

SOUTH HERO AND KEELER BAY WASTEWATER FEASIBILITY STUDY

DRAFT REPORT FINDINGS (60% complete)

Community Presentation and Discussion

GUIDED BY THE TOWN OF SOUTH HERO WASTEWATER COMMITTEE

SUPPORTED BY NORTHWEST REGIONAL PLANNING COMMISSION

FUNDED BY VT CLEAN WATER STATE REVOLVING FUND



Contents

- ▶ Committee Background and Activities
- ▶ Wastewater Project Benefits
- ▶ Summary of Study
- ▶ State Programs in Support

South Hero Wastewater Committee

Convened to Explore Wastewater Opportunities

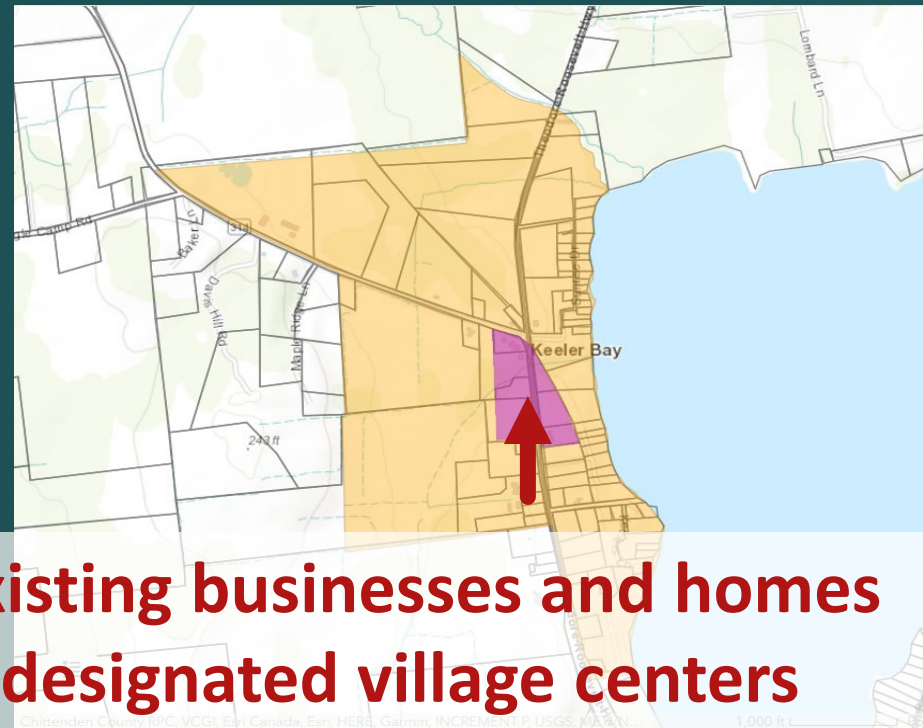
- ▶ Convened in late 2021, 27 committee meetings, project website (recent updates)
- ▶ Charge was to explore options for community wastewater systems for village areas under supervision of Selectboard.
- ▶ Initial need based on understanding that soils are broadly unsuitable for individual on-site treatment throughout the town.
- ▶ Committee Members:
 - ▶ Peter Zamore (Chair), George Harwood (Clerk), Ross Brown, Bob Buermann, Bob Krebs, Nate Hayward, Sue Arguin, Mitchell Richardson
- ▶ Project Consultants and Support:
 - ▶ Otter Creek Engineering, Northwest Regional Planning Commission, Lake Champlain Islands Economic Development Corporation

Wastewater Committee Work to Date

Prioritizing Study Areas

South Hero Village

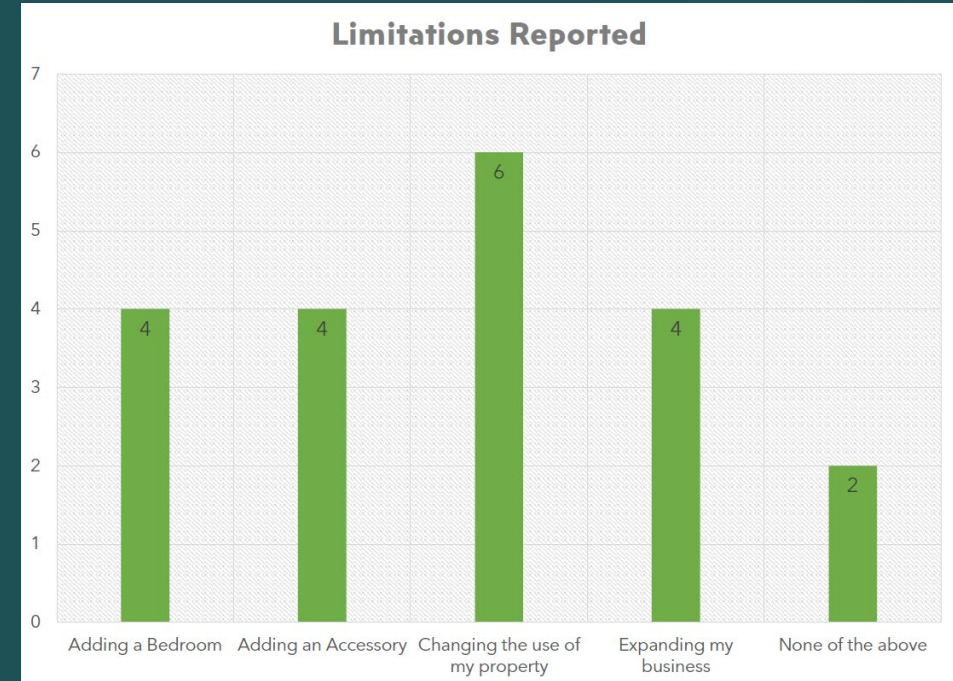
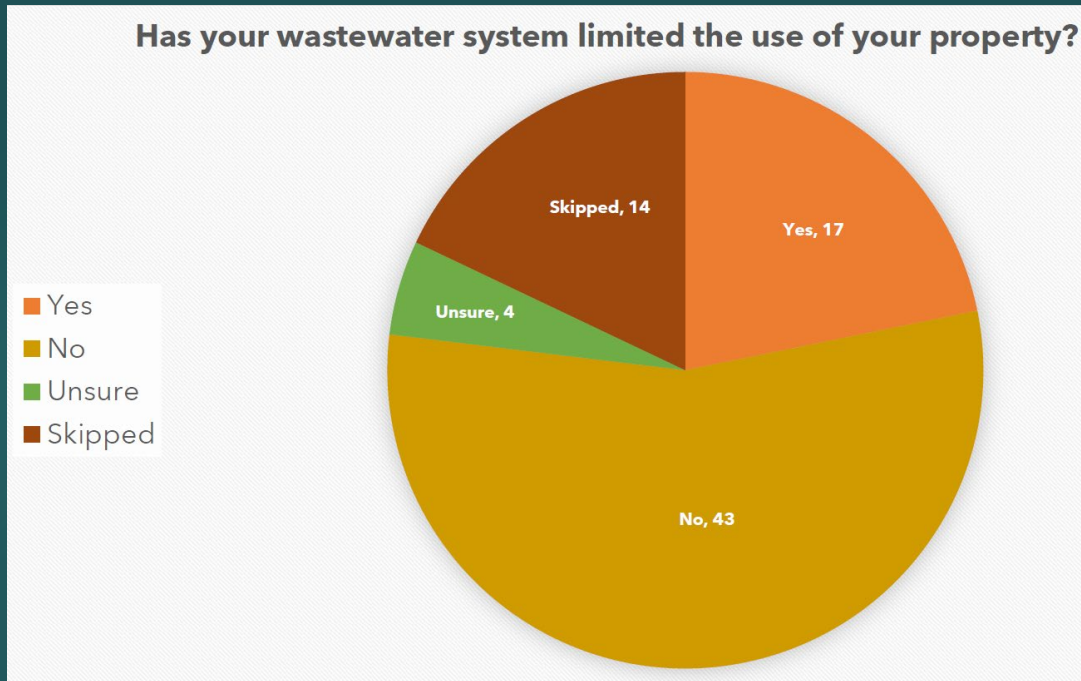
Keeler Bay Village



