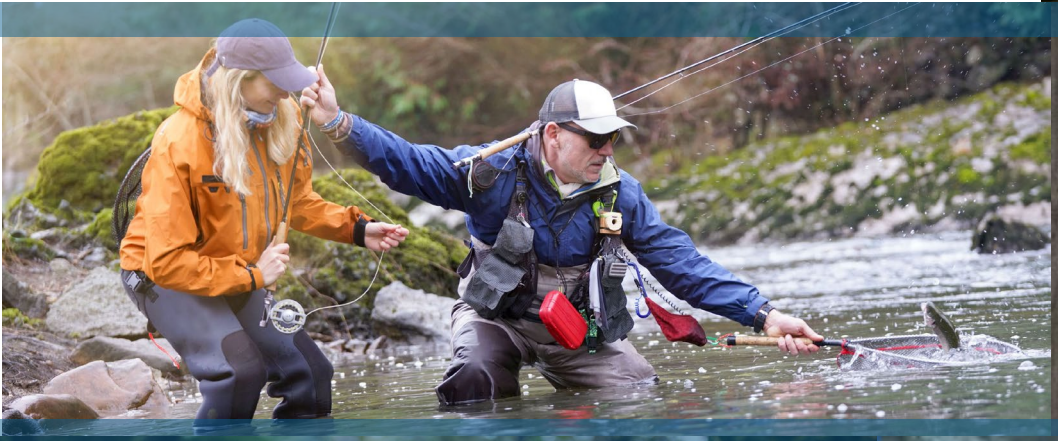


Water & Wastewater Feasibility Study – 60% Meeting

Erin Moore, PE, Senior Project Manager
Kyle Kortright, Staff Engineer

Tighe&Bond

Presentation Outline

GRAFTON
COMMUNITY WASTEWATER EVALUATION

- **Project Background**
- **30% Meeting Summary**
- **Community Drinking Water**
- **60% Report Review:**
  - Service Area Delineation
  - Flow Estimate
  - Potential Locations
  - Wastewater Systems
  - Alternatives
  - Cost Estimate & User Fees
- **Next Steps**
- **Community Feedback & Questions**

Project Background

GRAFTON
COMMUNITY WASTEWATER EVALUATION

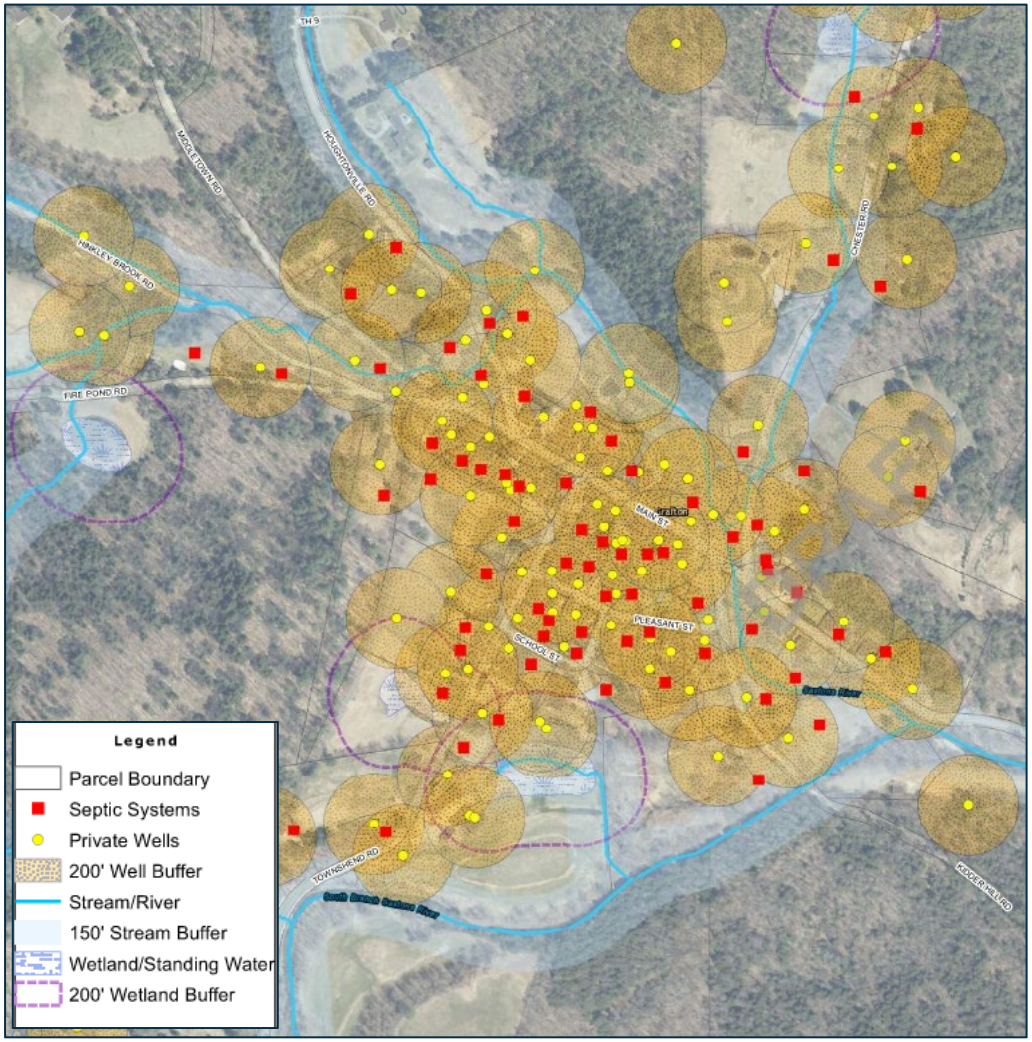
- **How Did We Get Here?**
  - 2020
    - Village sends out Wastewater Survey
  - 2021
    - Village submits Project Priority List Application for Wastewater ARPA Funding
  - January 2022
    - Town hires Tighe & Bond to complete feasibility study funded by DEC Engineering Planning Advance Program – no cost to Town
  - May 2022
    - Project Kick-off Meeting
  - September 2022
    - 30% Meeting
  - October 2022
    - Town is awarded $3,968,331 for Village Wastewater Project in ARPA Funds
  - Spring/Summer 2023
    - Site Investigations, 60% Report
  - September 2023
    - 60% Meeting

Project Background

- **Collaborative effort between Town, Community, DEC, Tighe & Bond, Windham Regional**
- **Grant funded**
- **Project Goals**
  - Find technically feasible options for drinking water and/or wastewater
  - Understand current issues & desire for a community wastewater system or a community drinking water system
  - Community involvement & input from start to finish
  - Develop a report which compares alternatives including construction costs, O&M costs, and potential user fees so the community can make an informed decision
- **Process**
  - Project Completed in Four Steps:
    - 30% Preliminary Engineering Report – Public Meeting (September 2022)
    - 60% Preliminary Engineering Report – Where we are today!
    - 90% Preliminary Engineering Report – Public Meeting
    - Final Preliminary Engineering Report – Public Hearing

