

Septage Receiving Upgrades: Regionally Serving Northern, NH

Plymouth Village Water & Sewer District

Presented by:

WRIGHT-PIERCE 
Engineering a Better Environment



NEWEA Annual Conference
January 2017

Presentation Overview

- ✓ Background
- ✓ Key Issues
- ✓ Goals
- ✓ Phased Approach
- ✓ Project Overview
- ✓ Funding



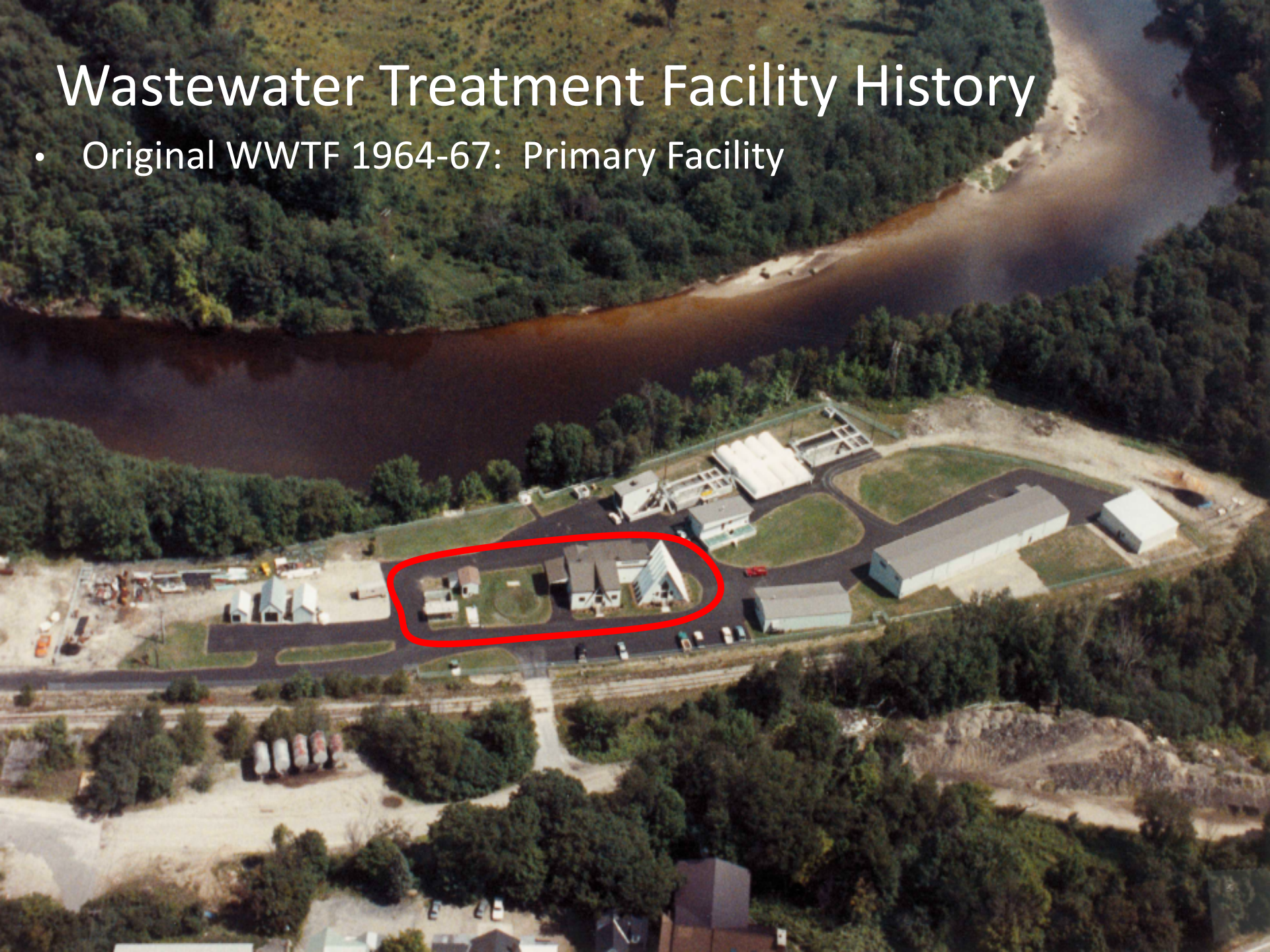
Plymouth Village Water & Sewer District

- Provides water and sewer service within the Town of Plymouth, NH
 - Service Population: 3,200, Seasonal Service Population: 6,200
- Water
 - Well pumping facility, 3.0 MG storage in two tanks
 - 27 miles of 4-12" water main
- Wastewater
 - Treatment Facility
 - 9 Pump Stations
 - 25 miles of gravity sewer
 - 5 miles of force main



Wastewater Treatment Facility History

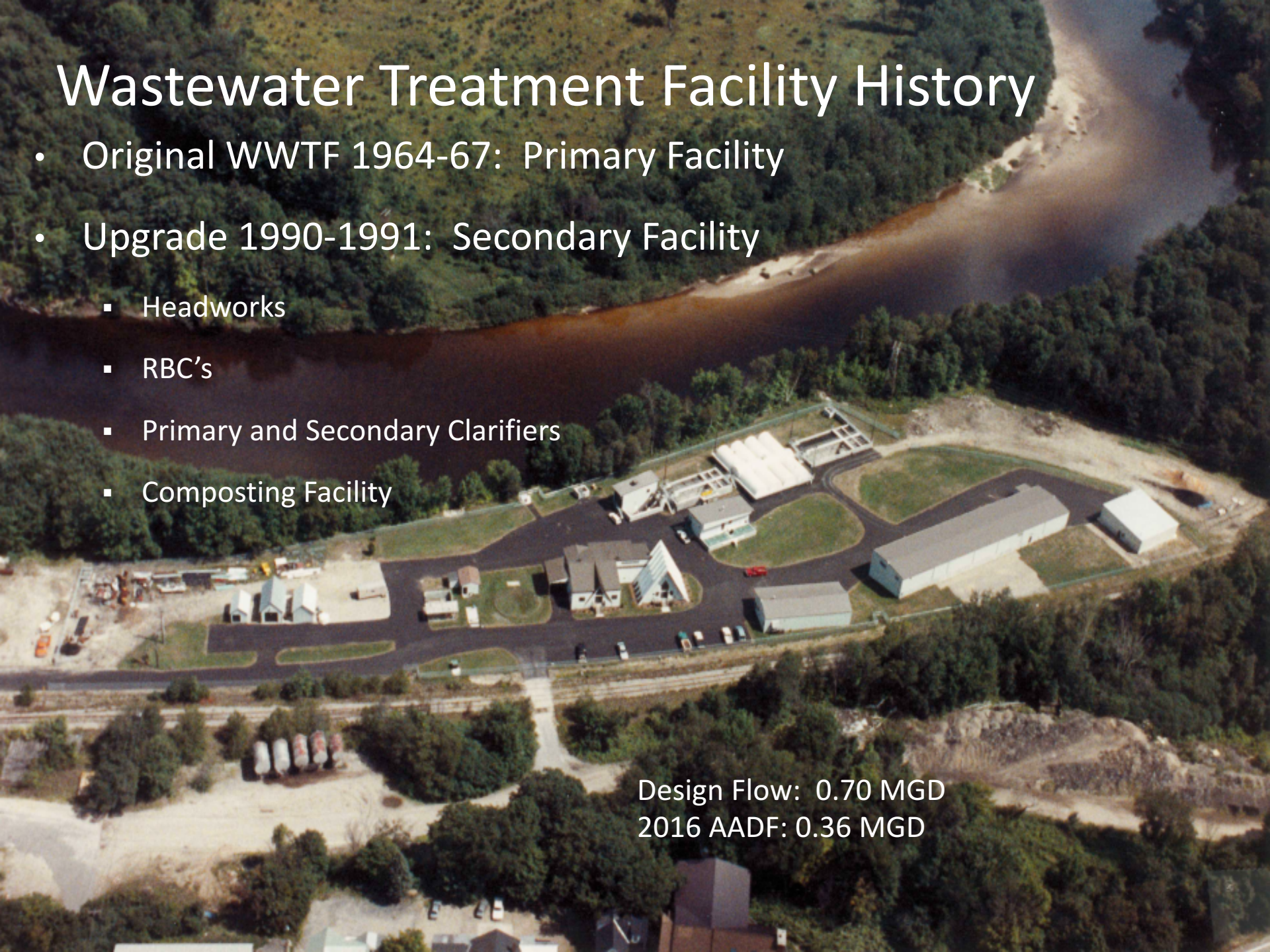
- Original WWTF 1964-67: Primary Facility