Primarily looking to serve existing businesses and homes and infill development in designated village centers

Wastewater Committee Work to Date

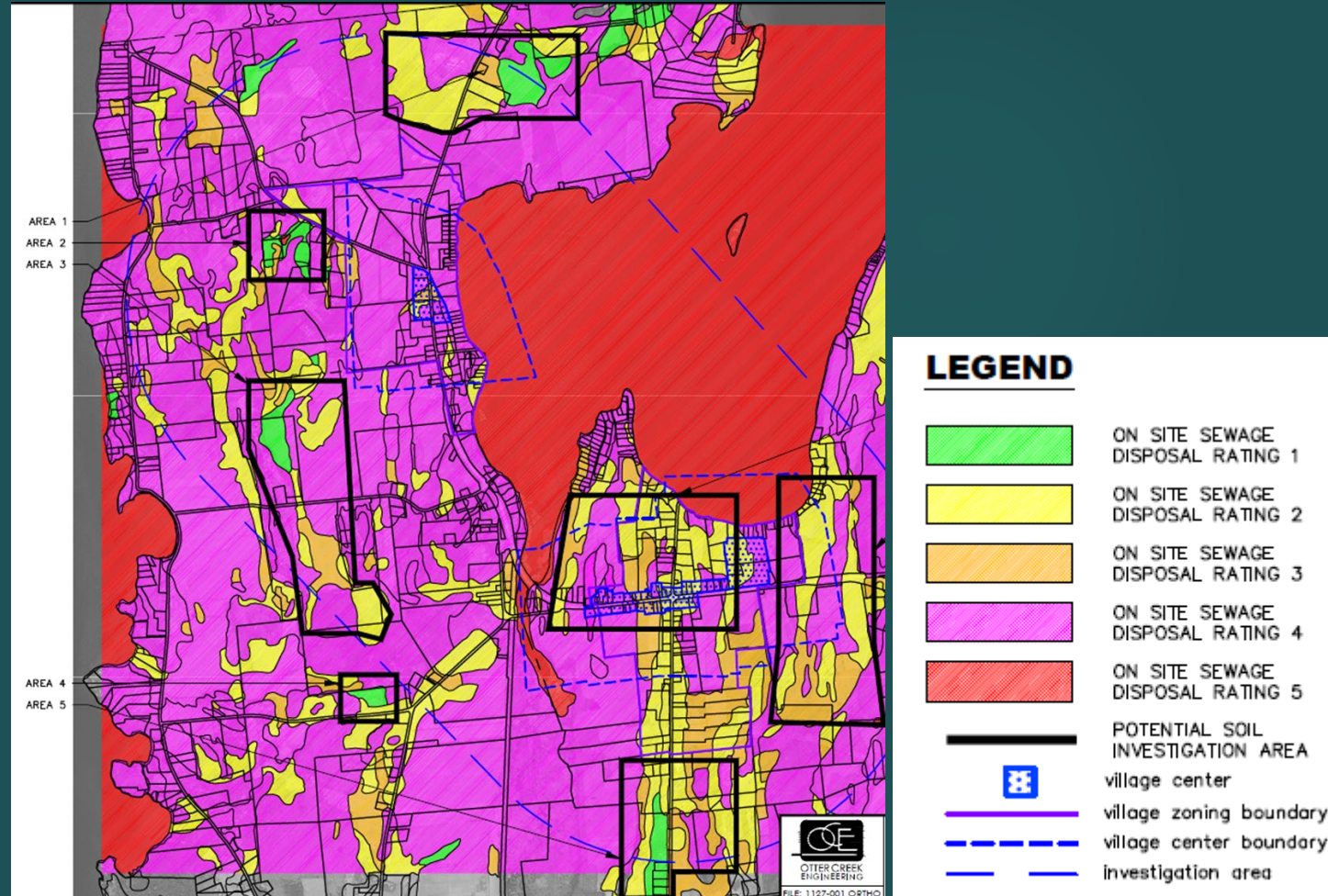
Landowner Survey



Wastewater Committee Work to Date

Property Identification and Test Pitting

- ▶ Prioritized sites based on location, soils and size
- ▶ Coordinated outreach to 12 properties
- ▶ Received permission from 5 to complete test pitting
- ▶ Test pitting completed on 4 properties



Community Wastewater Benefits

- ▶ Historic densities do not support current engineering standards for individual systems and well isolation distances.
- ▶ Individual on-site wastewater limits the potential for villages to continue or grow as vibrant community centers.
- ▶ Creates opportunities for new or expanded housing, public and civic spaces and businesses.