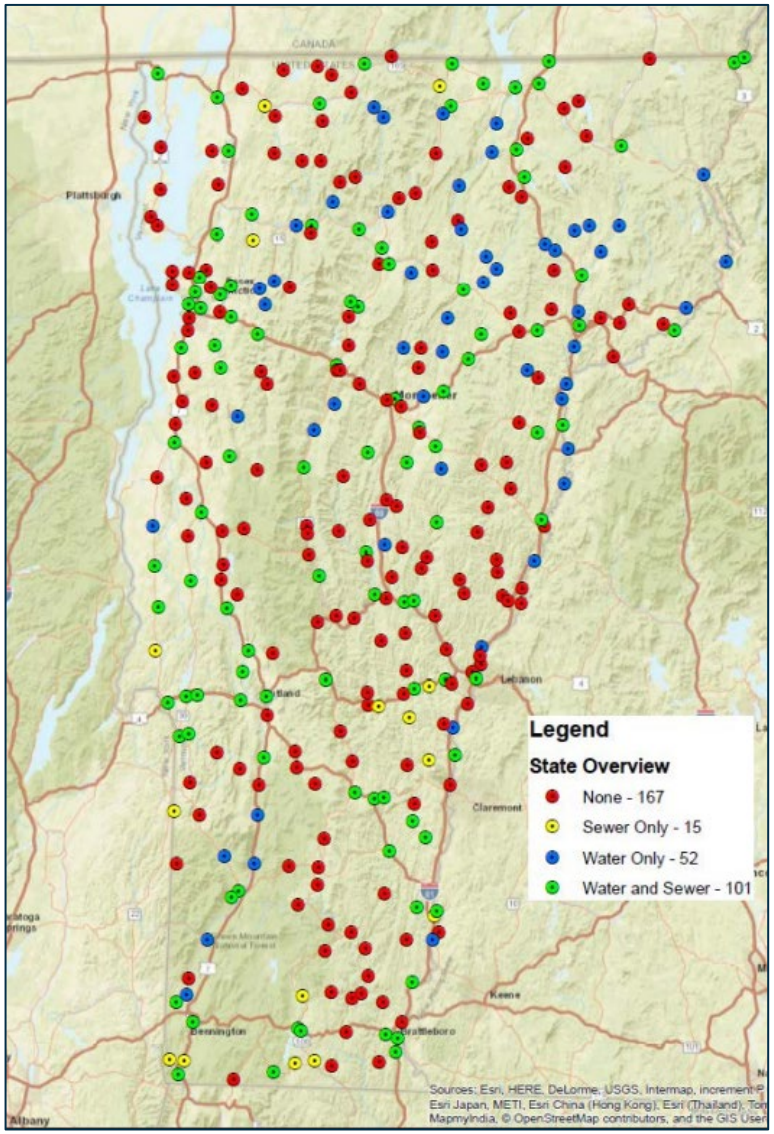
Project Background

- **Why?**
  - Village center is developed
  - Set-backs between wells & septic systems not in compliance
  - Potential environmental impacts of old/failing system
  - Concerns with septic system impact on drinking water wells (PFAS)
  - Limited opportunities for housing, services, and business expansion
  - Difficult to establish water-intensive businesses (restaurants, breweries, etc.)



Project Background

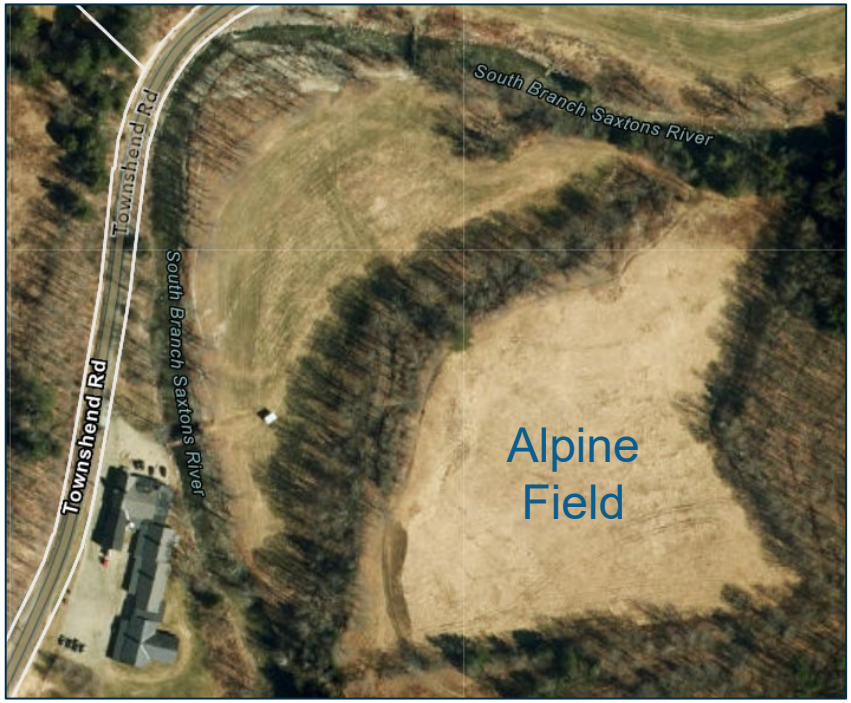
- **Why Now?**
  - Historic funding availability
  - Grafton ARPA Funding (~$4M)
  - Current concerns with water quality
  - Many other Villages also considering



30% Meeting Summary

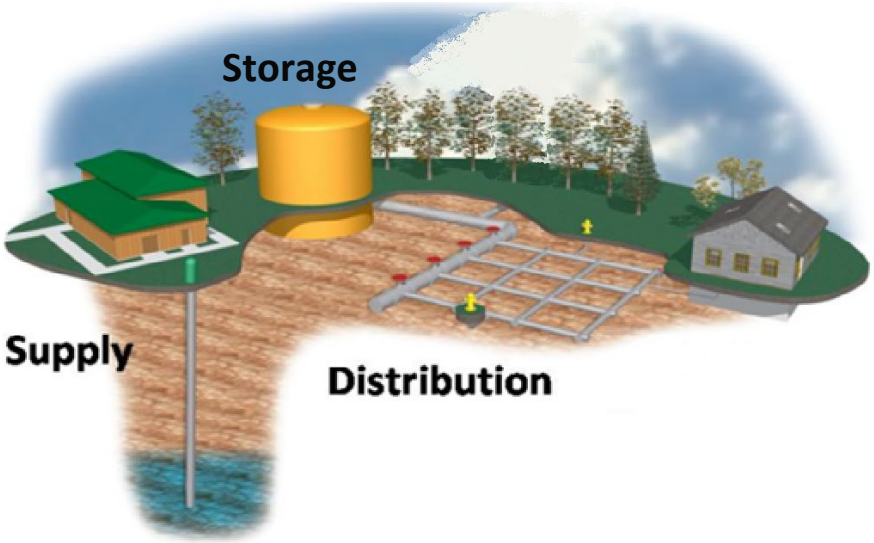
GRAFTON
COMMUNITY WASTEWATER EVALUATION

- **30% Meeting in September 2022**
- **Developed Service Area**
- **Developed Flow Estimate**
- **Compared Two Potential Wastewater Sites**
  - Discussed two primary sites for Wastewater System:
    - Village Park Site
    - Alpine Field Site
  - Alpine Field site generally preferred and looked promising on paper
- **Discussed Drinking Water Systems**



Drinking Water Systems

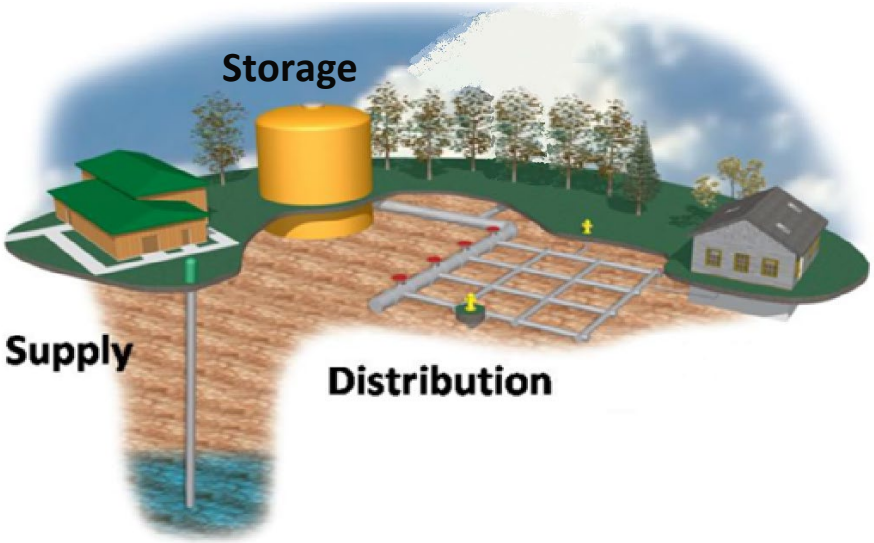
- **Scope of Work included Investigation of a Community Drinking Water System**
  - Water quality topic of discussion
  - PFAS in Village
  - PFAS are man-made chemicals that have been used in consumer products for many years
  - PFAS found in wells near the school
  - PFAS is persists in the environment



- **Drinking Water Considerations for Grafton**
  - Stand-alone Community Drinking Water System
  - Required if Village Park site is to be considered for wastewater
  - PFAS, drinking water, and wastewater are all related
  - Complicated situation

