Costs and Feasibility of the Decentralized Approach for the Chatham CWMP

Presentation to the

Wastewater Forum for Chatham Citizens

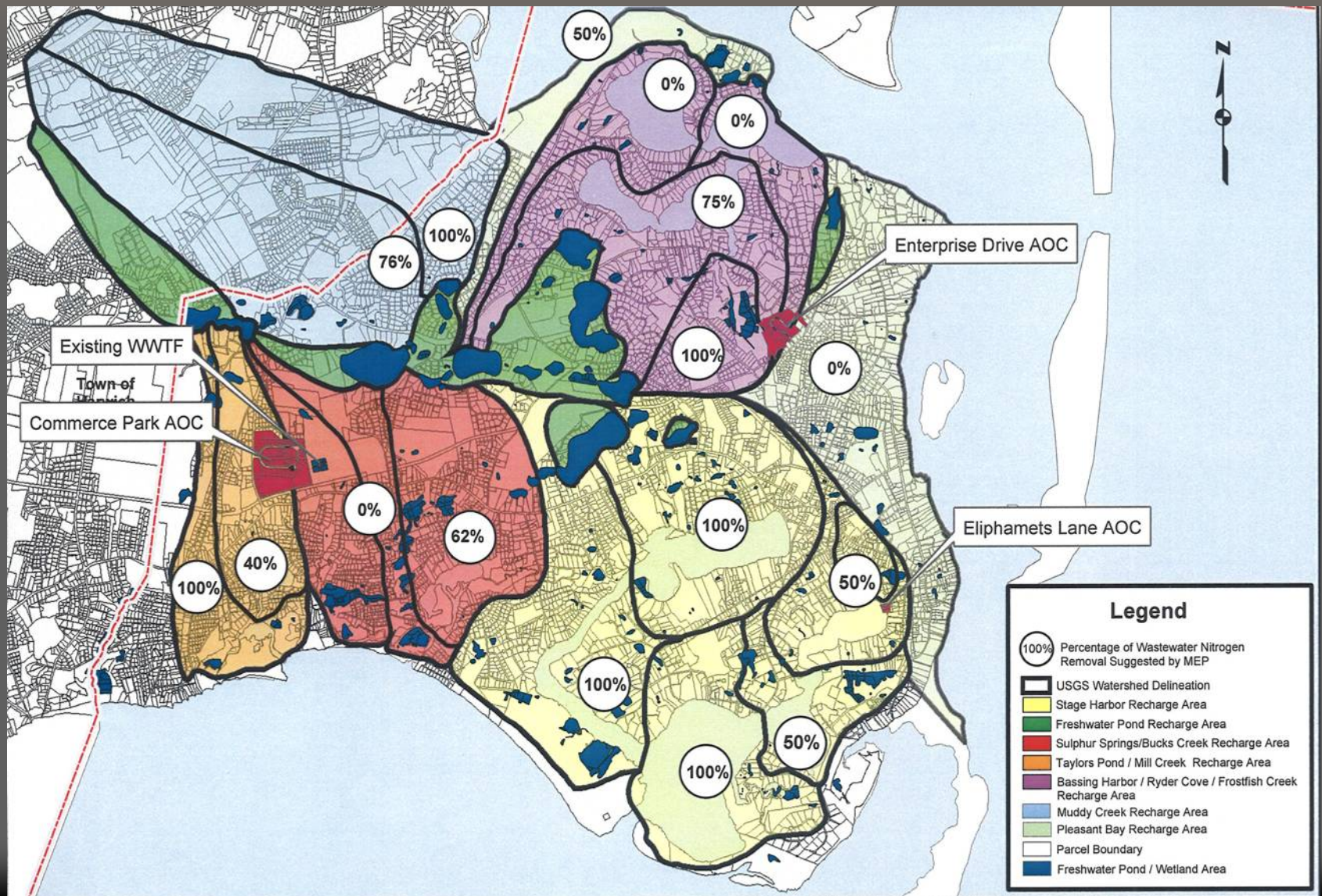
on

October 17, 2009

Presentation Outline

- Wastewater and Nitrogen Management Needs
- Expected Wastewater Management System Performance
- Individual On-Site Systems
- Community/Cluster Systems
- Feasibility Considerations
- Cost Considerations
- Cost and Feasibility Comparison

