• Set up a local loan program</td>
</tr>
<tr>
<td>• Investigate available technologies</td>
<td>• Identify long term management structures</td>
<td></td>
<td>Decide on system management</td>
</tr>
<tr>
<td>How to Proceed?</td>
<td></td>
<td></td>
<td>• Who will be responsible for long term system management?</td>
</tr>
<tr>
<td>• Define a scope of services</td>
<td></td>
<td></td>
<td>• How will fees be structured and collected?</td>
</tr>
<tr>
<td>• Discuss with community and key stakeholders</td>
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<tr>
<td>• Select an engineering consultant</td>
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<tr>
<td>• Obtain funds for engineering</td>
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## Additional work may be necessary before proceeding to final design

- Secure land
- Legal agreements with landowners, land trusts and other entities
- Preliminary purchase and sale
- Zoning and other land use permitting issues

## Secure funding

- Coordinate with business and housing projects that need wastewater
- Income surveys to qualify for USDA-RD funds
- Apply for public funds
- Engage public in preparation for bond vote
- Set up a local loan program

## Decide on system management

- Who will be responsible for long term system management?
- How will fees be structured and collected?

## Project Coordinator

- Work normally funded by DEC and USDA
- Work requiring other funds
Feasibility Level Funding Opportunities

- Vermont Pollution Control Planning Advance (Lynnette)
  - Reimbursement Based, No Repayment Required Until & Unless Construction
- Municipal Planning Grant (Faith)
- USDA RD SEARCH Grant (Jon)
- RCAP (Mark)
Project Level Funding Opportunities

- Vermont Pollution Control Grants (DEC)
- Vermont Clean Water State Revolving Fund (DEC)
- Vermont Drinking Water State Revolving Fund (DEC)
- USDA Rural Development Loans and Grants (USDA RD)
- Community Block Development Grants (ACCD)
Can my Town afford to even think about this? Can you afford not to?

To sewer or not to sewer...
Getting to Solutions Worksheet

• Forming a Wastewater Committee
• Getting Selectboard & Planning Commission Involvement
• Feasibility Studies and Beyond
• Community Development/Visioning
• Funding
• Selecting a Consultant
Questions?

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