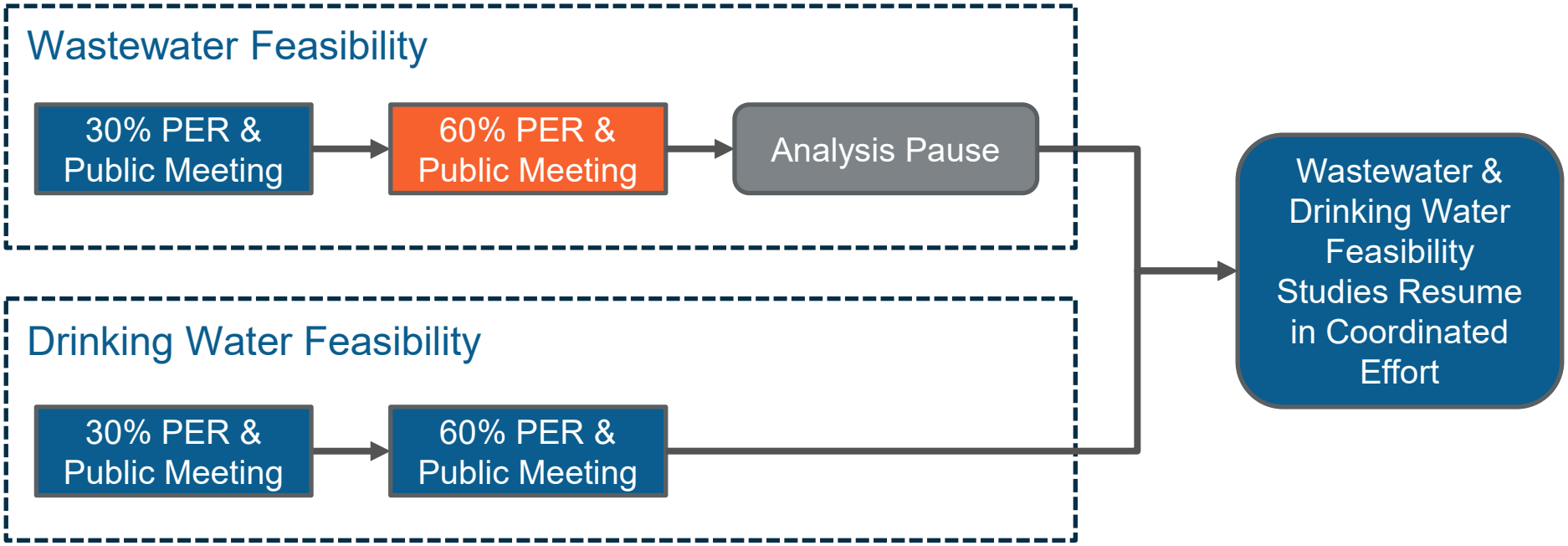
Drinking Water Systems

- **Drinking Water Permitting Challenges**
  - Town must demonstrate Technical, Managerial, and Financial Capacity (TMF) to permit a New Public Community Water System
  - Grafton is not alone
- **The Path Forward?**
  - VT DEC has determined that a separate drinking water system preliminary engineering report (PER) is required
  - Drinking water PER will be fundable through ARPA
  - Consider other ways to build TMF



The Path Forward

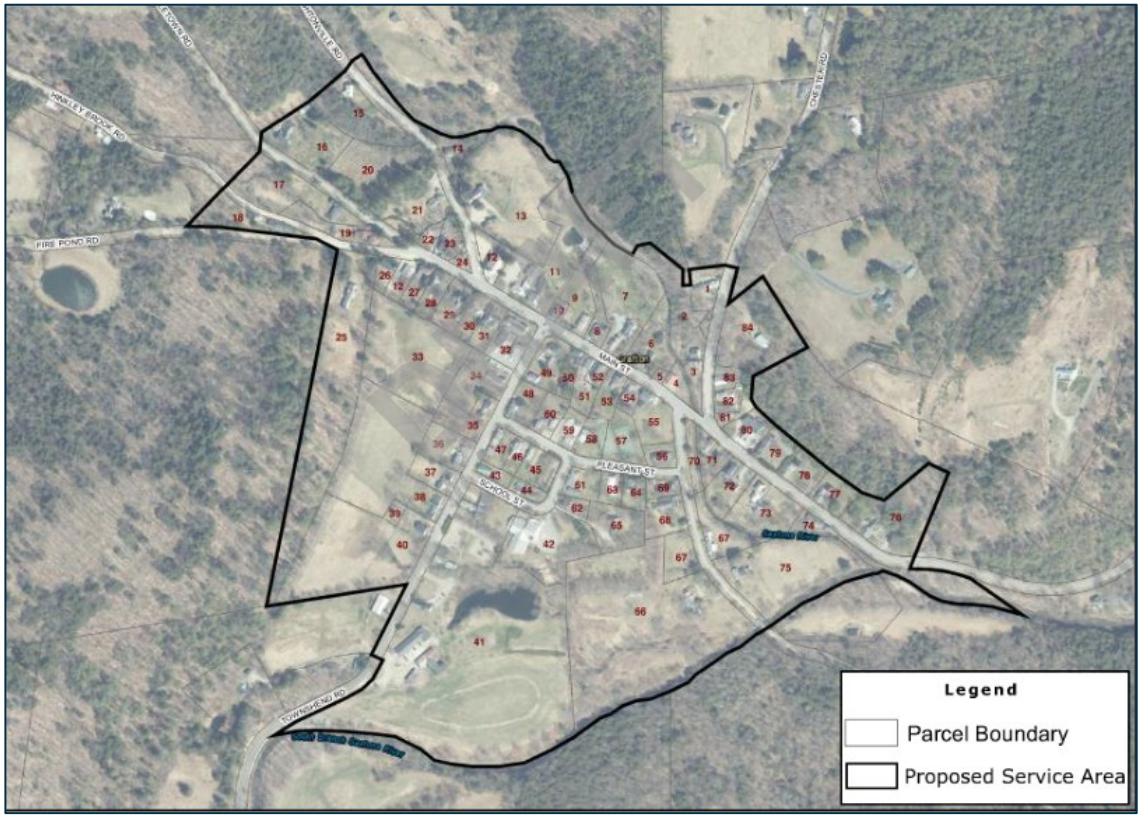
GRAFTON
COMMUNITY WASTEWATER EVALUATION



- **Remaining portion of presentation focused on wastewater**

Service Area & Flow Estimate

- **Includes Village Center & Village Center Planning Buffer**
- **Service Area Stats:**
  - 84 Parcels Total:
    - 56 Residential
    - 23 Commercial
    - 5 Vacant
- **Total Flow Estimate = 42,500 gpd**
  - Includes 10% for future expansion & growth



Potential Locations

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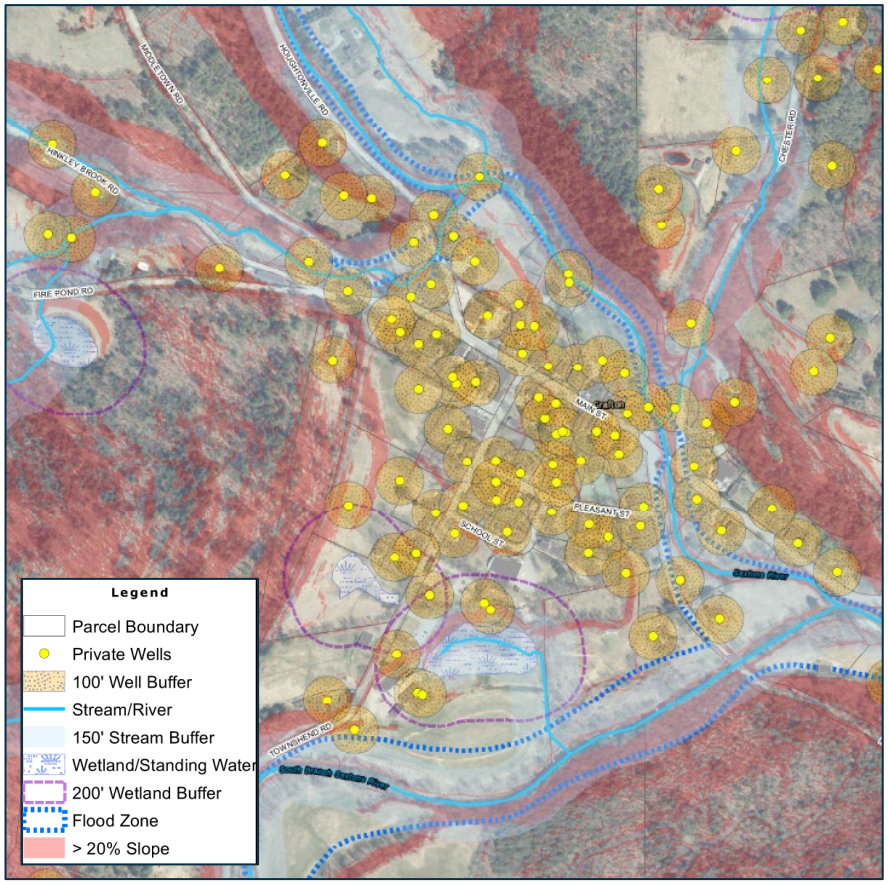
COMMUNITY WASTEWATER EVALUATION