Wastewater Treatment Facility History

- Original WWTF 1964-67: Primary Facility
- Upgrade 1990-1991: Secondary Facility
 - Headworks
 - RBC's
 - Primary and Secondary Clarifiers
 - Composting Facility

Design Flow: 0.70 MGD
2016 AADF: 0.36 MGD



Wastewater Treatment Facility History

- Upgrade 2010-2011: Dewatering, Gravity Thickener
 - Rotary Press Dewatering, Truck Bay
 - Convert Primary Clarifier to Gravity Thickener
 - Odor Control



Growth

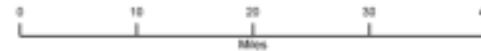
1. Population Trend

North Country Council Planning Region

Population Change 2000-2010

Legend

- NCC Border
- Unincorporated Places
- Municipal Boundary
- County Boundaries
- No Data
- < 0 to - 10%
- 0
- 1% to 10%
- 10% to 20%
- > 20%



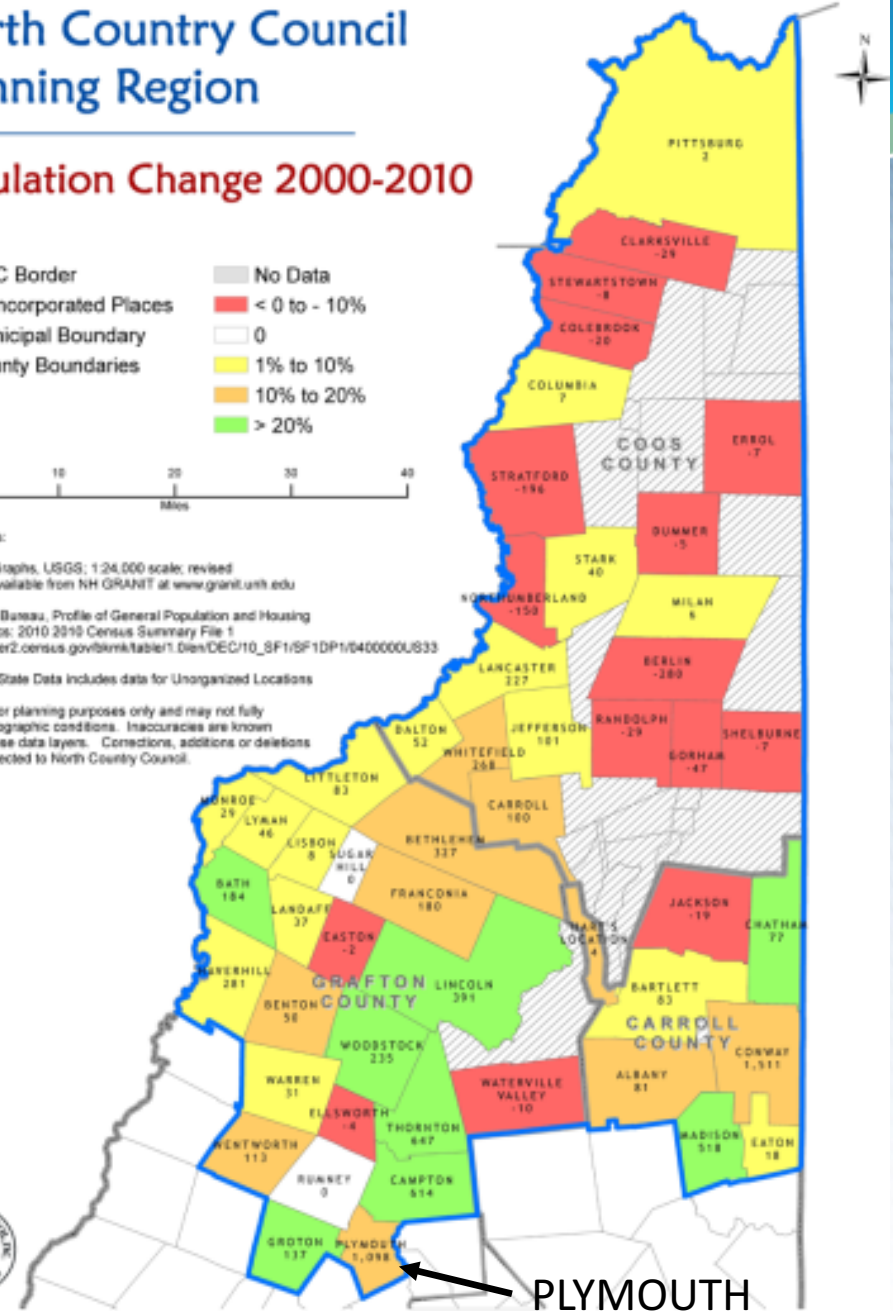
Data Sources:

Digital Line Graphs, USGS; 1:24,000 scale; revised April 2009; available from NH GRANIT at www.granit.unh.edu

U.S. Census Bureau, Profile of General Population and Housing Characteristics: 2010 2010 Census Summary File 1 http://factfinder2.census.gov/servlet/table?_lang=en&_ss=1&_ds=1&_tid=101&_cid=101&_all_geo_types=N

County and State Data includes data for Unorganized Locations

This map is for planning purposes only and may not fully represent geographic conditions. Inaccuracies are known to exist in these data layers. Corrections, additions or deletions should be directed to North Country Council.