Community Wastewater Benefits

- ▶ Outdated systems cause groundwater and surface water contamination.
- ▶ Lack of space and soil conditions can prevent replacement or make it too costly.
- ▶ Development can be more cost effective without individual wastewater treatment.



2023 South Hero Town Plan

- Minimize lake pollution (9)
- Support a mix of residential, commercial & public uses in the core village areas, continue village character (walkable, consistent in siting/scale with surrounding historic structures), facilitated by collective, rather than individual wastewater systems (23)
- Support expansion of businesses & jobs (44)
- Community Planning Survey: More than two-thirds supported exploring municipal wastewater management in the village areas (13)

Process of wastewater planning

Wastewater Feasibility Analysis

Wastewater Preliminary Engineering Investigation

Refines to a single or few preferred alternative(s)
More detailed feasibility and cost analysis
Environmental review
Permit analysis

Final Design Phase

Fieldwork (surveys, borings, easements)
Finalize funding options
Bond vote
Develop construction ready design documents

Bidding

Construction








WE ARE HERE!

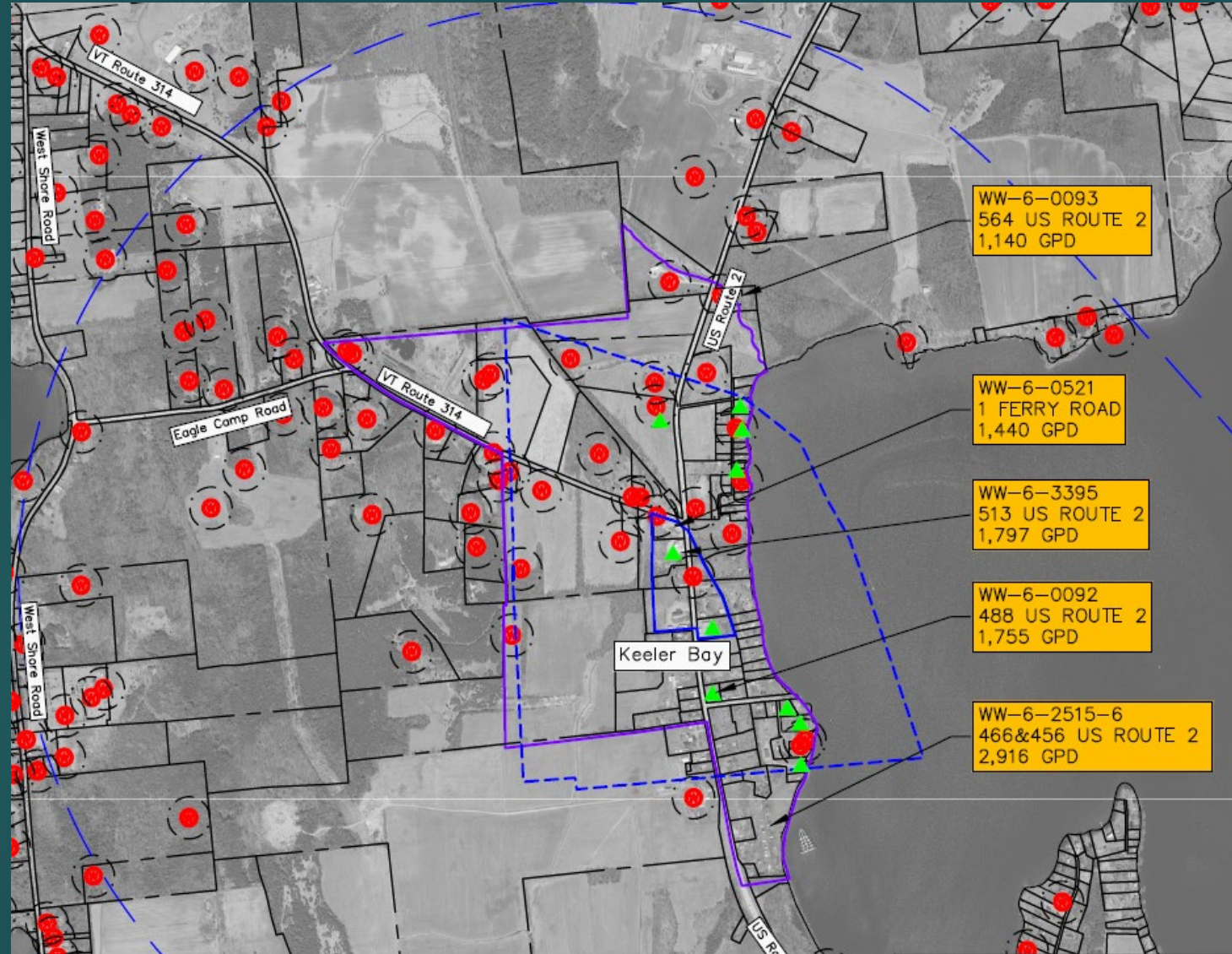
Intent of Investigation

- IDENTIFY cost effective and appropriately scaled solutions for South Hero Village and Keeler Bay.
- EVALUATE alternatives for their ability to address each village's needs.
- ENSURE solutions are protective of public health and safety.
- PRIORITIZE 2-3 solutions (ideally!) that will service the vision for development in South Hero and Keeler Bay