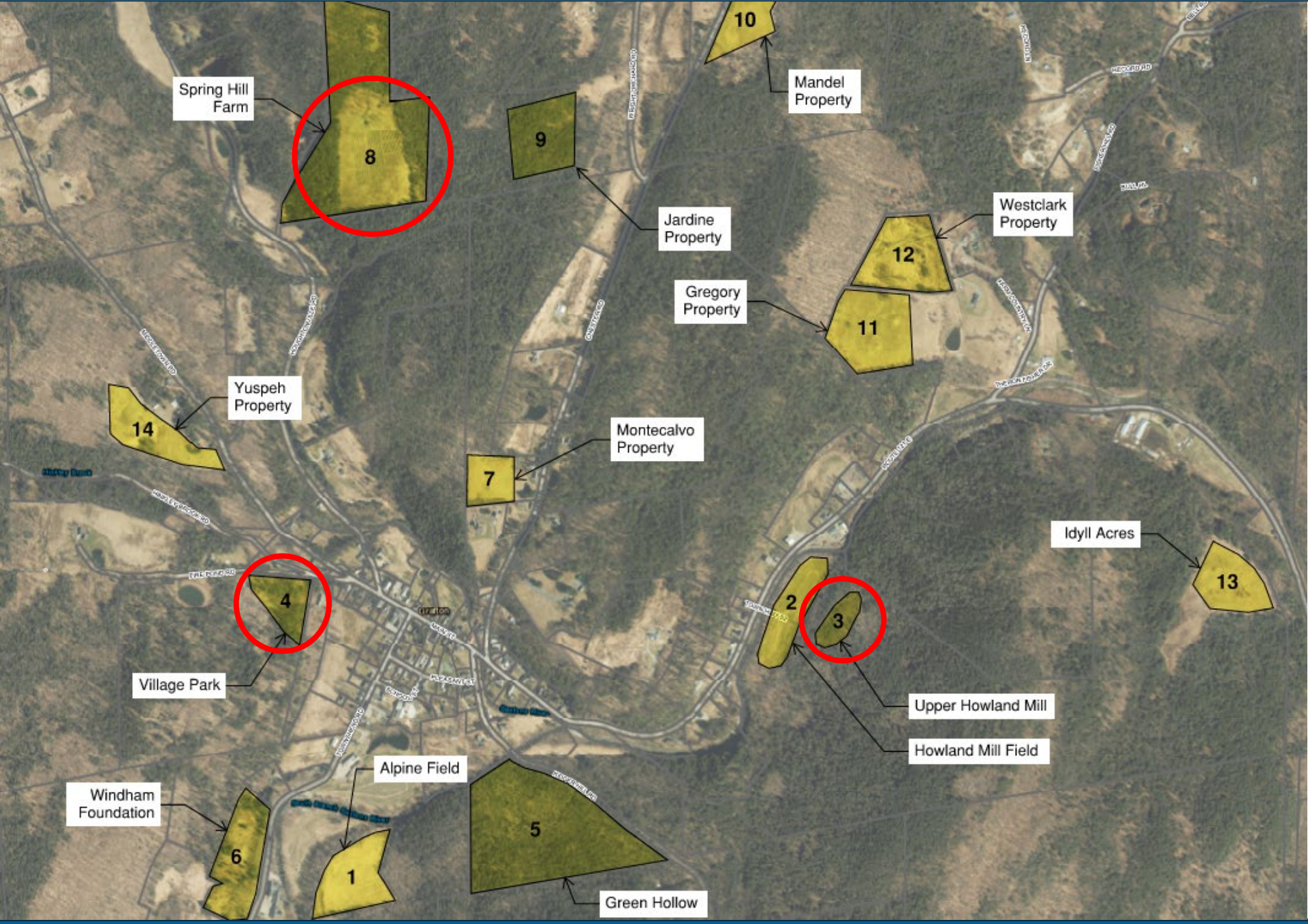
- **Alpine Field Site Investigation**
  - Performed test pits in November 2022
  - Found high seasonal groundwater condition
  - Would need large mound system – expensive & limit use of the site
  - Back to the drawing board!

Potential Locations

GRAFTON
COMMUNITY WASTEWATER EVALUATION

- **Since 30% Meeting:**
  - Finding suitable sites became a major challenge
  - Performed cluster analysis
  - Considered sites for spray fields
  - Considered other sites further from the Village
  - Desktop Analysis - Identified total of 14 potential sites, performed test pits at 2 of the sites:
    - Spring Hill Farm
    - Upper Howland Mill
  - Village Park still an option for WW, but only in conjunction with a drinking water system




Spring Hill Farm
8
9
10
Mandel Property
Jardine Property
Westclark Property
12
Gregory Property
11
Yuspeh Property
14
Montecalvo Property
7
Idyll Acres
13
4
2
3
Village Park
Upper Howland Mill
Howland Mill Field
Alpine Field
Windham Foundation
6
1
5
Green Hollow

Potential Locations

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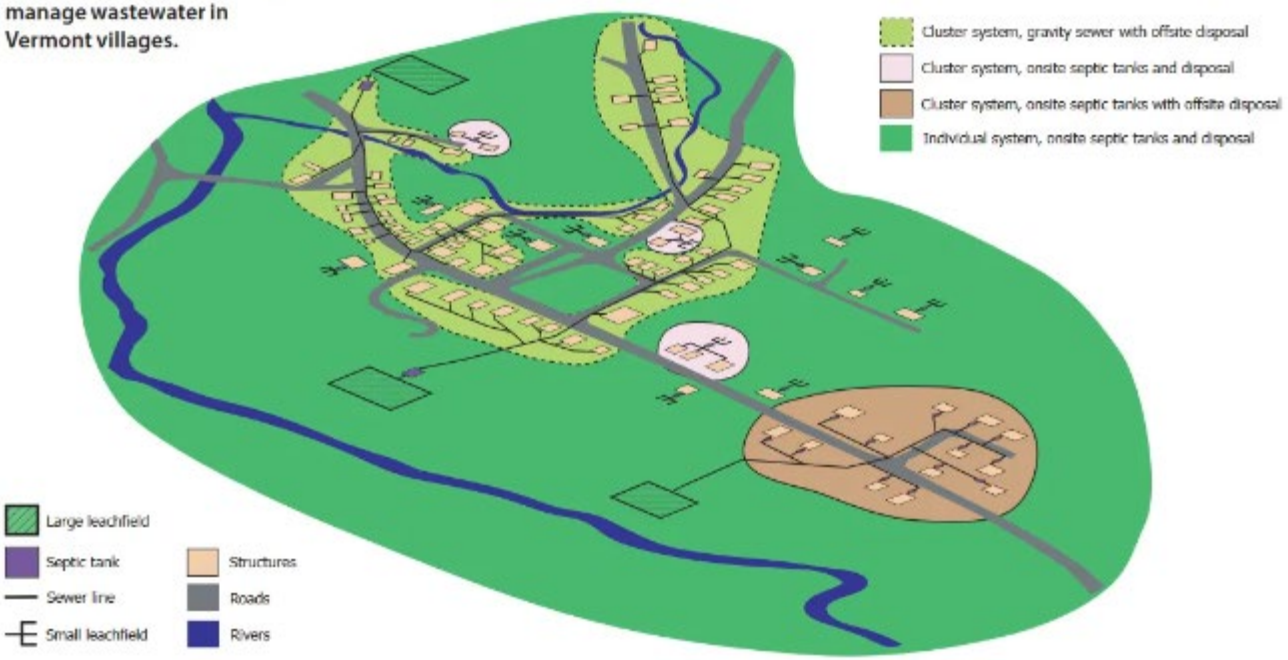
COMMUNITY WASTEWATER EVALUATION

- **Village Park**
  - Confining layer 26” – 43” below grade
  - Several challenges with this site
- **Upper Howland Mill**
  - Seasonal high groundwater only 12” – 14” below grade
  - Site is too small
- **Spring Hill Farm**
  - Seasonal high groundwater approximately 26” – 36” below grade
  - Site is feasible