PLYMOUTH

Growth

1. Population Trend
2. Historical Septage

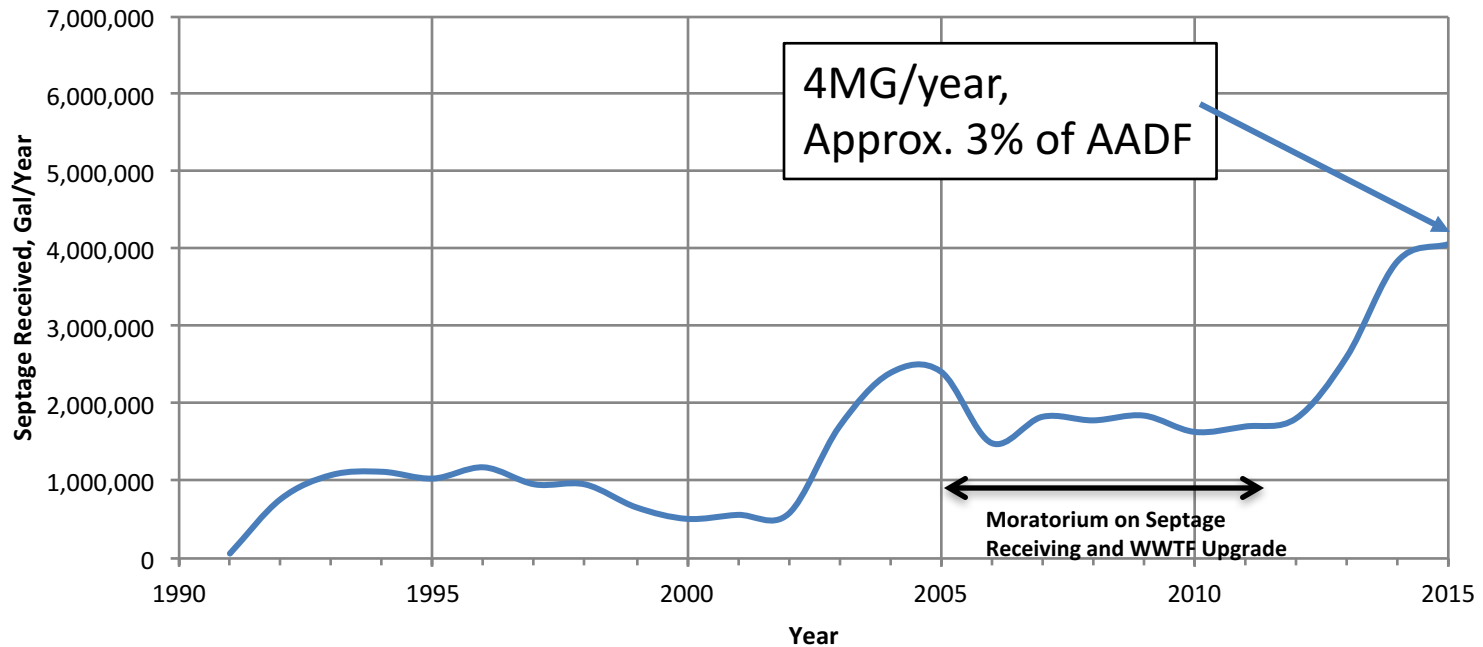
North Country Council Planning Region

Population Change 2000-2010

Legend



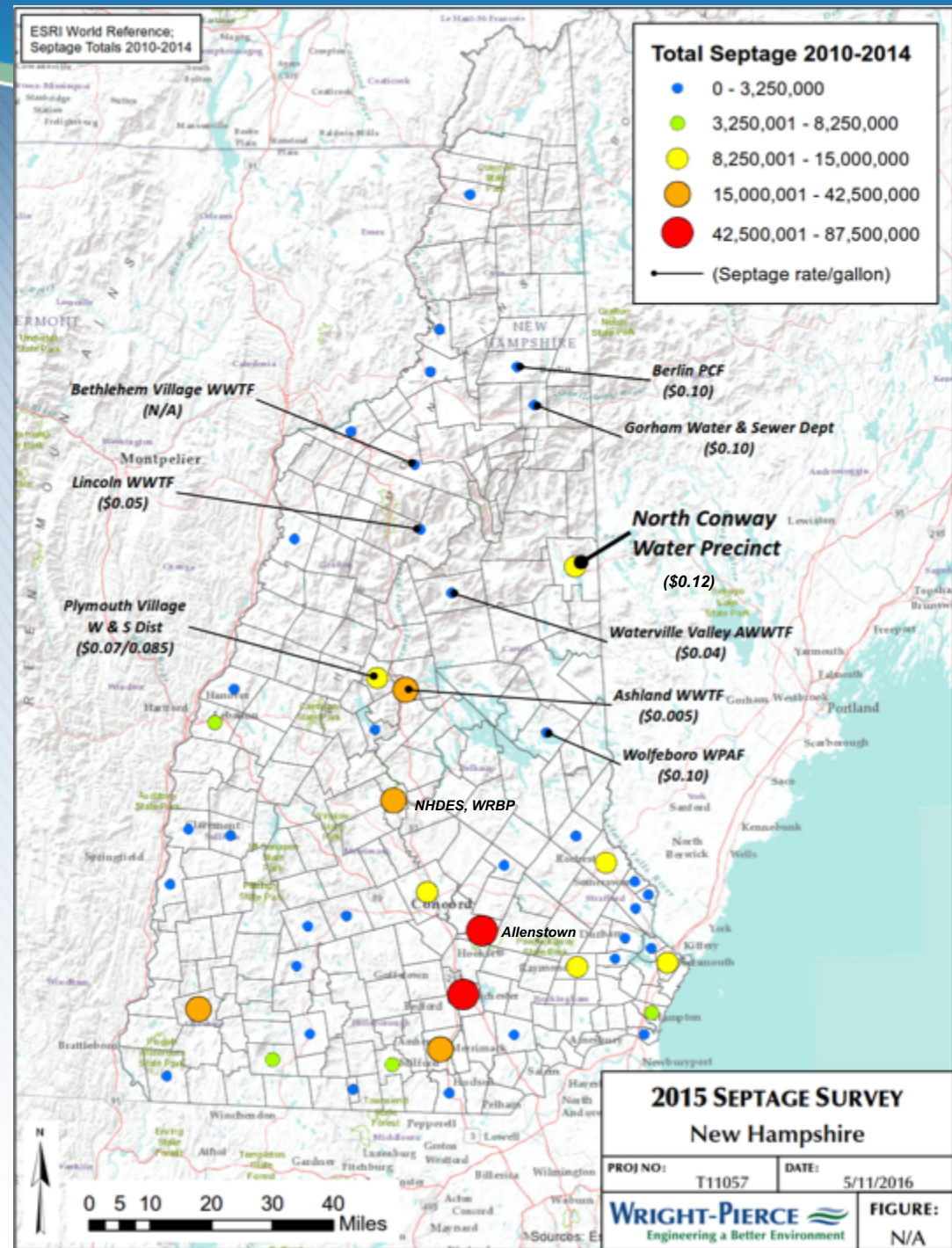
Historical Septage Receiving



Competition

Advantages:

- Location
- Price -
 - \$0.07/gal member comm.
 - \$0.085/gal non-member
- Open discharge, No pressure limitations
 - Time saving



Key Issues

Site Constraints

- West: Plymouth-Lincoln Railroad, Railroad Yard



Key Issues

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- East: Pemigewasset River and floodway



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- East: Pemigewasset River and floodway
- North: Town Highway Department



Key Issues

Site Constraints

- West: Plymouth-Lincoln Railroad, Railroad Yard
- East: Pemigewasset River and floodway
- North: Town Highway Department
- South: Overhead Power Lines



Key Issues

Floodplain

- 75% of site is within the 100-year flood plain
- Existing grade near septage receiving is 3-4 ft below 100-year flood elevation

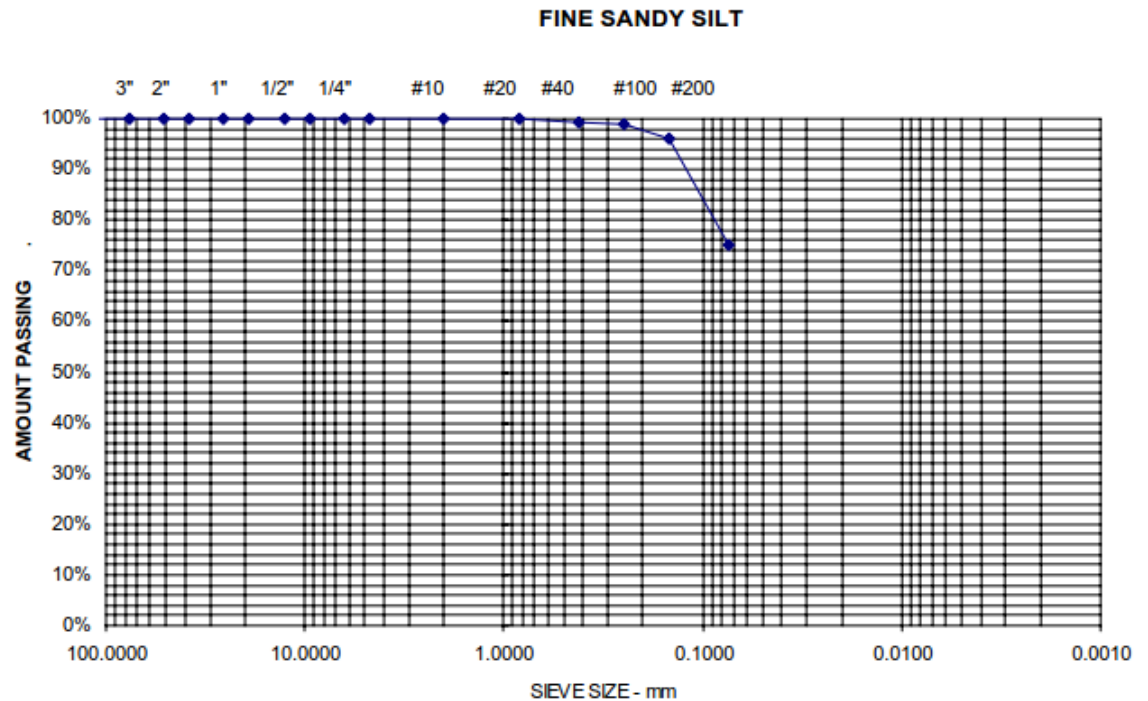


Key Issues

Geotechnical Concerns

- Historical fill for most of the area
- 3 ft thick compressible organics ~ 19 ft deep
- Borings: 60-75% passing #200 sieve
- Settlement of existing structures