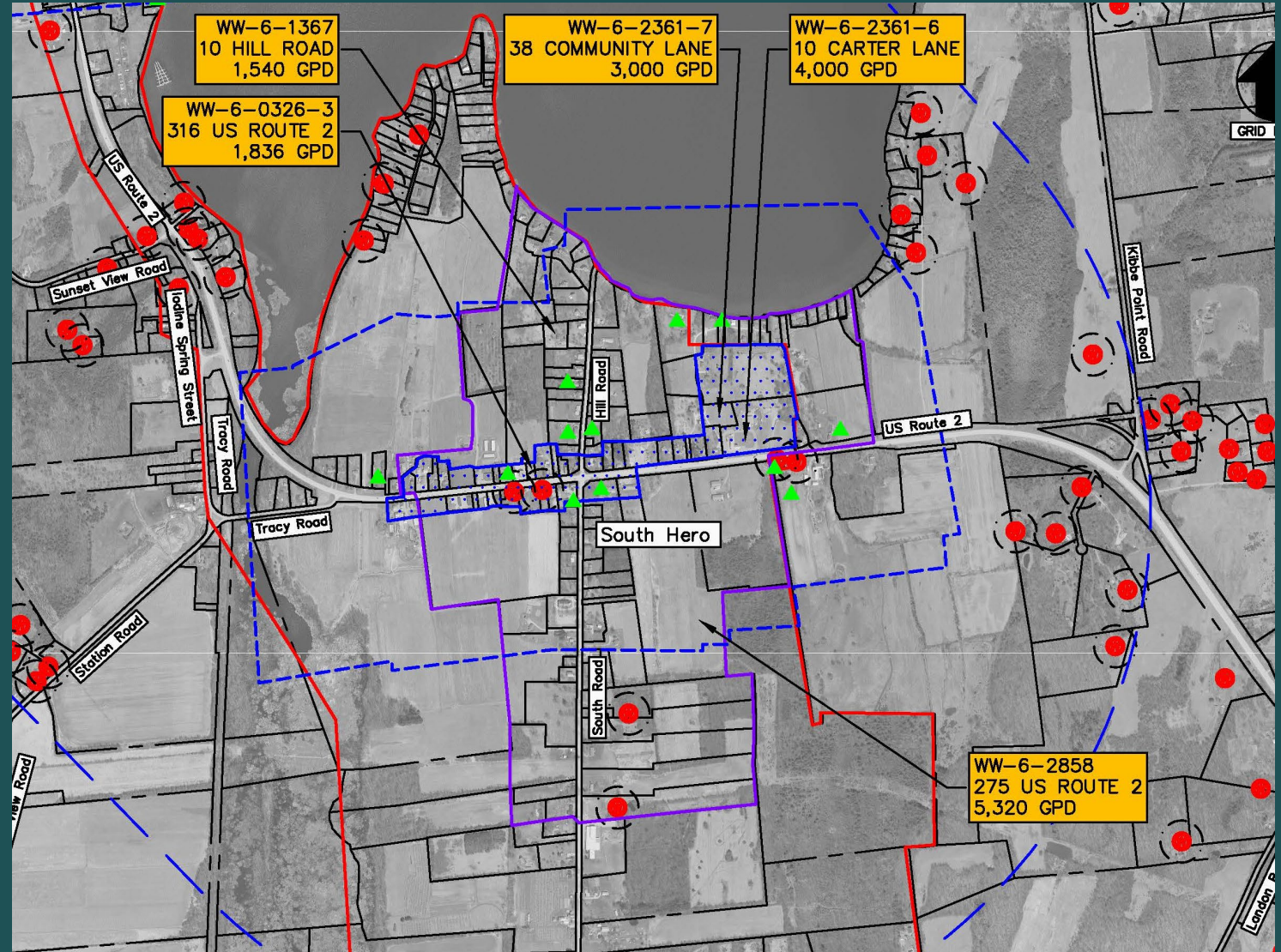
Existing Water and Wastewater Supplies in Keeler Bay








LEGEND

-  failed septic system
-  well and 200' isolation shield
-  village center
-  village zoning boundary
-  village center boundary
-  5000' investigation area
-  1320' investigation area



Existing Water and Wastewater Supplies in South Hero Village



LEGEND	
	failed septic system
	well and 200' isolation shield
	village center
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	1320' investigation area

Approaches to Wastewater Collection and Treatment

DIRECT DISCHARGE

INDIRECT DISCHARGE

CENTRALIZED

- Large Collection Network
- Central Treatment Facilities
- Direct Discharge of Effluent to Surface Water
- Significant Infrastructure Investment
- Increased operations and maintenance

DECENTRALIZED

- Individual or Small Collection Network
- In ground collection and treatment (septic) systems that vary in size
- Indirect Discharge of Effluent to Subsurface

How much wastewater capacity does the village need?

	South Hero Village	Keeler Bay
Design Flow Designated Village Center	19,270 gpd (70-80 homes)	6,050 gpd (20-25 homes)
Design Flow Designated Village Center plus quarter mile buffer	33,200 gpd (100-125 homes)	13,700 gpd (50-55 homes)

Sources of information:

- Property owner surveys
- Existing databases and issued permits
- Town Plan and other planning documents
- Designated Village Center needs
- Allowable growth areas

Treatment, Conveyance and Disposal Options

Treatment Needs

- Primary (septic tanks)
- Secondary (Lagoons, package plants)
- Tertiary (advanced, filtration)



Conveyance

- Standard Gravity Collection Sewers and Pump Stations
- Septic Tank Effluent Pumping (STEP) Systems
- Low Pressure Grinder Pump Systems



Disposal

- Inground Subsurface
- Mound System
- Spray Disposal
- Drip Disposal

Treatment and Conveyance Alternatives

Septic Tank Effluent Pumping (STEP)

- ▶ Provides primary treatment at users property
- ▶ For residential and low strength commercial waste connections, this occurs through the installation of a properly sized septic tank.
- ▶ Effluent from the septic tank is subsequently pumped into a shared, low pressure sewer force main, where it is conveyed to a disposal site.