Wastewater Systems

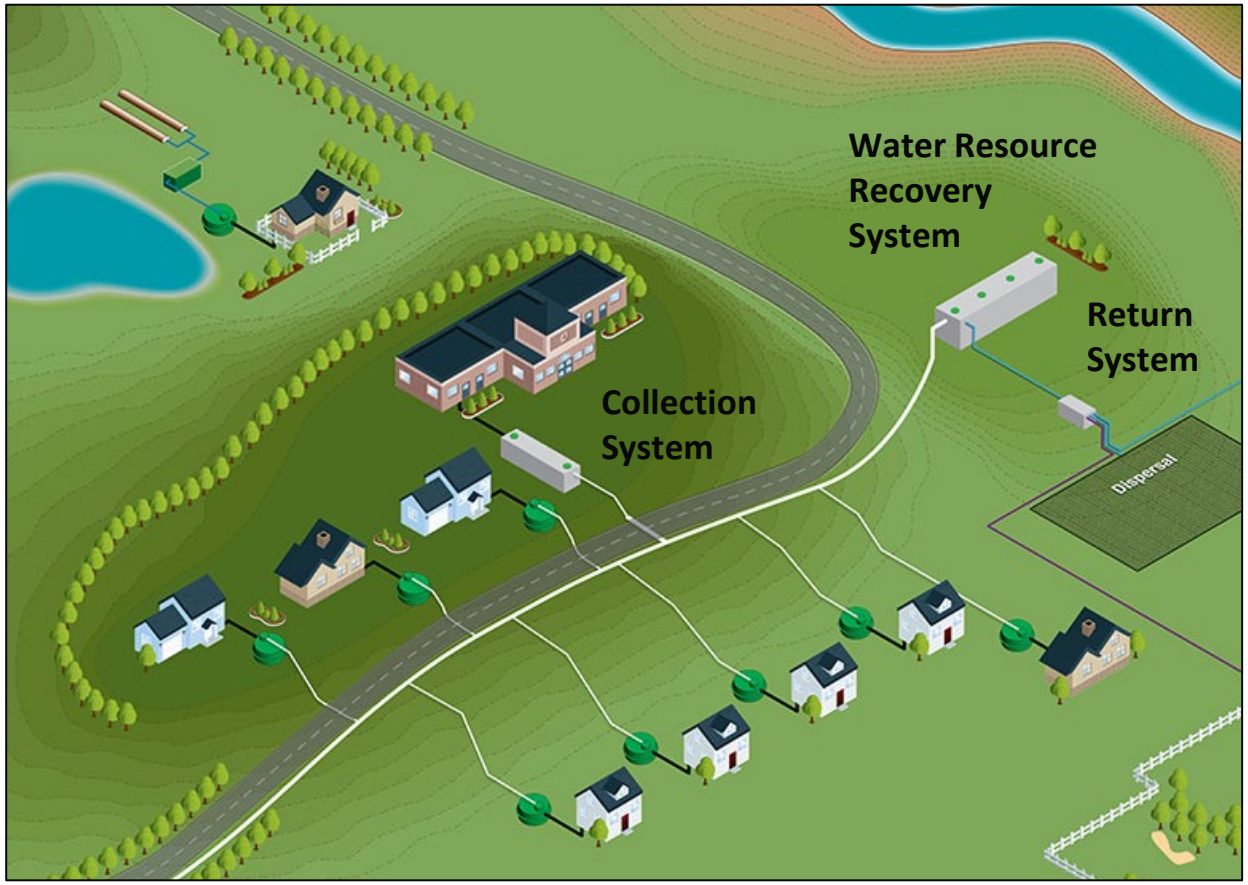
- **Focus on Decentralized, Soil Based Systems**
  - Meets the rural aesthetic of the community

A variety of collection and treatment solutions can be used to manage wastewater in Vermont villages.



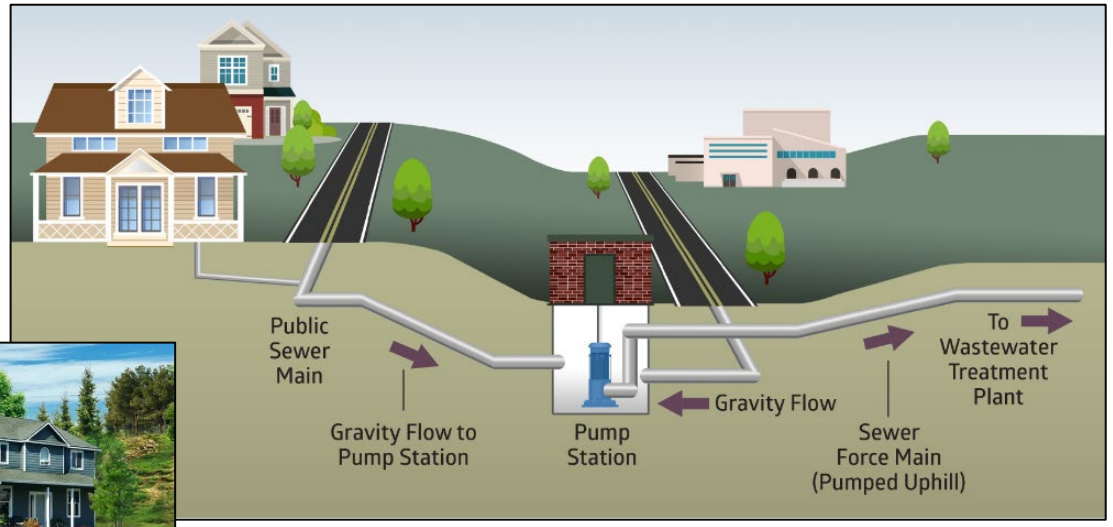
Wastewater Systems

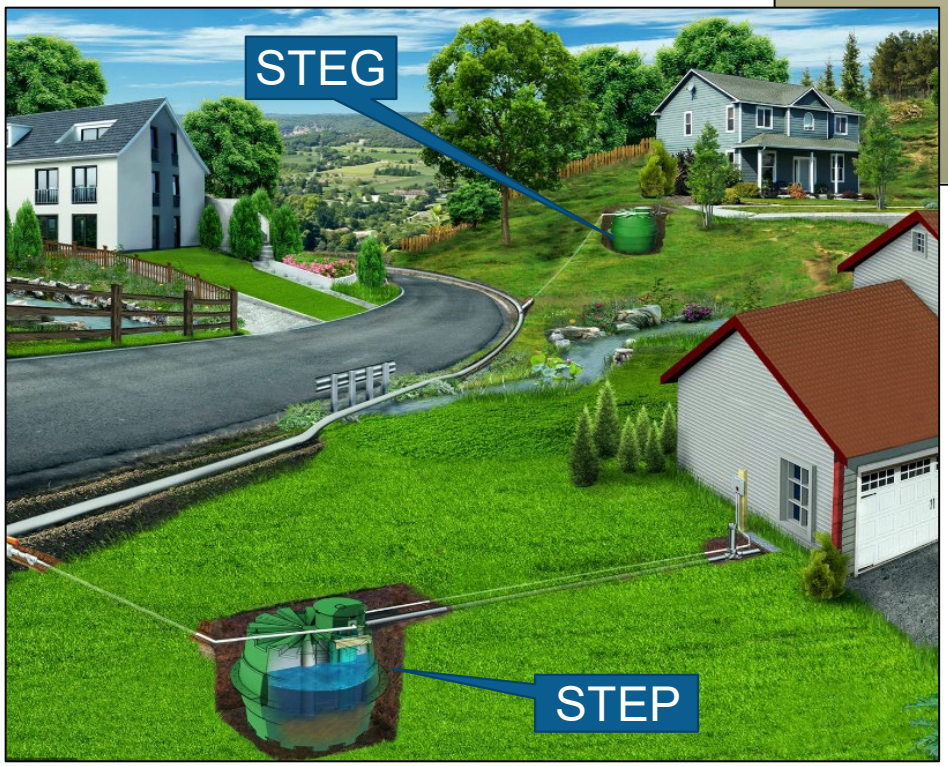
- **Three Components**
  - Collection System
  - Water Resource Recovery System (Treatment System)
  - Return System



Wastewater Systems

- **Collection Systems**
  - Conventional
  - Septic Tank Effluent





- **Conventional**
  - Typical for larger communities
  - Solids transported to treatment system
- **Septic Tank Effluent**
  - Typical for smaller rural communities
  - Solids remain in septic tanks
  - Smaller diameter sewer mains installed by directional drilling

Wastewater Systems

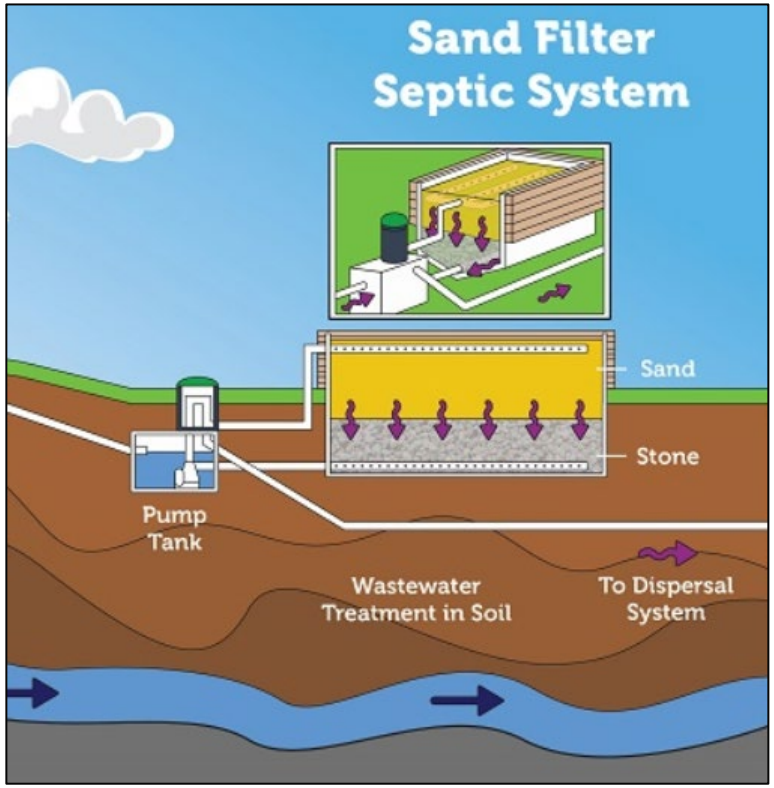
- **Water Resource Recovery Systems**
  - Only considered systems approved by Indirect Discharge Program
  - Technologies Considered:
    - Recirculating Sand Filters
    - Packed Bed Media Filters
    - Fixed Bed Bio-Reactors