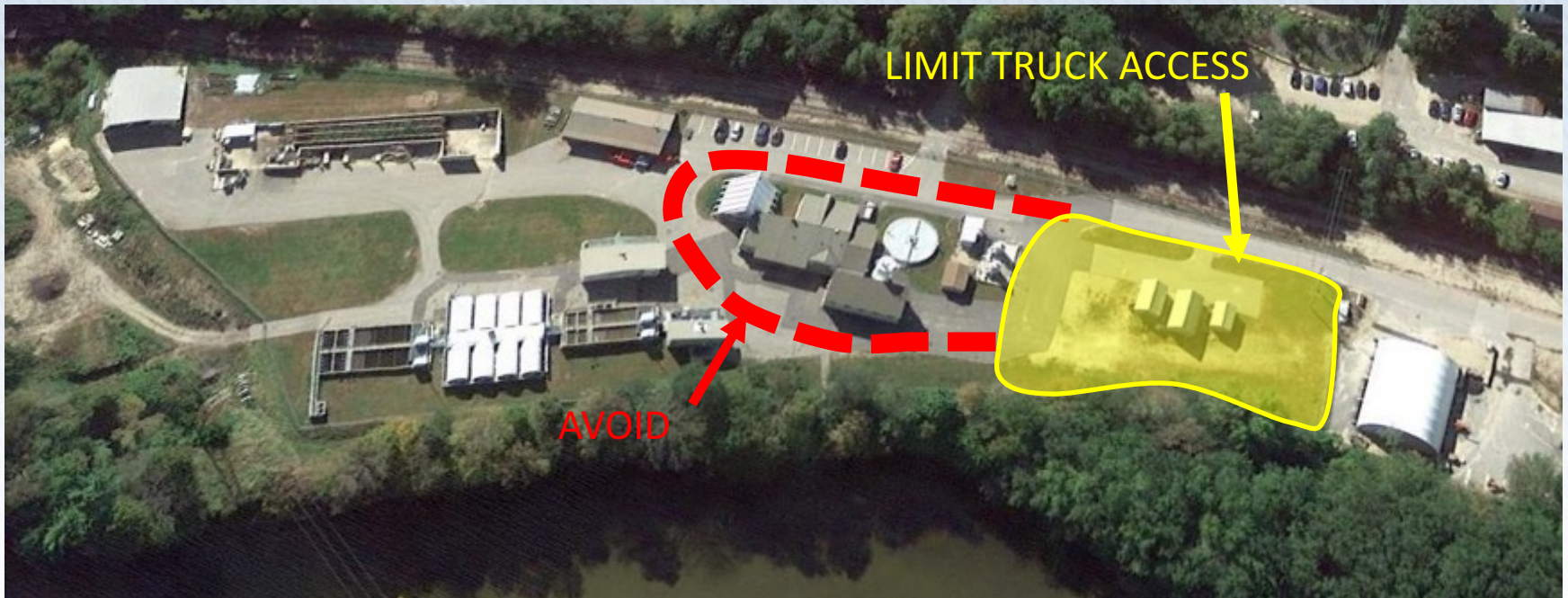
DEPTH	STRATA & TEST DATA
0.3'	DARK BROWN SILTY SAND WITH ORGANICS (TOPSOIL)
7.0'	BLACK ASH/SLAG (FILL) - LOOSE TO MEDIUM DENSE -
12.0'	BROWN SILTY SAND - LOOSE -
19.0'	GRAY SILTY SAND - LOOSE -
22.0'	BROWN ORGANIC SILTY SAND - VERY LOOSE -
26.0'	BROWN SAND AND GRAVEL WITH SOME SILT - MEDIUM DENSE -



Key Issues

Site Safety

- Avoid septic hauler traffic around operations building, process
- Limit truck traffic to North end



Project Goals

1. Existing facilities inadequate, defunct septage receiving unit



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2. Screening, grit removal, convey flows to gravity thickener



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3. Septage discharge measurement, billing



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4. Additional discharge stations, relieve long wait times



Project Goals

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3. Septage discharge measurement, billing
4. Additional discharge stations, relieve long wait times
5. Grease receiving station

Project Goals

1. Existing facilities inadequate, defunct septage receiving unit
2. Screening, grit removal, convey flows to gravity thickener
3. Septage discharge measurement, billing
4. Additional discharge stations, relieve long wait times
5. Grease receiving station
6. Additional improvements
 - a. Grit, vector truck dump station
 - b. Gravity thickener scum spray wash system
 - c. Tool and part storage, pipe pole barn

Phased Approach

- Original Scope of Work:
 - Packaged septage acceptance unit
 - Screening, no grit removal
 - 1-2 discharge points
 - Reuse existing sludge storage tanks
 - \$1.3M Total Project Cost
 - March 2016 Warrant Article, Voter Approval



Phased Approach

- Phase I – Critical Needs
 - Must fit within \$1.3M budget, total project cost
 - Septage storage – Aerated grit and EQ Tanks
 - Septic discharge points
 - Shed relocation, pipe pole barn
 - Odor control
 - Gravity thickener spray wash
 - Additive alternates:
 - ↳ Grit washer
 - ↳ Truck scale
 - ↳ Grit, Vector truck disposal



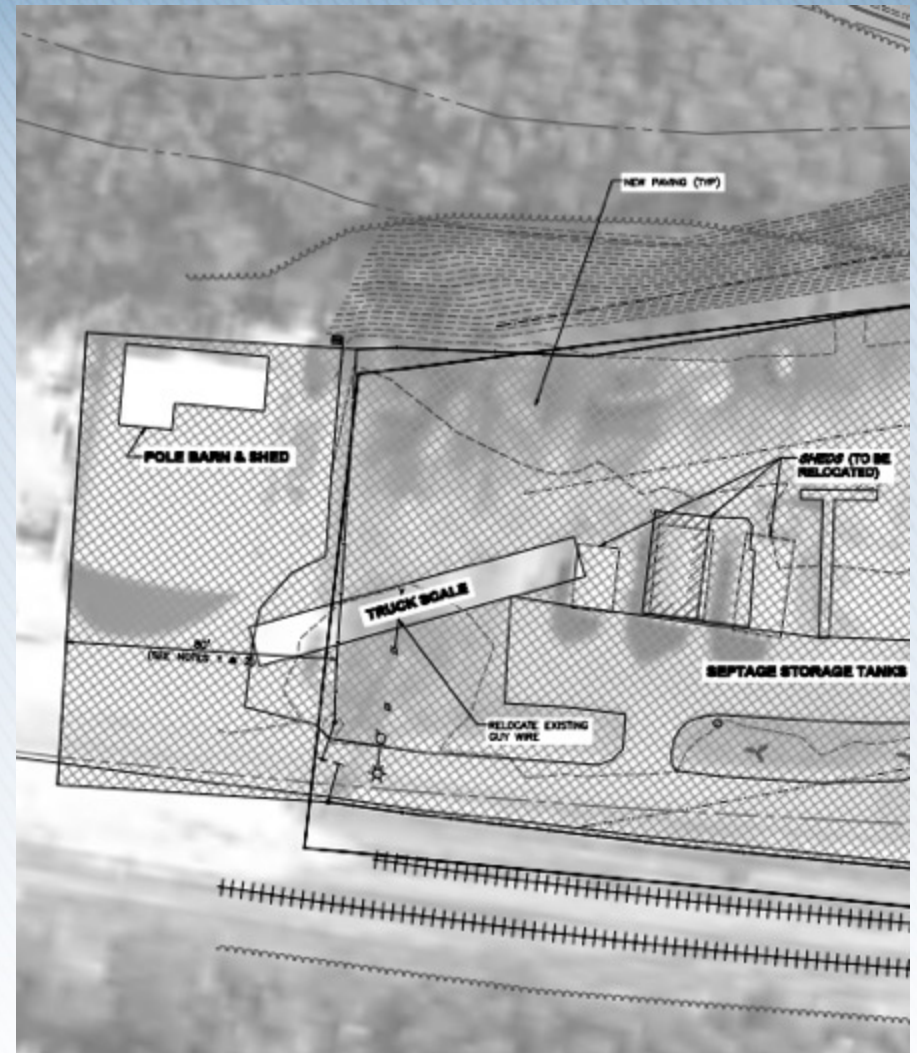
Phased Approach

- Phase II – Complete Septage Receiving Upgrades
 - Leftover Phase I additive alternates
 - Screening equipment
- Phase III – Complete Septage Receiving Upgrades
 - Grease Acceptance Unit