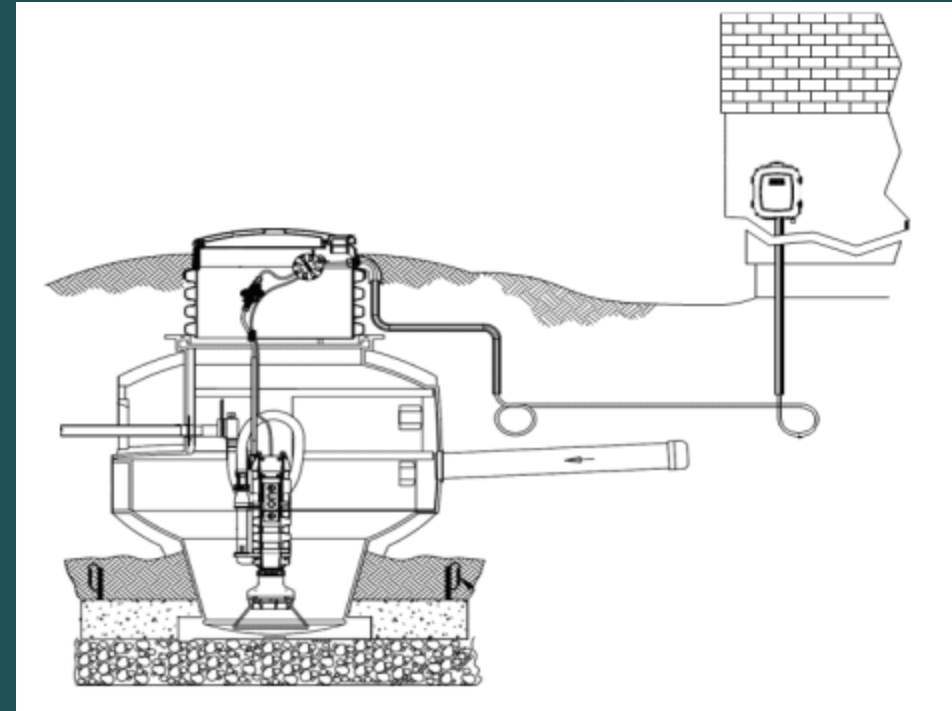


<https://cityoflacey.org/wastewater-programs/>

Treatment and Conveyance Alternatives

Grinder Pump, Low-Pressure Pumping

- ▶ Nearly identical to the STEP system, but replace the need for septic tanks and other primary treatment on site.
- ▶ They grind up the solids and convey them through a pressure force main to the treatment and disposal site.
- ▶ Wastewater flows are conveyed through a shared, low-pressure force main.



Secondary and Tertiary Treatment of Wastewater

Gpd capacity can be increased if the treatment level of the waste is increased

- ▶ Secondary treatment: biological treatment of wastewater to reduce the effluent strength prior to discharge
- ▶ Tertiary treatment: a third level of effluent renovation, often through filtration



Treatment Options:

- ▶ Algae Wheel: An algal-bacterial bioreactor, utilizes algae which grows on rotating wheels.
- ▶ Conventional Aerated Lagoon: Viable secondary treatment system in advance of spray disposal under the current Indirect Discharge Rules.
- ▶ Membrane Bioreactor (MBR): Low energy advanced treatment process.



When In-ground Disposal Isn't Enough: Spray Disposal Systems

- ▶ When in-ground disposal capacity is limited, spray disposal/drip dispersal can provide a single in-direct discharge solution for the whole village
- ▶ Consists of an advanced treatment system with effluent spray irrigation or drip dispersal system
- ▶ Spray disposal uses sprinklers to apply treated effluent on the land.
- ▶ Drip dispersal uses piping to irrigate soil with treated effluent in a series of shallow trenches



Keeler Bay Wastewater Recommendation: In-Kind Replacement

- ▶ This investigation did not find sites suitable and/or that gave permission for onsite investigations
- ▶ Limited number of properties with moderately suited soil for on site disposal
- ▶ Most appropriate solution individual on-site systems with in-kind replacement as needed
- ▶ Extending water service from South Hero Fire District No. 4 should be explored; would allow more land for wastewater
- ▶ Not financially feasible to connect Keeler Bay to a system in South Hero Village (based cost estimate \$1.5M)

Opportunities for In-Ground Disposal Sites in South Hero Village

- ▶ Onsite investigations were conducted at 3 sites
- ▶ Opportunity for a small system found at 1 site



South Hero Village Community Wastewater System Options

Option 1: No Change

Retain the existing on site wastewater disposal systems per lot.

Option 2: Cluster Wastewater Disposal Systems

A series of small scale (less than 6,500 gpd capacity) wastewater systems in an effort to meet the needs of the village over time.