GRAFTON
COMMUNITY WASTEWATER EVALUATION

Wastewater Systems

GRAFTON
COMMUNITY WASTEWATER EVALUATION

- **Recirculating Sand Filters**
  - Effluent percolates through filter bed, portion of flow is recirculated
  - Workhorse: sand media
  - Re-circulation increases oxygen content



Wastewater Systems

- **Packed Bed Media Filters (PBF)**
  - Series of partially buried fiberglass tanks
  - Workhorse: textile media
  - Small building for controls and equipment

Wastewater Systems

- **Fixed Bed Bioreactors**
  - Effluent percolates through media
  - Blowers adds oxygen
  - Precast concrete tanks

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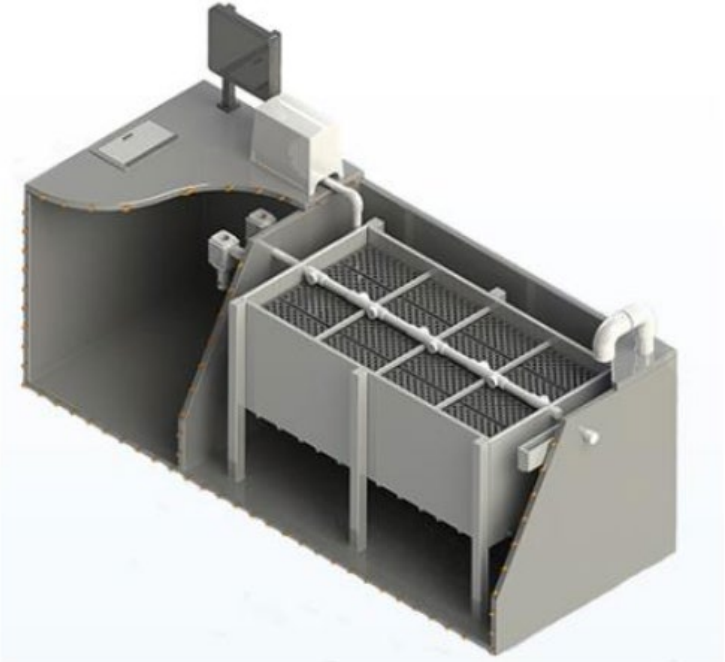
COMMUNITY WASTEWATER EVALUATION



Wastewater Systems

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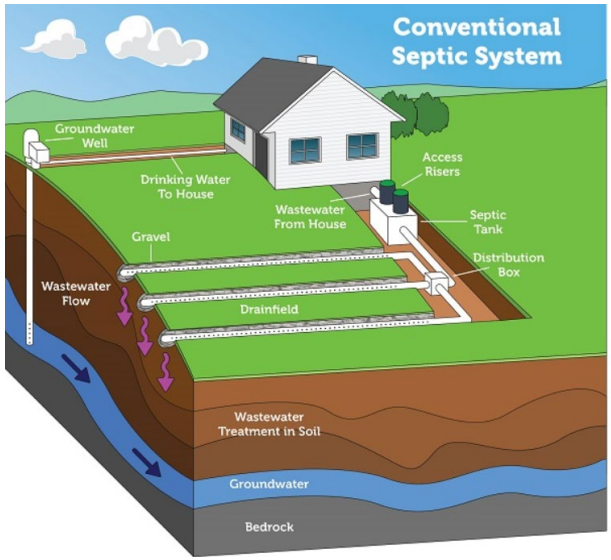
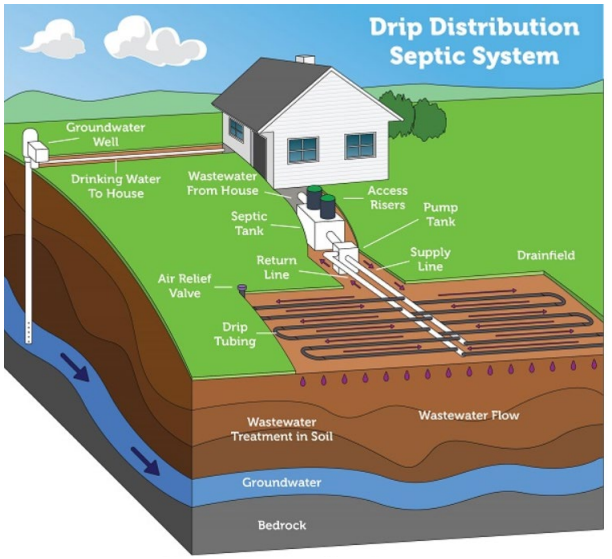
COMMUNITY WASTEWATER EVALUATION

- **Return Systems**
  - Technologies Considered:
    - Conventional Absorption Fields
    - Gravelless Geotextile Sand Filters (GGSF)
    - Drip Dispersal
  - Also considered sprayfield systems, however, no suitable locations for sprayfields were identified

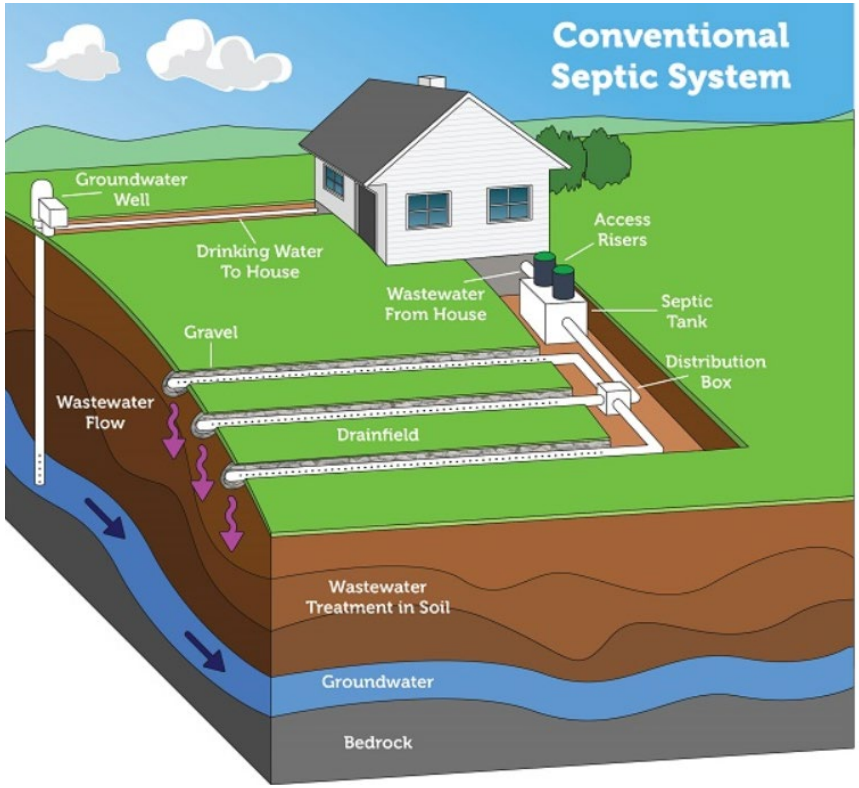




Wastewater Systems

- **Conventional Absorption Fields**
  - PVC pipe in gravel trench
  - Larger version of standard residential leachfield