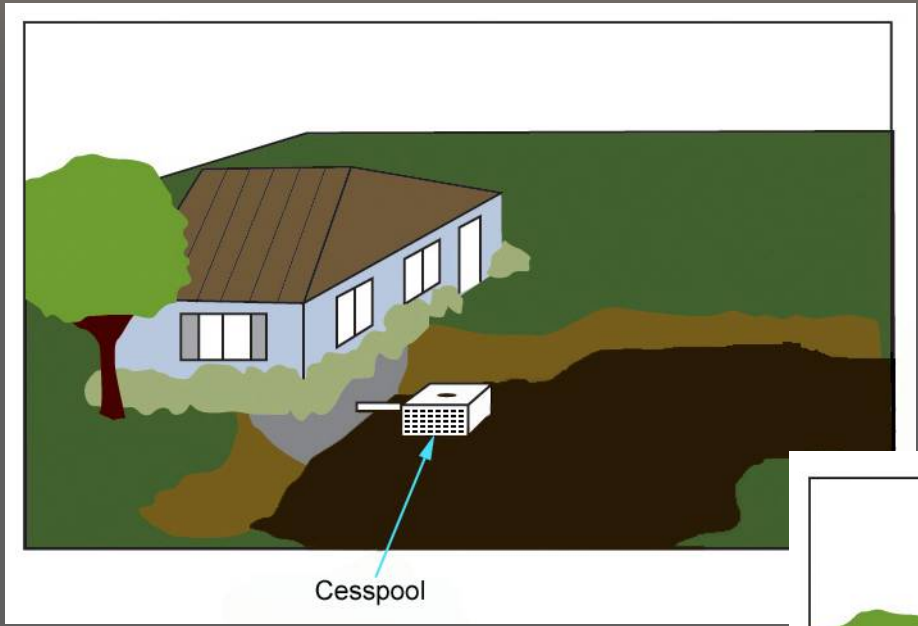
Wastewater and Nitrogen Management Need

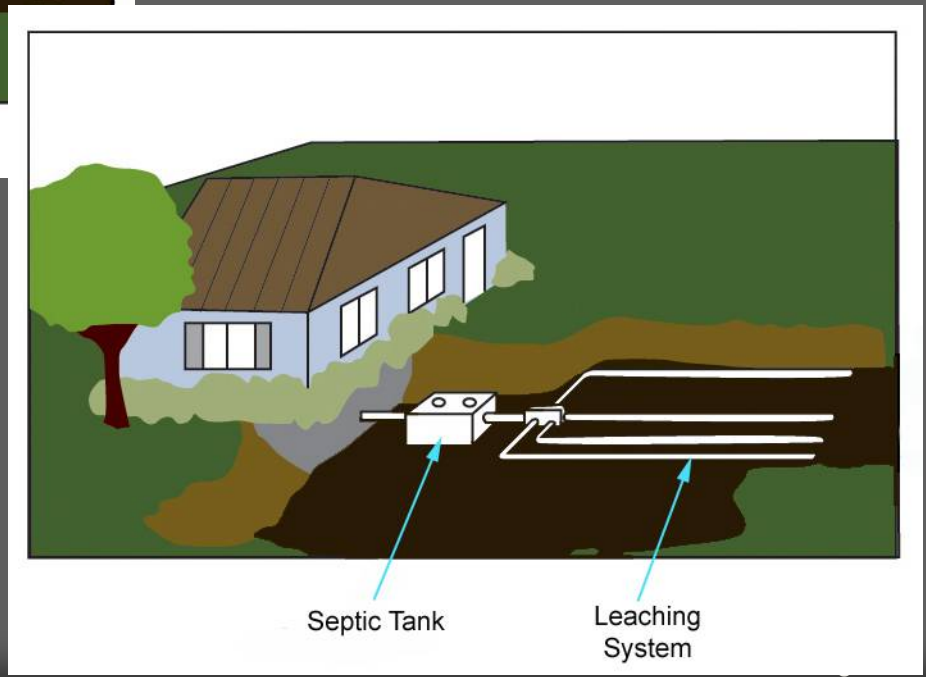


Expected Wastewater Management System Performance

Summary of Typical Nitrogen Removals for the Wastewater Management Options		
Technology	Typical Nitrogen Concentration in the Effluent	Typical Percent Removal
Title 5 Septic System	20 to 40 mg/l	23%
Individual Nitrogen Removal Septic System	15 to 25 mg/l	50%
Community/Cluster System	5 to 15 mg/l	75%
Upgraded Chatham WWTF	3 mg/l	93%