Option 3: Package Wastewater Treatment

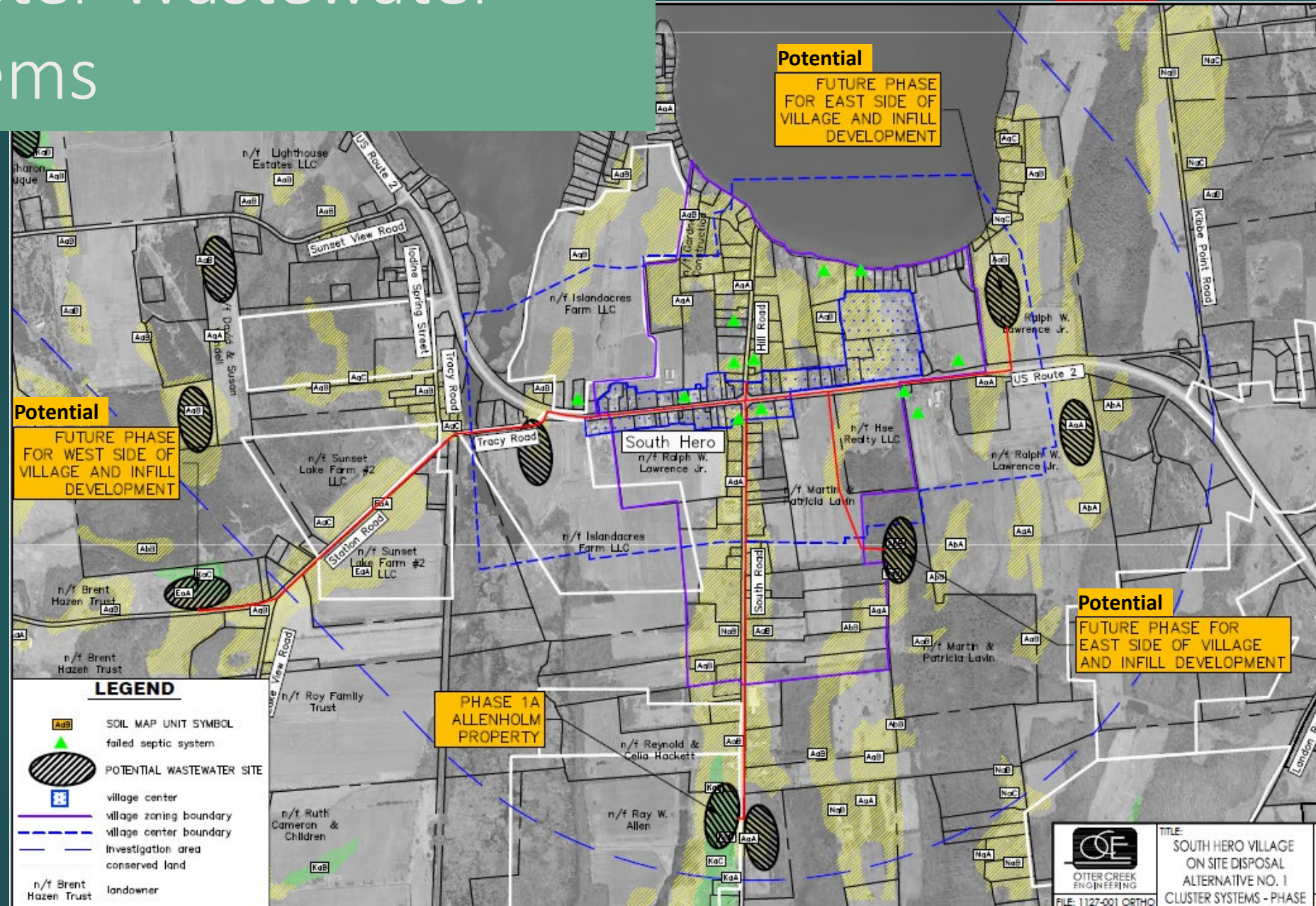
A package wastewater treatment facility with a 30,000-50,000 gpd capacity. Has secondary and tertiary treatment prior to land application of treated effluent.

Option 1: No Change/ No Community Wastewater

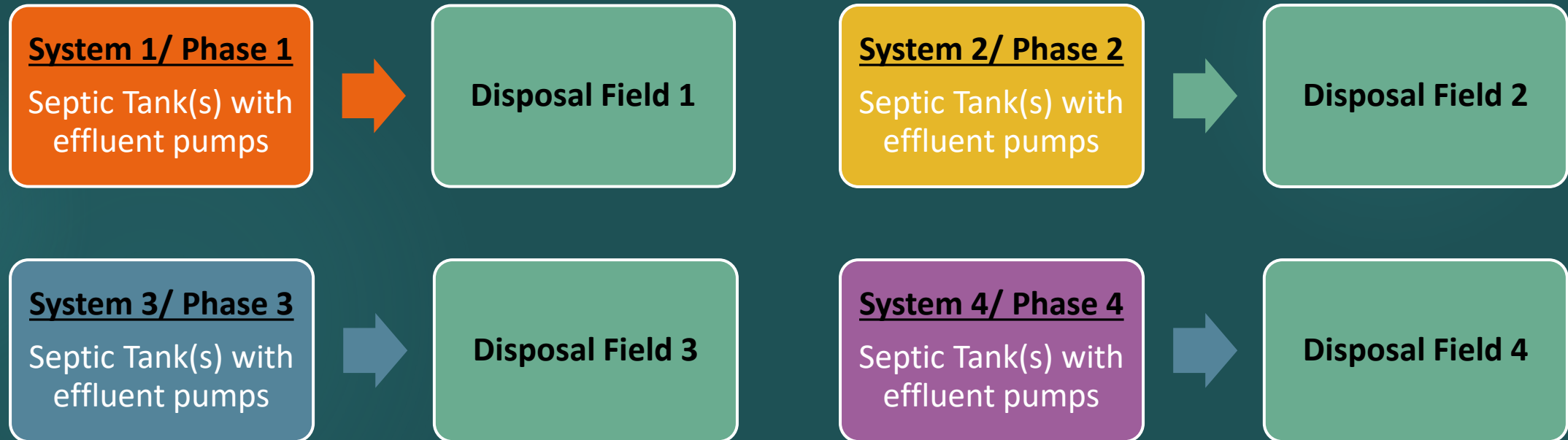
- ▶ Opt not to pursue a community wastewater system to serve South Hero Village.
- ▶ Wastewater solutions continue to be the responsibility of individual landowners on a site by site basis.
- ▶ Design capacity is limited on a per lot basis, which will impact the potential for reuse, expansion and infill development in South Hero Village.