GRAFTON
COMMUNITY WASTEWATER EVALUATION



Wastewater Systems

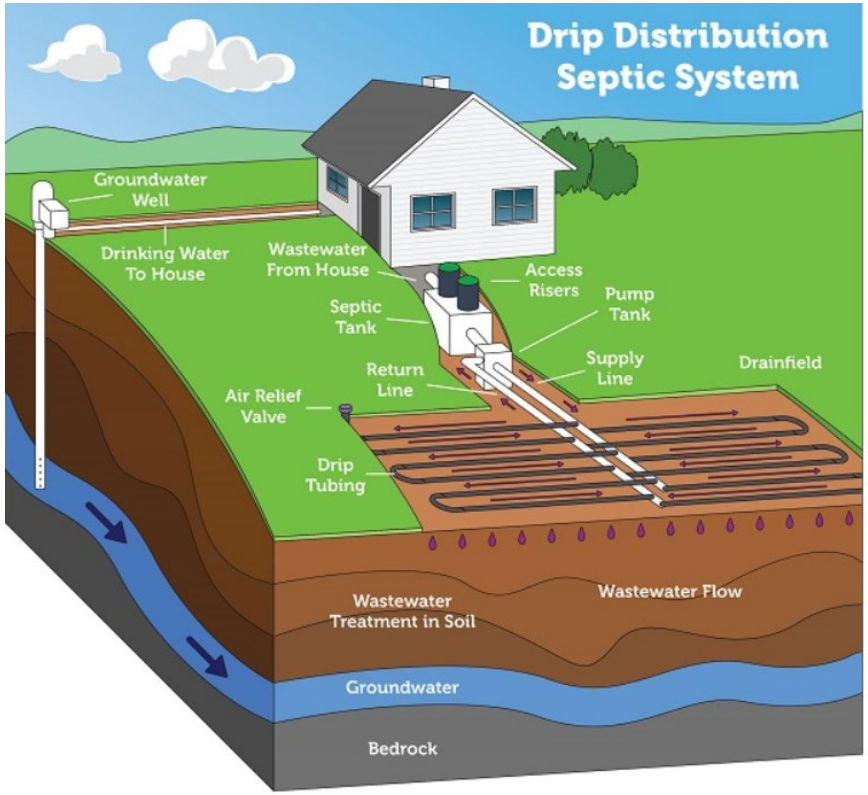
GRAFTON
COMMUNITY WASTEWATER EVALUATION

- **Gravelless Geotextile Sand Filters (GGSF)**
  - Innovative & Alternative Wastewater Technology
  - Consists of perforated pipe surrounded by synthetic aggregate or media, wrapped in geotextile, and placed in bed of sand

Wastewater Systems

GRAFTON
COMMUNITY WASTEWATER EVALUATION

- **Drip Dispersal System**
  - Innovative & Alternative Wastewater Technology
  - Small diameter tubing with emitters installed relatively shallow



Alternatives

- **Alternative No. 1**
  - Wastewater System at Spring Hill Farm
- **Alternative No. 2 (Requires DW PER)**
  - Wastewater System at Village Park
  - Drinking Water System
  - Stormwater Improvements
- **Alternative No. 3 (Requires DW PER)**
  - Drinking Water System
- **Alternative No. 4**
  - Do Nothing

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COMMUNITY WASTEWATER EVALUATION

Alternative Analysis

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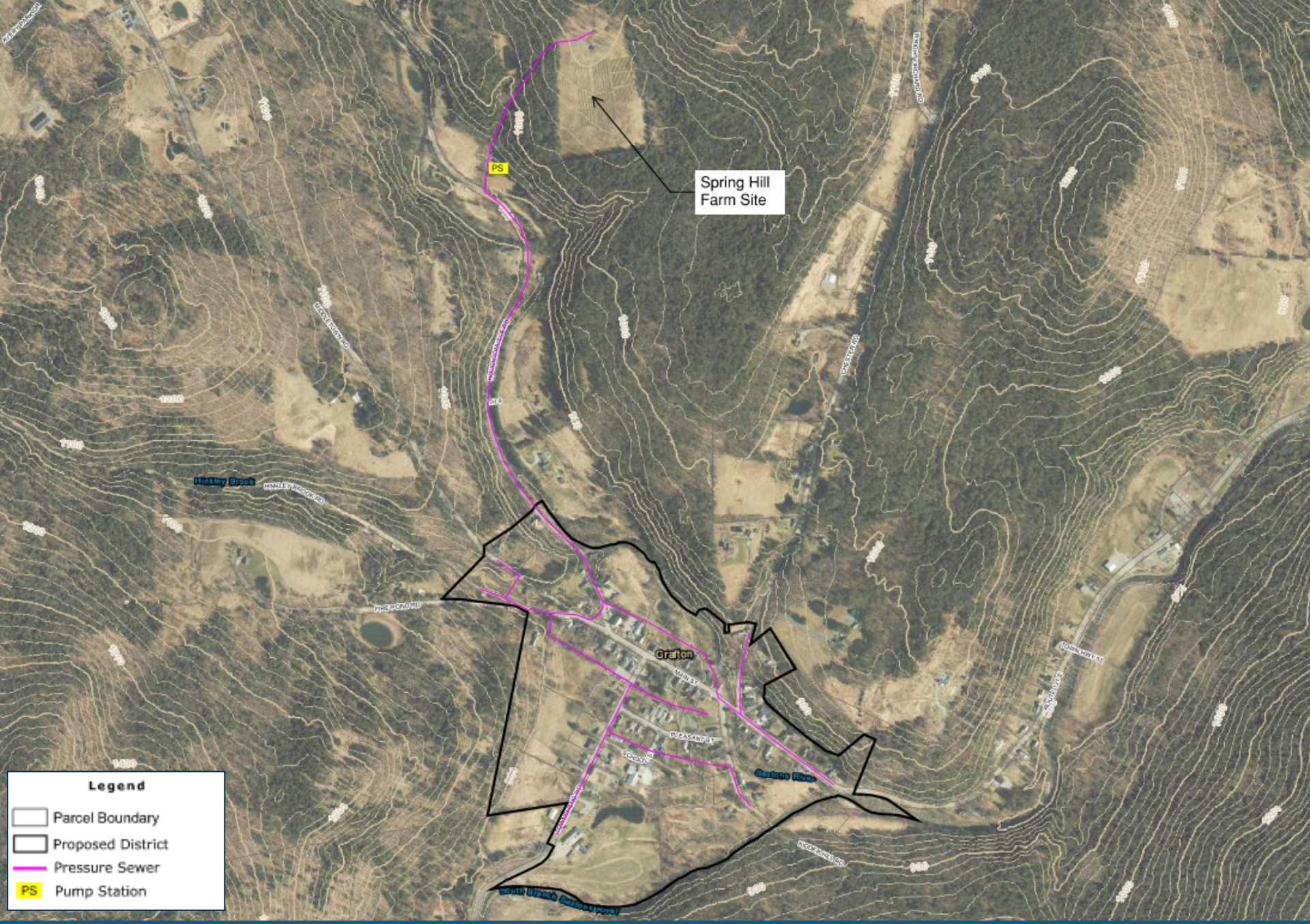
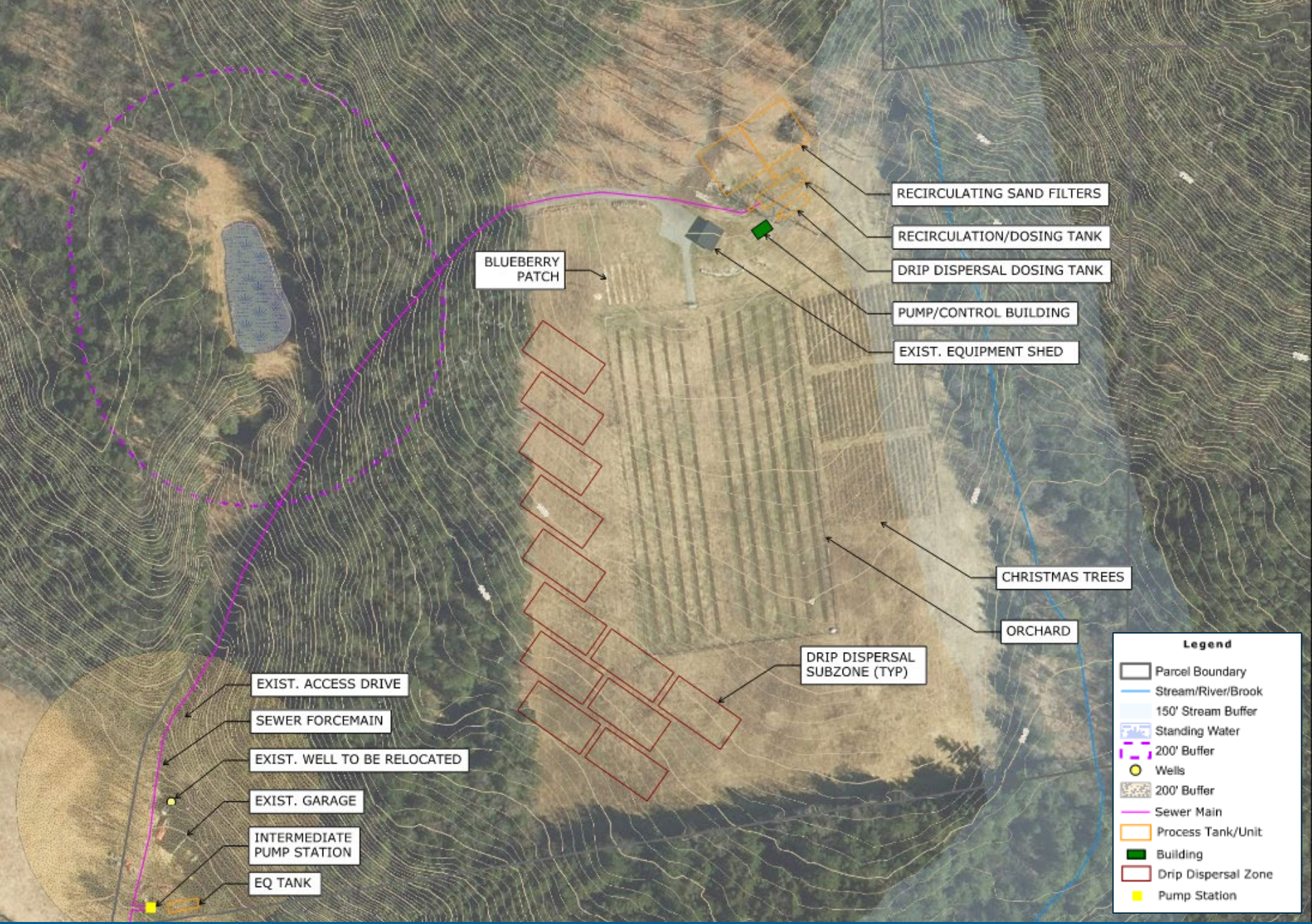
COMMUNITY WASTEWATER EVALUATION