Individual On-Site Systems:
Recent History





Nitrogen Removal On-Site Systems Evaluated

On-Site systems approved by MassDEP for **"General Use"** and credited for Nitrogen removal to 19 mg/l total Nitrogen

- Recirculating sand filters
- RUCK systems
- Bio-Microbics FAST system for flows > 2,000 gpd

Nitrogen Removal On-Site Systems Evaluated

On-Site systems approved by MassDEP for **"Provisional Use"** to determine if they can be credited for Nitrogen removal to 19 mg/l total Nitrogen

- Bioclere
- Smith & Loveless FAST
- Amphidrome system
- Waterloo Biofilter
- AdvanTex
- Nitrex
- SeptiTech
- Singulair
- Bio-Microbics FAST system for flows > 2,000 gpd

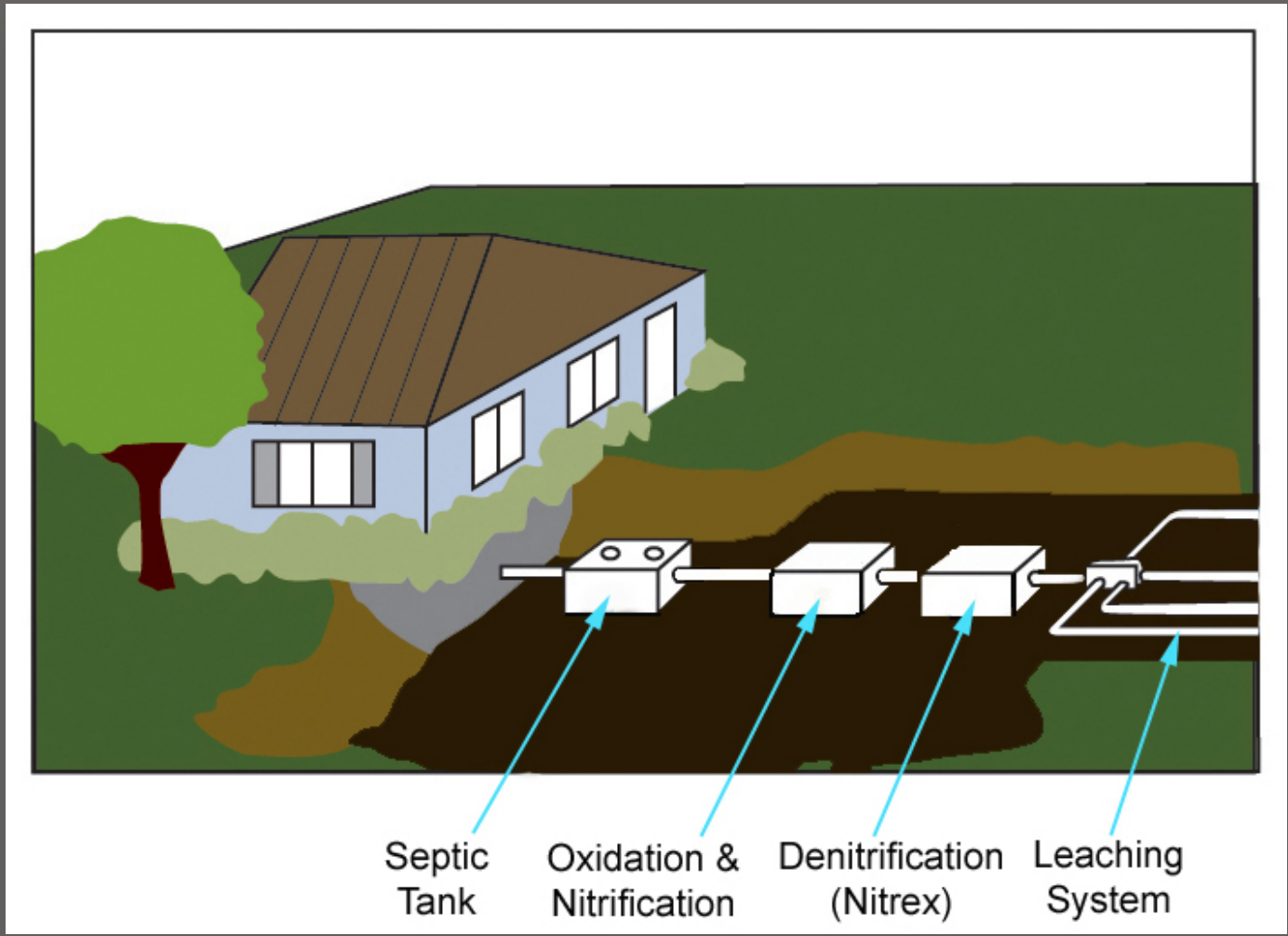
Nitrogen Removal On-Site Systems Evaluated