Option 2: Cluster Wastewater Disposal Systems

- ▶ Several cluster, soil based wastewater disposal systems in areas where suitable soil exists, phased in over a period of time
- ▶ Build out in phases; could potentially achieve up to 20,000 gpd of total design capacity
- ▶ Total design capacity limited by unsuitable soil, uninterested landowners and proximity to village

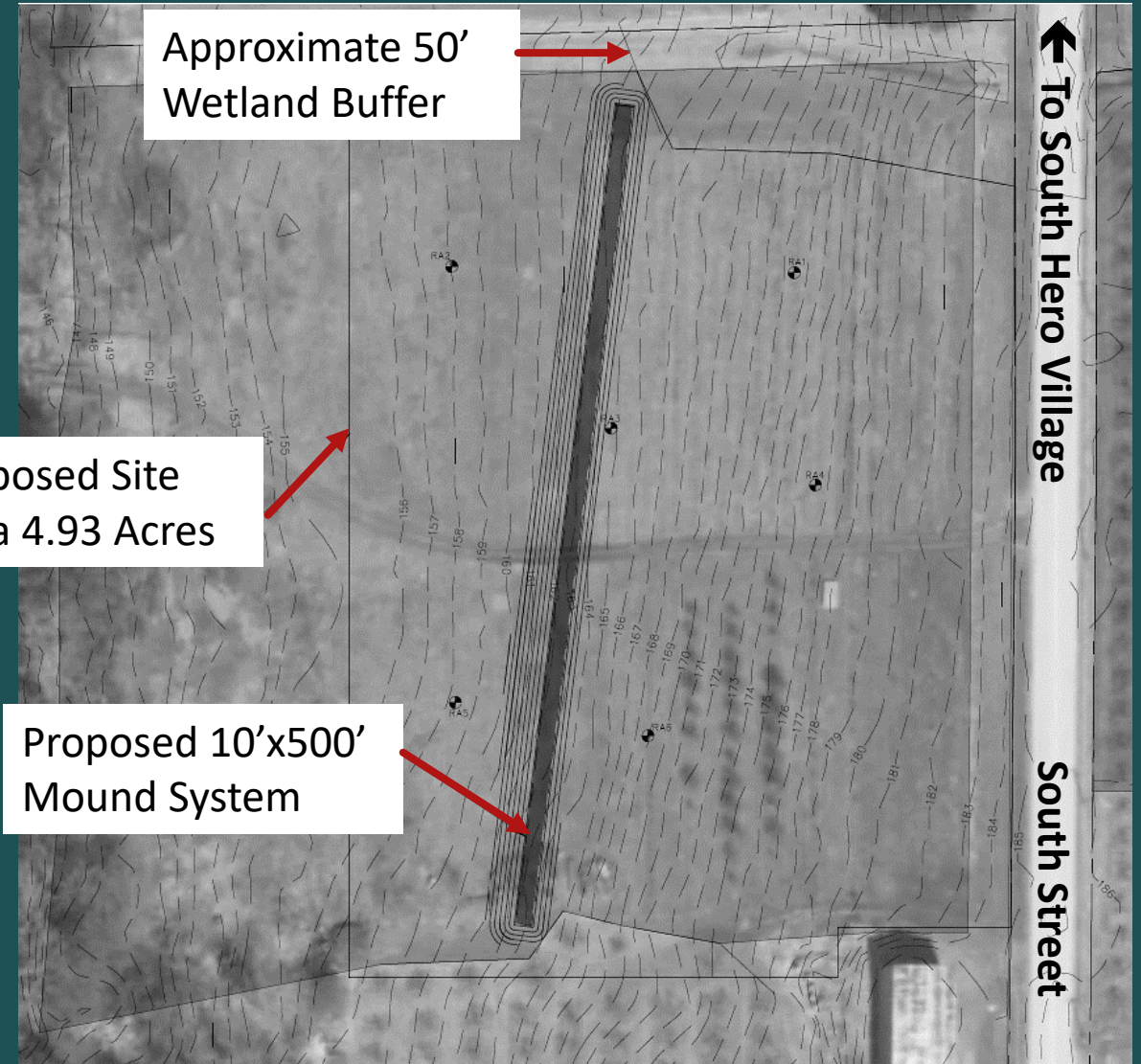


Phased Cluster Systems with Septic Tank Effluent Pumping (STEP)



Phase 1 Cluster System Potential at Allenholm Farm

- ▶ Mound system with capacity for 6,000 gpd with pre-treatment
- ▶ Working through feasibility with Land Trust



Option 3: Package Wastewater Treatment and Disposal System

- ▶ Package wastewater treatment system with land disposal of effluent through either spray disposal or drip dispersal
 - ▶ Package treatment is a compact and more portable version of conventional treatment
 - ▶ Provides secondary treatment, phosphorus removal, and effluent discharge through spray disposal
 - ▶ Depending on the capacity of the system, additional (tertiary) treatment may be necessary
 - ▶ The design capacity of this system is up to 50,000 gpd.



<https://www.meurerresearch.com/products/mri-packaged-water-treatment-systems>

What do we think the costs are?

Table 8
Construction Cost Estimates
Wastewater Treatment / Disposal for Both Villages

	Keeler Bay Village	South Hero Village	Cluster WW Systems in South Hero Village		Package WWTF	
	Do Nothing	Do Nothing	Phase I	Full Build	SHV	SHV & KBV Combined
Estimated Design Flow (gpd)	6,000	20,000	6,000	20,000	50,000	50,000
Construction Cost (Disposal)	\$ 480,000	\$ 1,835,000	\$ 575,000	\$ 1,000,000	\$ 9,895,000	\$ 9,895,000
Construction Cost (Conveyance)	\$ -	\$ -	\$ 826,000	\$ 2,426,000	\$ 375,000	\$ 381,000
Construction Cost (Village Interconnect)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,783,000
Contingency (20%)	\$ 96,000	\$ 367,000	\$ 280,200	\$ 685,200	\$ 2,054,000	\$ 2,611,800
Disposal Construction Cost	\$ 576,000	\$2,222,000	\$1,687,200	\$4,131,200	\$ 12,324,000	\$ 15,670,800
Disposal Cost per gallon of capacity	\$96	\$111	\$281	\$207	\$246	\$313

Notes:


- 1) Construction Costs are as outlined on the individual estimates.
- 2) Construction Cost for Village Interconnect assumes STEP collection system in each designated village center
- 3) No Additional Connections are included in "Conveyance Costs" though they could occur
- 4) 20% Project Contingency is an industry standard for this preliminary assesment.