- **Alternative No. 1**
  - Grafton Village Sewer District
  - Septic Tank Effluent Pumped Collection System
  - Recirculating Sand Filter Treatment System at Spring Hill Farm
  - Drip Dispersal System at Spring Hill Farm


Spring Hill
Farm Site
PS
Hinkley Brook
Grafton
Stations Pond
Legend
Parcel Boundary
Proposed District
Pressure Sewer
PS
Pump Station


RECIRCULATING SAND FILTERS
RECIRCULATION/DOSING TANK
DRIP DISPERSAL DOSING TANK
PUMP/CONTROL BUILDING
EXIST. EQUIPMENT SHED
BLUEBERRY PATCH
CHRISTMAS TREES
ORCHARD
DRIP DISPERSAL SUBZONE (TYP)
EXIST. ACCESS DRIVE
SEWER FORCEMAIN
EXIST. WELL TO BE RELOCATED
EXIST. GARAGE
INTERMEDIATE PUMP STATION
EQ TANK
Legend
Parcel Boundary
Stream/River/Brook
150' Stream Buffer
Standing Water
200' Buffer
Wells
200' Buffer
Sewer Main
Process Tank/Unit
Building
Drip Dispersal Zone
Pump Station

Cost Estimate

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COMMUNITY WASTEWATER EVALUATION

- **Capital Costs**

Alternative No. 1 Opinion of Probable Cost	Cost
Septic Tank Effluent Collection System	$3,434,900
Recirculating Sand Filter Water Resource Recovery System	$1,170,100
Drip Dispersal Return System	$991,700
Site Work at Spring Hill Farm	$91,700
Subtotal Construction Costs	$5,688,400
Engineering (20%)	$1,137,700
Contingency (20%)	$1,137,700
Property Acquisition/Easement	$100,00
Opinion of Probable Cost	**$8,063,800**

- **Annual Operation & Maintenance Costs**

Alternative No. 1 Annual O&M Costs	Cost
Alternative No. 1 Annual O&M	**$116,800**

Cost Estimate

Recommended Project Costs	Alt. No. 1
1. Construction Costs[1]	$6,216,000
2. Engineering Costs	
Design[2]	$483,000
Construction[1]	$746,000
3. Other Expenses	
Local Counsel (0.75%)	$47,000
Bond Counsel (1.25%)	$78,000
4. Equipment	$0
5. Land Acquisition	$100,000
6. Project Contingency (20%)[1]	$1,244,000
7. Total Project Costs	$8,914,000
8. Less Other Sources of Financing[3]	$3,968,000
9. Project Costs to be Financed	$4,946,000
10. Financing Insurance Costs	
Direct Expense (1%)	$50,000
Stand Bond Issuance Charge (0.84%)	$42,000
Administrative Fee (1.1%)	$55,000
Total Project Cost to be Financed	**$5,093,000**

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COMMUNITY WASTEWATER EVALUATION

- **Cost to be financed (subtract ARPA funding)**

[1]Includes an escalation of 3%/year for 3 years

[2]Includes an escalation of 3%/year for 2 years

[3]ARPA funds appropriated to Grafton for Village Wastewater Project

User Costs

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COMMUNITY WASTEWATER EVALUATION

- **EPA Sewer Affordability**
  - Cost per single family user (1 ERU) < 2% of the Median Household Income (MHI)
- **MHI for Grafton is $68,125**
- **Grafton EPA Annual Sewer Affordability**
  - < $1,363
- **User fees only paid by those in the sewer district**

User Costs

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COMMUNITY WASTEWATER EVALUATION

- **Assume Clean Water State Revolving Fund (CWSRF) loan for 30 years @ 2%**

ERU Based User Fees	Alt. No. 1
Total Project Cost to be Financed	$5,093,000
Annual Dept Service Payment, 30 years @ 2%	$227,402
Number of ERUs in Proposed Sewer District	97
Annual Cost per ERU	$2,344
Annual O&M Costs	$116,800
Number of ERUs in Proposed Sewer District	97
Annual O&M Cost per ERU	$1,204
Total Annual Cost per ERU	**$3,548**

> $1,363

- **As shown, this would not result in an affordable user fee**
- **How do we get to an affordable user fee?**

User Costs

GRAFTON
COMMUNITY WASTEWATER EVALUATION

- **Let's say 100% of project cost was covered by grants**

ERU Based User Fees (O&M Costs Only)	Alt. No. 1
Annual O&M Costs	$116,800
Number of ERUs in Proposed Sewer District	97
Annual O&M Cost per ERU	**$1,204**

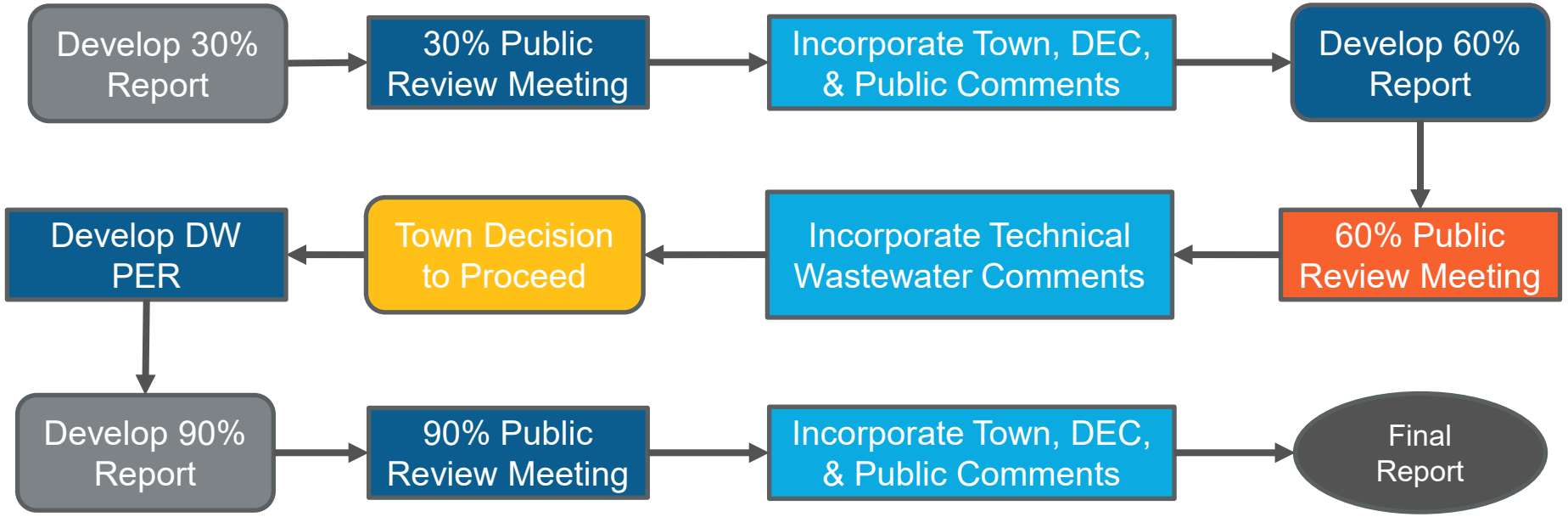
Nearly the entire cost of the project would need to be covered by grants to meet the EPA sewer affordability criteria

- **Multiple options for billing**
  - ERU based
  - Assessment based
  - Flow based

Next Steps

- **Get public comments and feedback from community at today's 60% meeting**
- **Finalize 60% report as related to WW**
- **Town to decide on Drinking Water PER**

GRAFTON
COMMUNITY WASTEWATER EVALUATION



Community Feedback & Questions