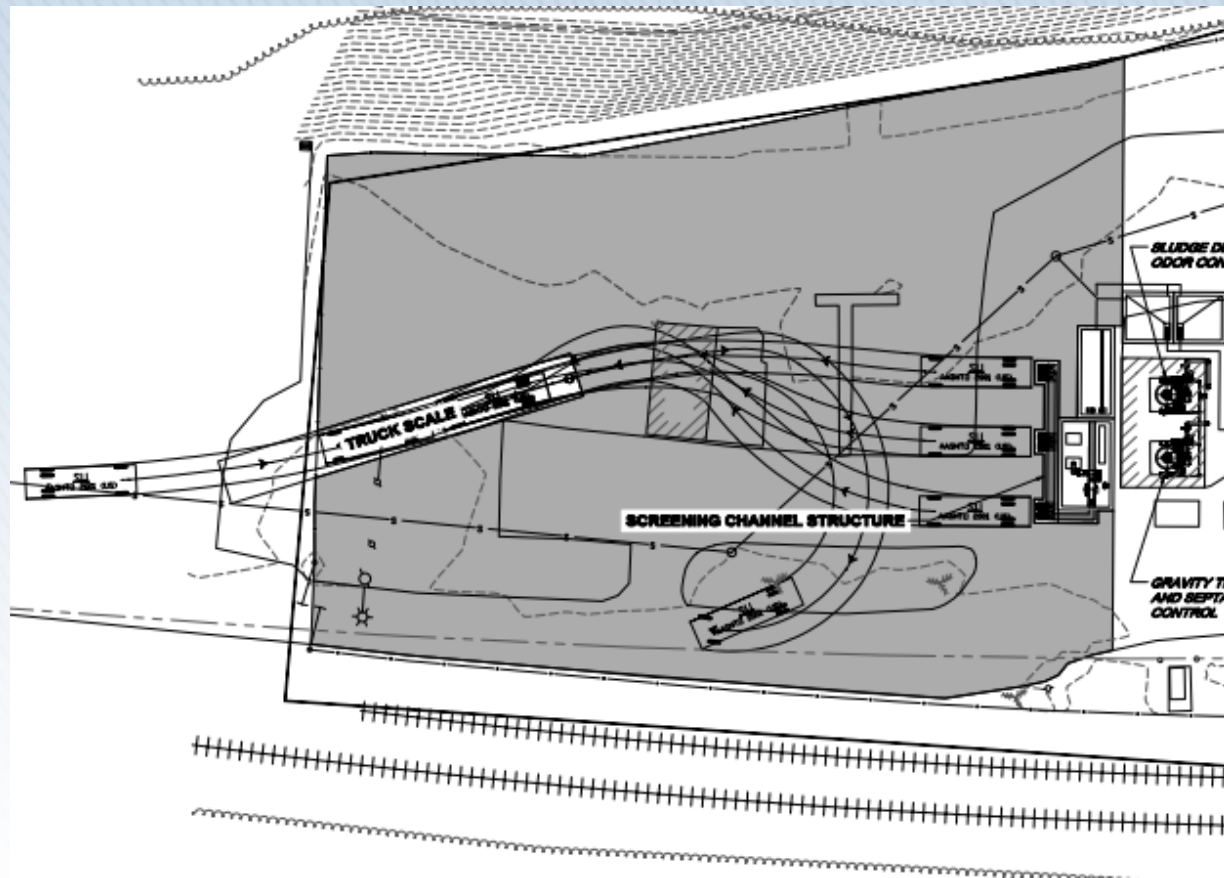
Overview

- Reconfigure North end:
 - Relocate 3 existing storage sheds
 - Town to relocate salt shed
 - New septic hauler entrance
 - New Truck scale
 - Expand pavement area
 - New pole barn and shed