Funding Opportunities

Combination of sources:

- Grants
- Low-interest loans
- Municipal bonds

Now is an unprecedented time to access funding for village wastewater projects, but there is a time limit on when ARPA funds need to be expended.



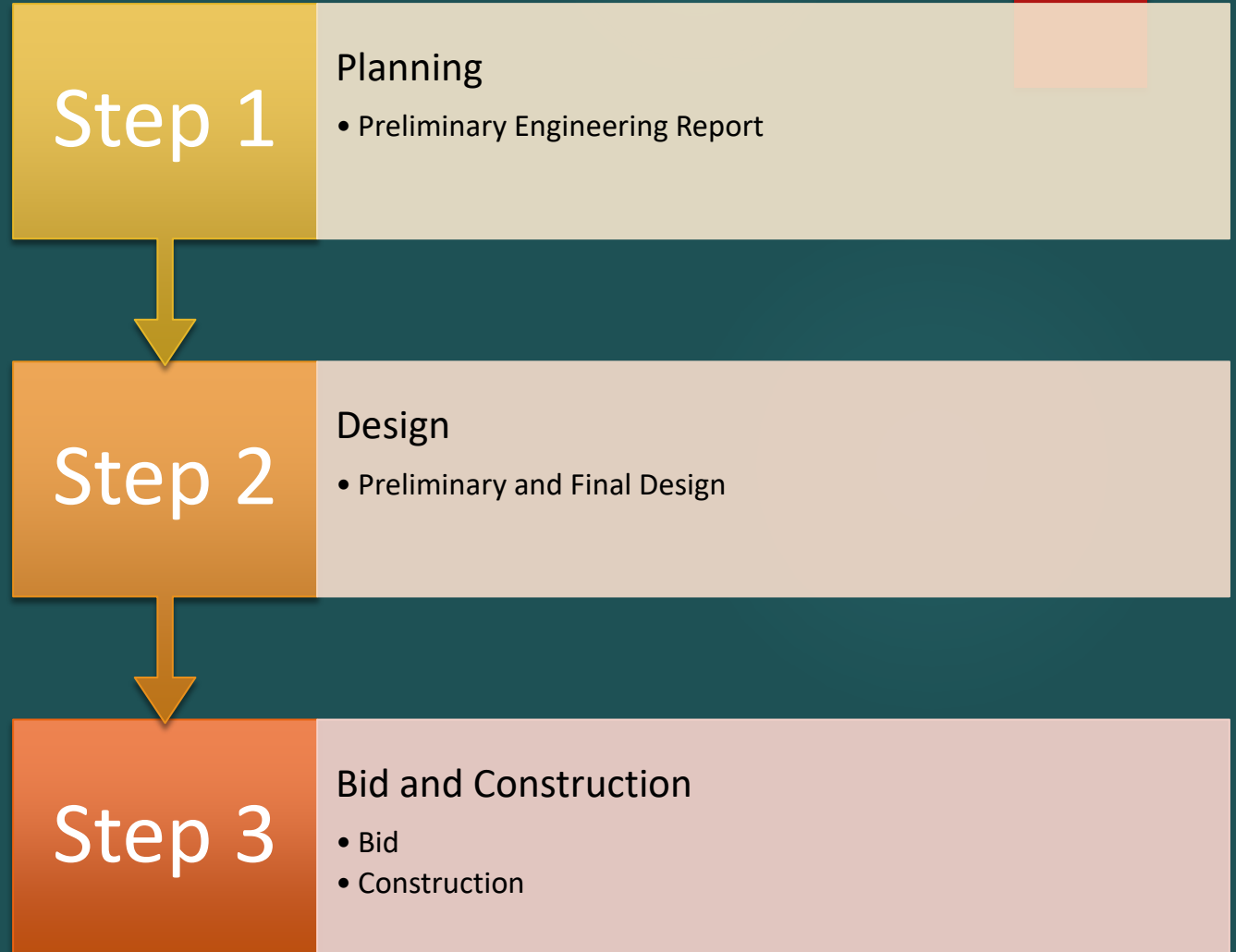
Construction \$
Raised So Far:
\$2,192,081

Wastewater Committee Work to Date

Fundraising

- ▶ Applied for & received grants
 - ▶ Clean Water State Revolving Fund (CWSRF), \$97K, Feasibility and Preliminary Engineering
 - ▶ CWSRF has up to \$150,000K allocated for final design and engineering in FY23IUP
 - ▶ ARPA Funds, through CWSRF, \$1.465 MM, Construction
 - ▶ Community Recovery and Response Program, Agency of Commerce and Community Development, \$727K, Construction
 - ▶ Northern Border Regional Commission, 1M, Rejected in 2023. Would like to reapply in 2024.
 - ▶ Considering additional funding from USDA Rural Development and CWSRF.

Environmental
Review
Permitting
Easements



CWSRF Affordability Metric

Annual User Rate
Median Household
Income = 1% to 2%

South Hero MHI = \$107,750 (2021)
South Hero CDP MHI = \$86,125 (2021)

Approximate User Rate
\$860 to \$1700 per year

Warren, Vermont (Constructed 2003)

- ▶ Municipal Owned Community Wastewater System Solution
 - ▶ 10 individual system refurbishments
 - ▶ 1 cluster system with 3 properties
 - ▶ 78 properties to a large shared system (20,000 gpd)
 - ▶ Alternative treatment at school
- ▶ \$4.7M Total Project Cost
- ▶ Funding - Combination of Grants and CWSRF Loan
- ▶ 2020 User Fees: **\$1180/year**
 - ▶ **~2% Affordability Metric**





Next steps

- ▶ Continued discussion around feasibility of Allenholm property
- ▶ Report to Selectboard and receive guidance on whether to move forward
- ▶ Finalize Options and Report - March /April of 2024

Questions and Comments

- ▶ Constructive, respectful feedback
- ▶ Everyone may speak once, ~2min limit
- ▶ May have opportunity to speak again if there is time
- ▶ Alternate 2 questions in the room, with 2 questions via zoom

Questions?

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George Harwood (Clerk)

Ross Brown

Bob Buermann

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