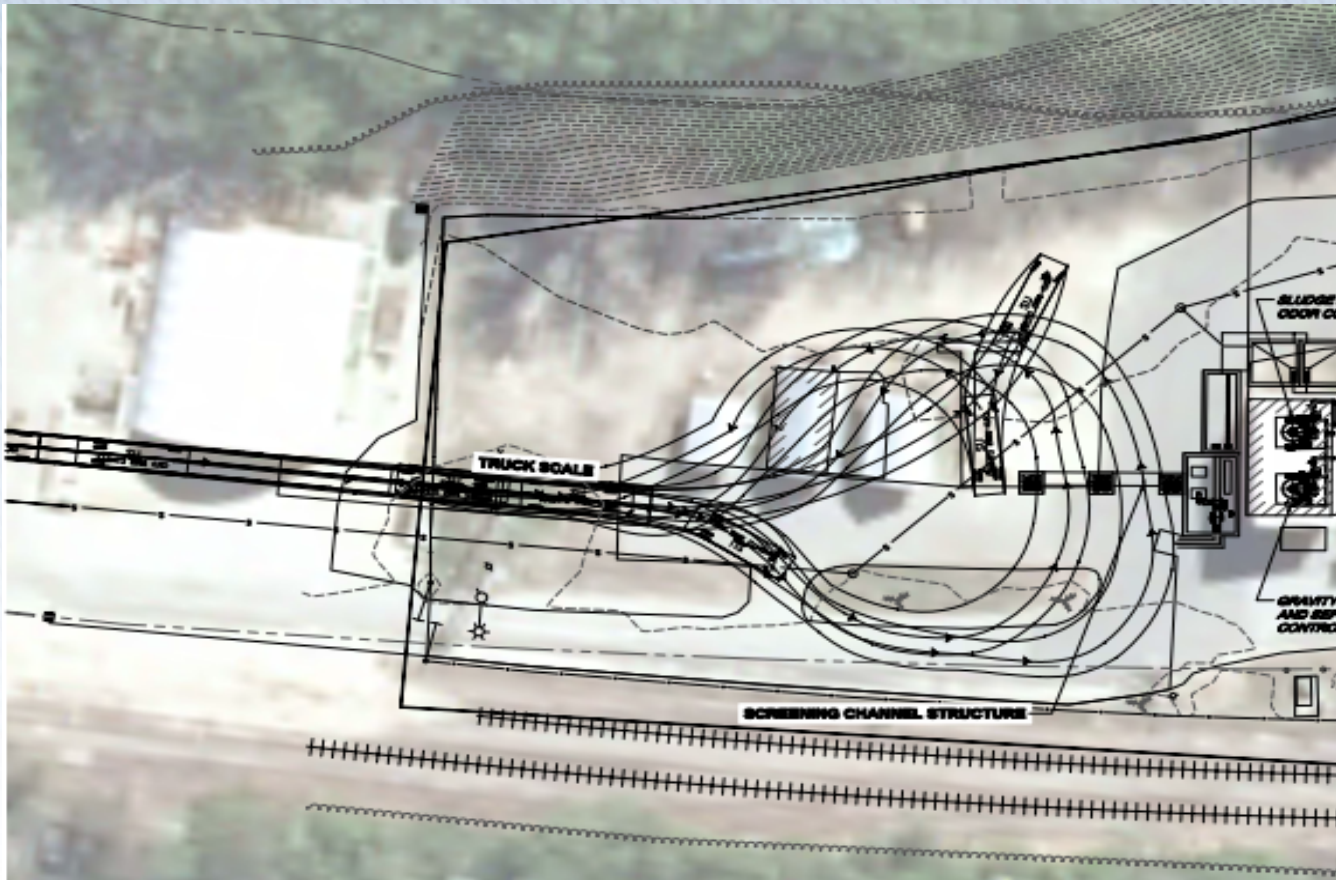
Overview

- Traffic Turnout Analysis:
 - Back-up layout



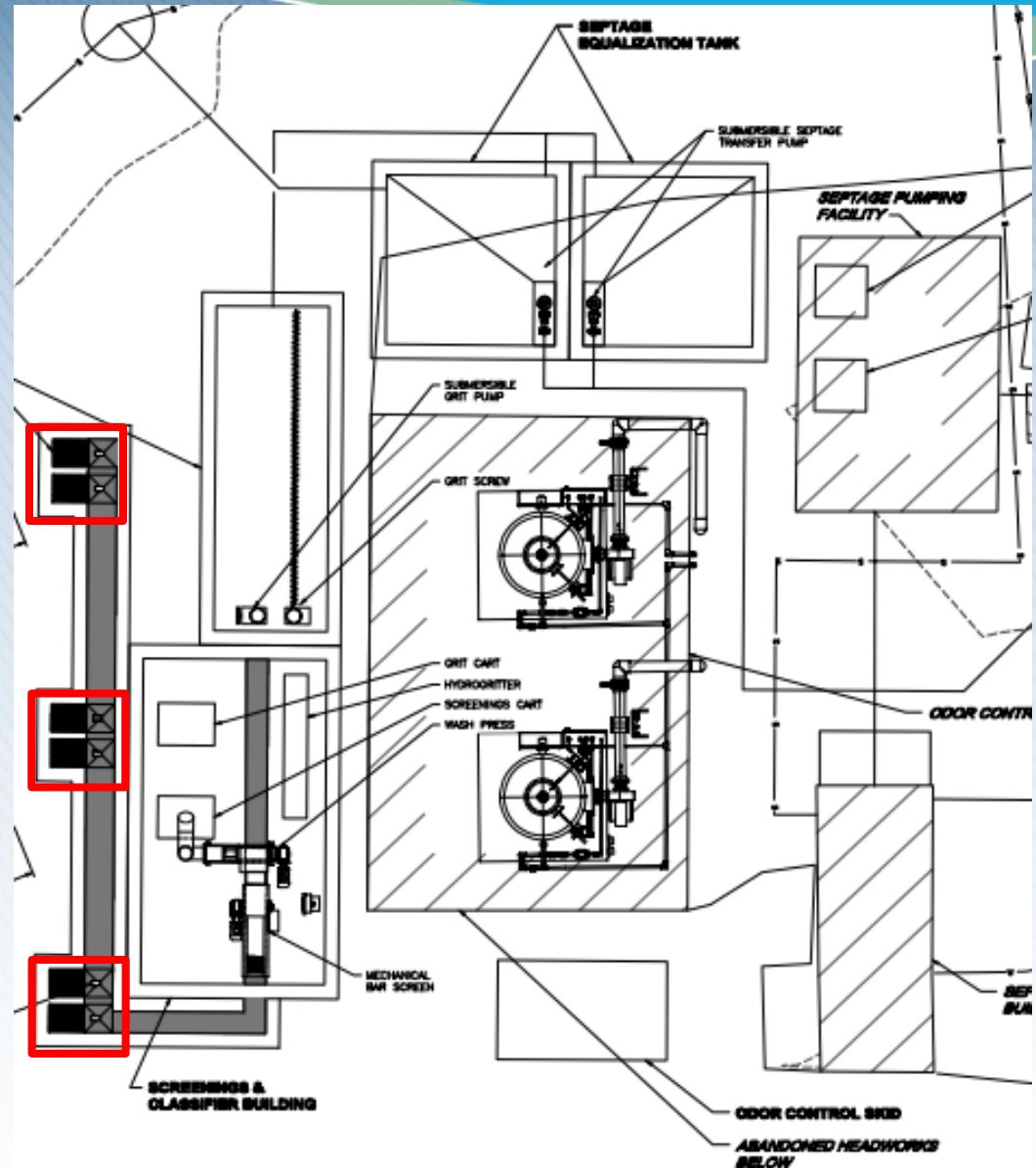
Overview

- Traffic Turnout Analysis:
 - Pull-thru layout



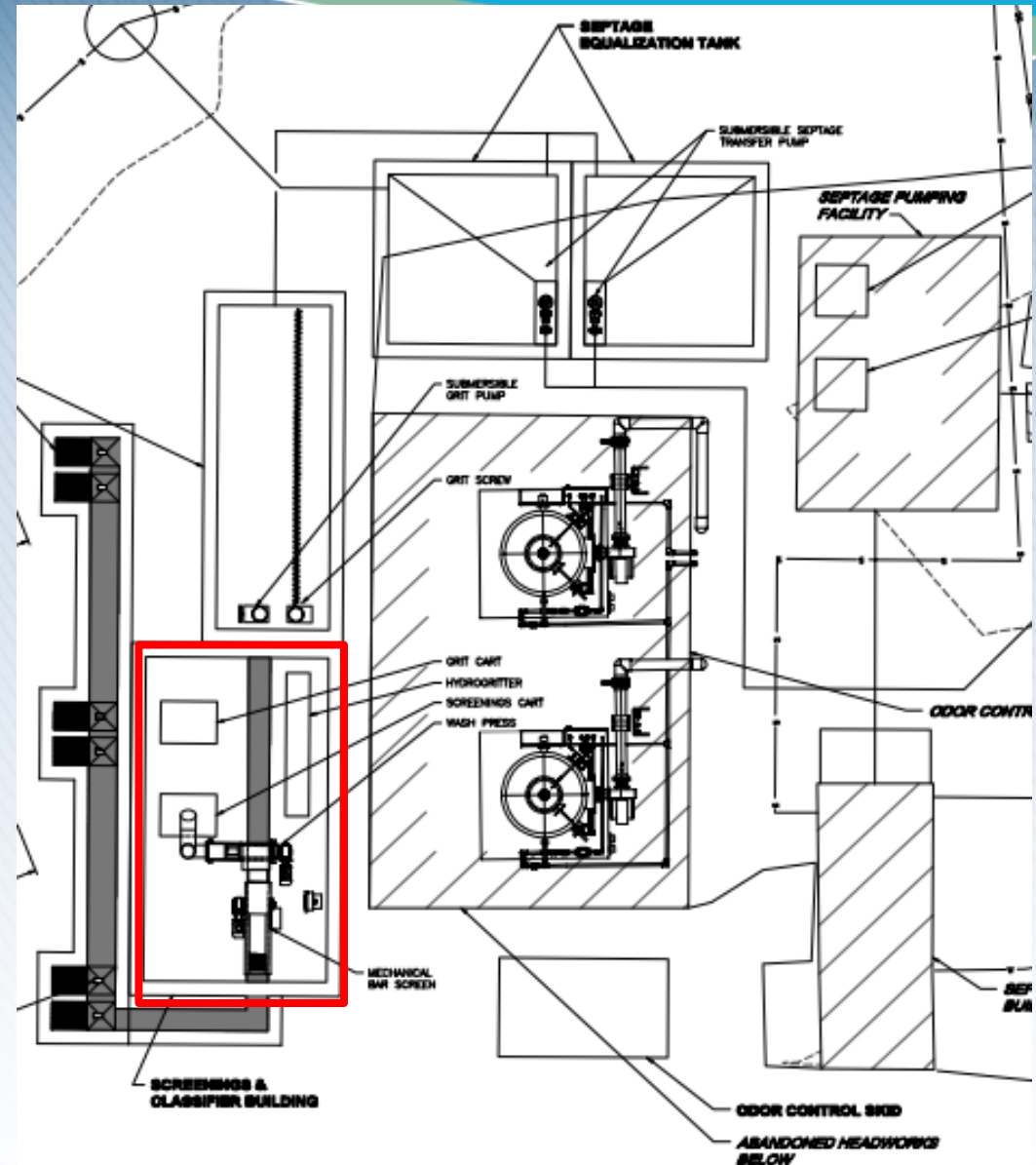
Overview

- Septage Processing:
 - 3 discharge bays



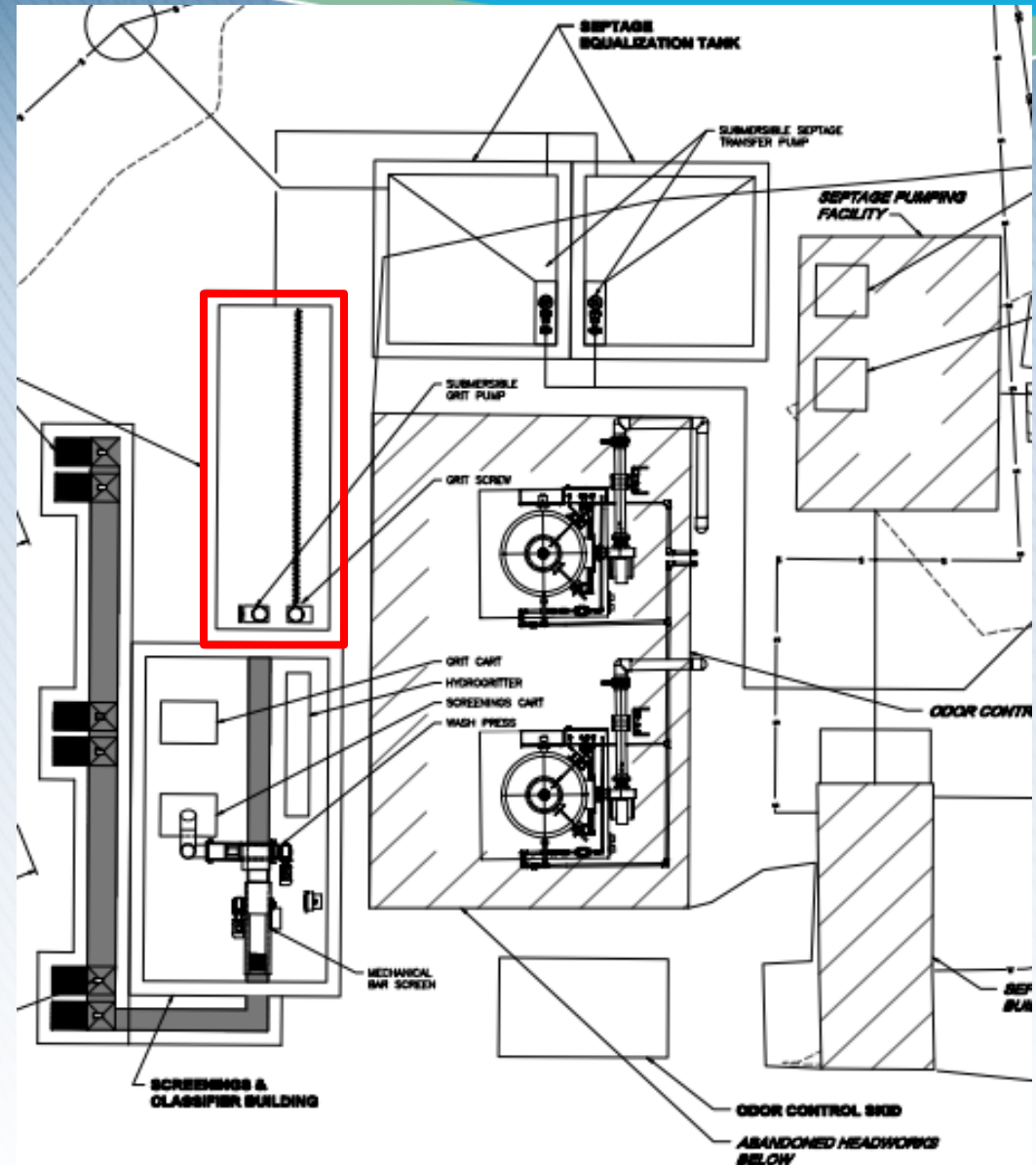
Overview

- Septage Processing:
 - 3 discharge bays
 - In-channel screen



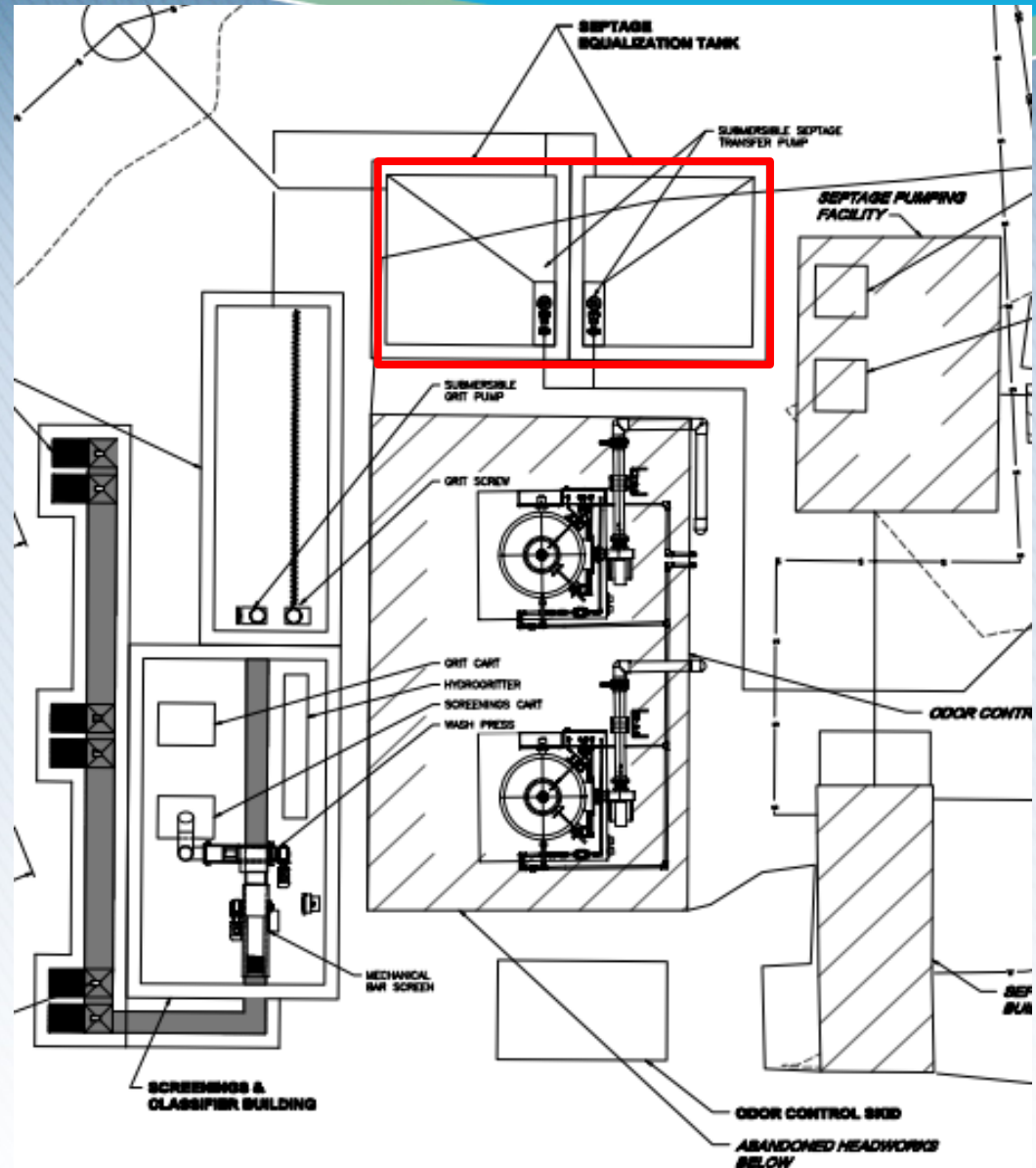
Overview

- Septage Processing:
 - 3 discharge bays
 - In-channel screen
 - Aerated grit removal



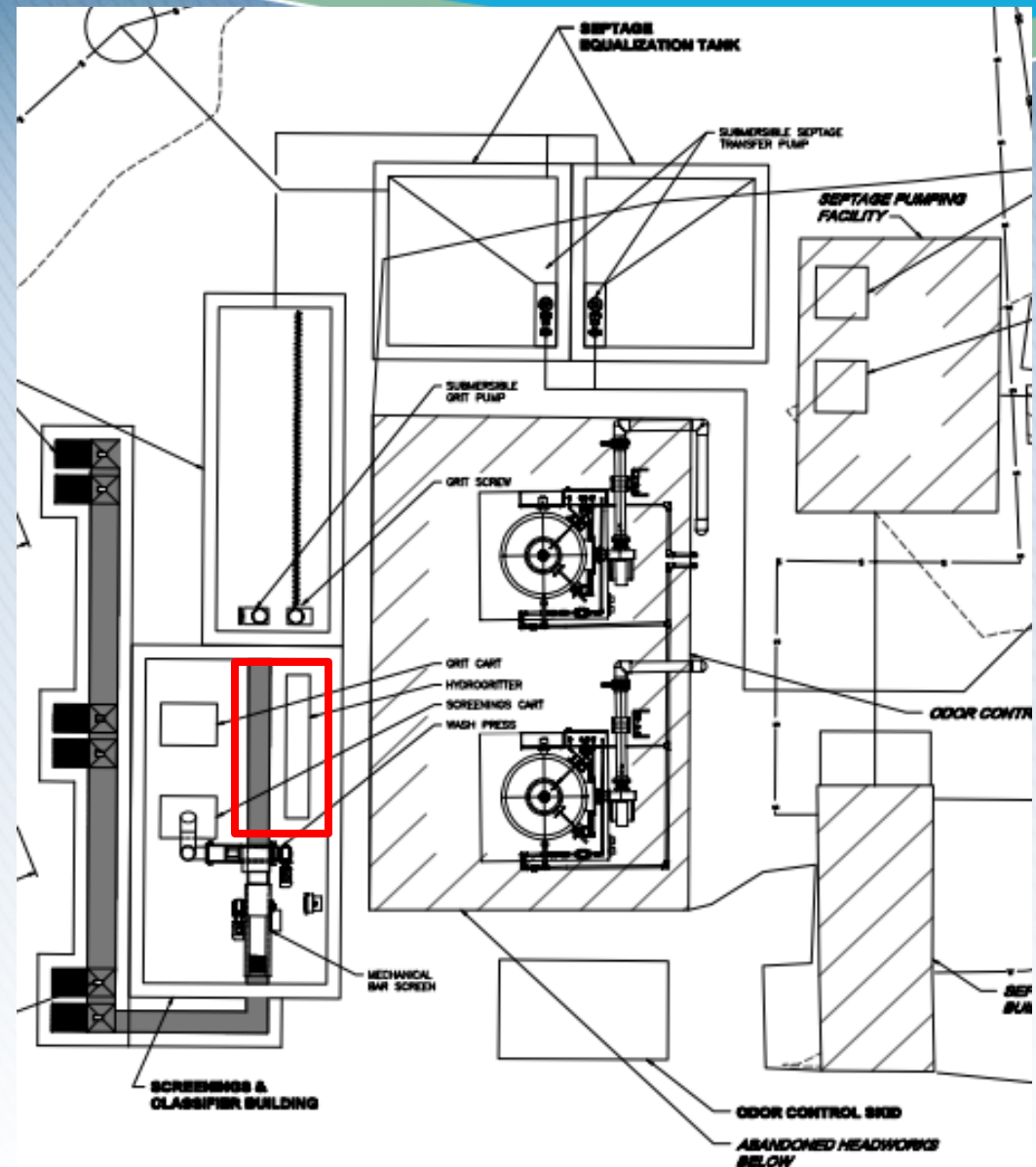
Overview

- Septage Processing:
 - 3 discharge bays
 - In-channel screen
 - Aerated grit removal
 - 2 equalization tanks
 - Septage transfer pumps



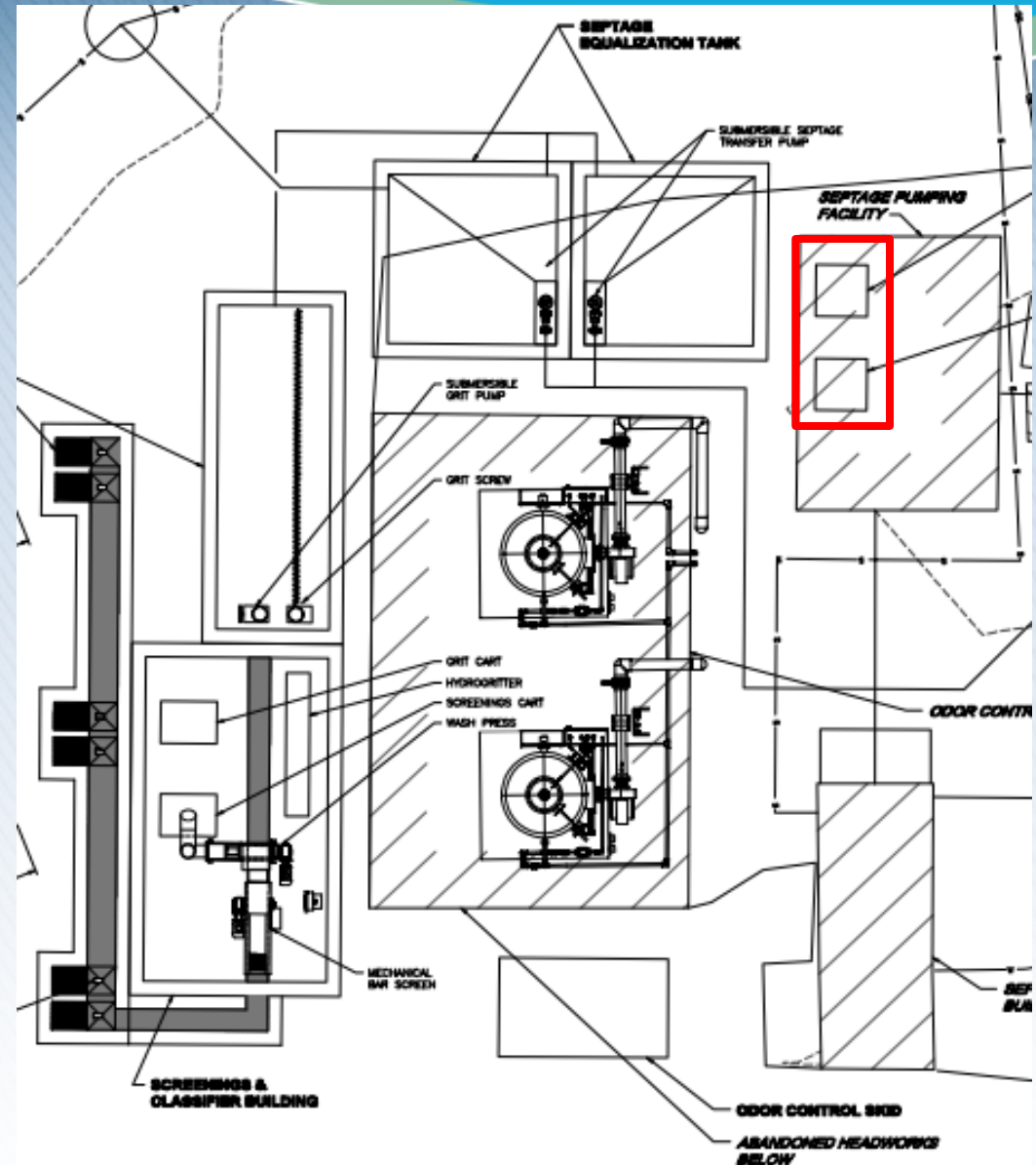
Overview

- Septage Processing:
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 - Grit washer



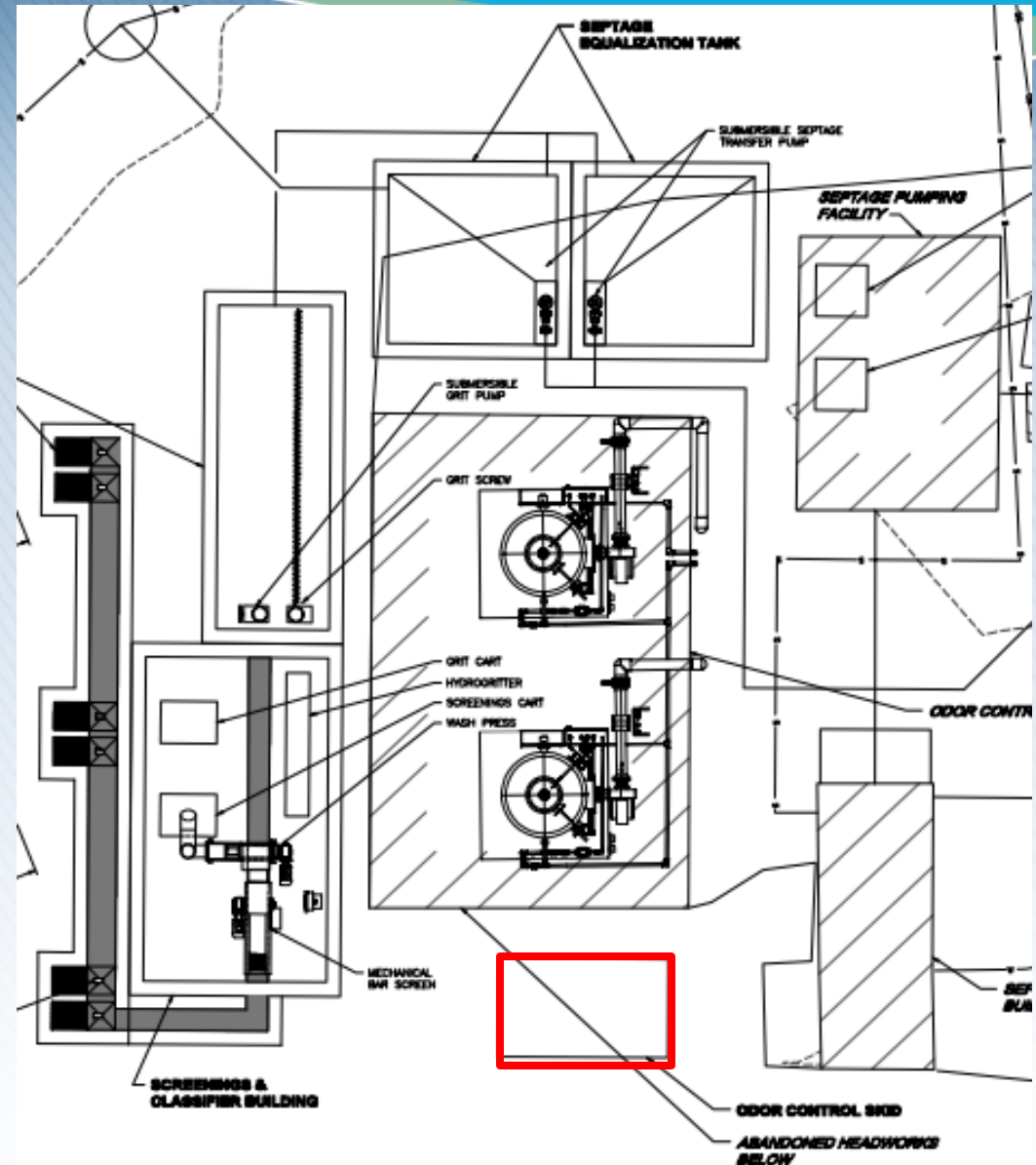
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Overview

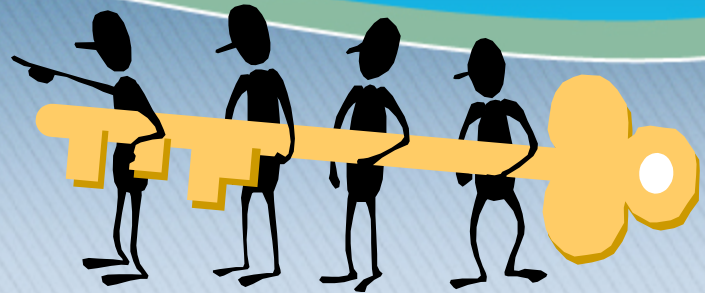
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 - Aeration blowers
 - Odor control



Funding

- USDA – Rural Development Loan and Grant
 - District historically received up to 45% grant funding
 - Given other contributing communities, higher MHI: 25% grant funding offered
 - \$1.3M Phase I funding in place
 - District to file funding applications for subsequent phases
- NHDES – State Revolving Loan Fund
 - 2% interest for interim financing
 - 12.5% Principal forgiveness offered
 - Wage Rates, AIS, etc... Required
 - Declined

Acknowledgements



PLYMOUTH VILLAGE WATER & SEWER DISTRICT

- ✓ Merelise O'Connor – District Administrator
- ✓ Jason Randall – Superintendent
- ✓ Fred Yeaton – Maintenance Supervisor

Wright-Pierce

- ✓ Mike Theriault, PE – Project Manager
- ✓ Mike Curry, PE – Project Engineer

USDA - Rural Development



Questions / Discussions