On-Site systems approved by MassDEP for **"Piloting Use"**

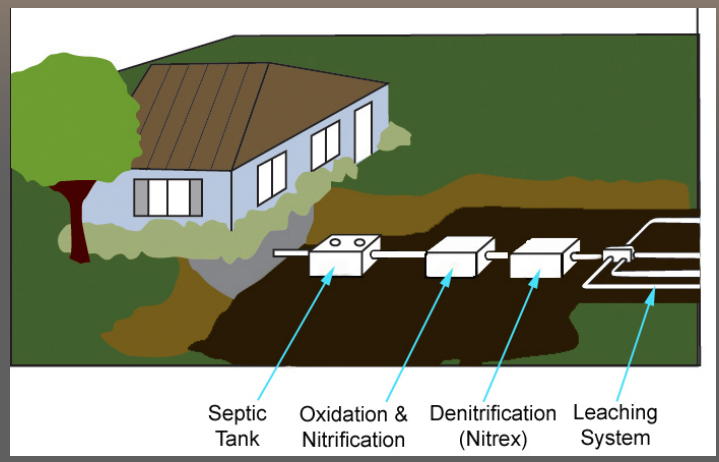
- RUCK CTF
- Cromoglass
- OMNI Recirculating Sand Filter
- OMNI Cycle system
- Nitrex Plus
- Bio-Microbics BioBarrier MBR System

Systems were evaluated and summarized in Chapter 6 and Appendix N, and also evaluated as part of Alternative Plan No.2 in Chapter 9

Typical On-Site System for Nitrogen Removal



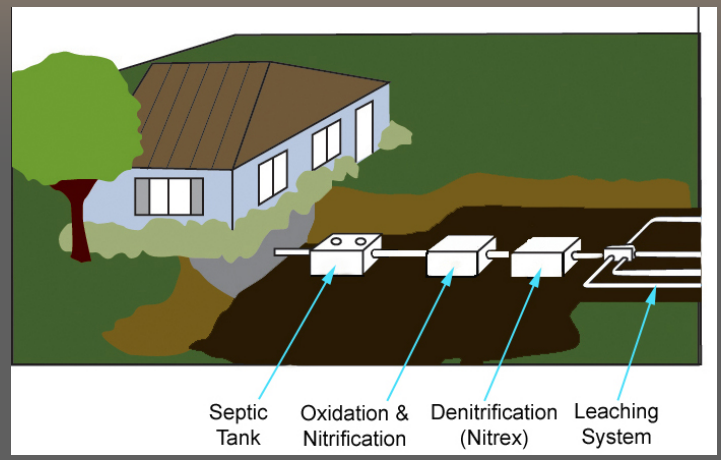
On-Site System for Nitrogen Removal



Feasibility Considerations:

- MassDEP will credit systems with General Use approval with 19 mg/l TN performance
- Questionable installed performance documented by Barnstable County
- Generally not good for seasonal properties
- Typically can't be owned by the Town
- Uncertain monitoring requirements for TMDL compliance

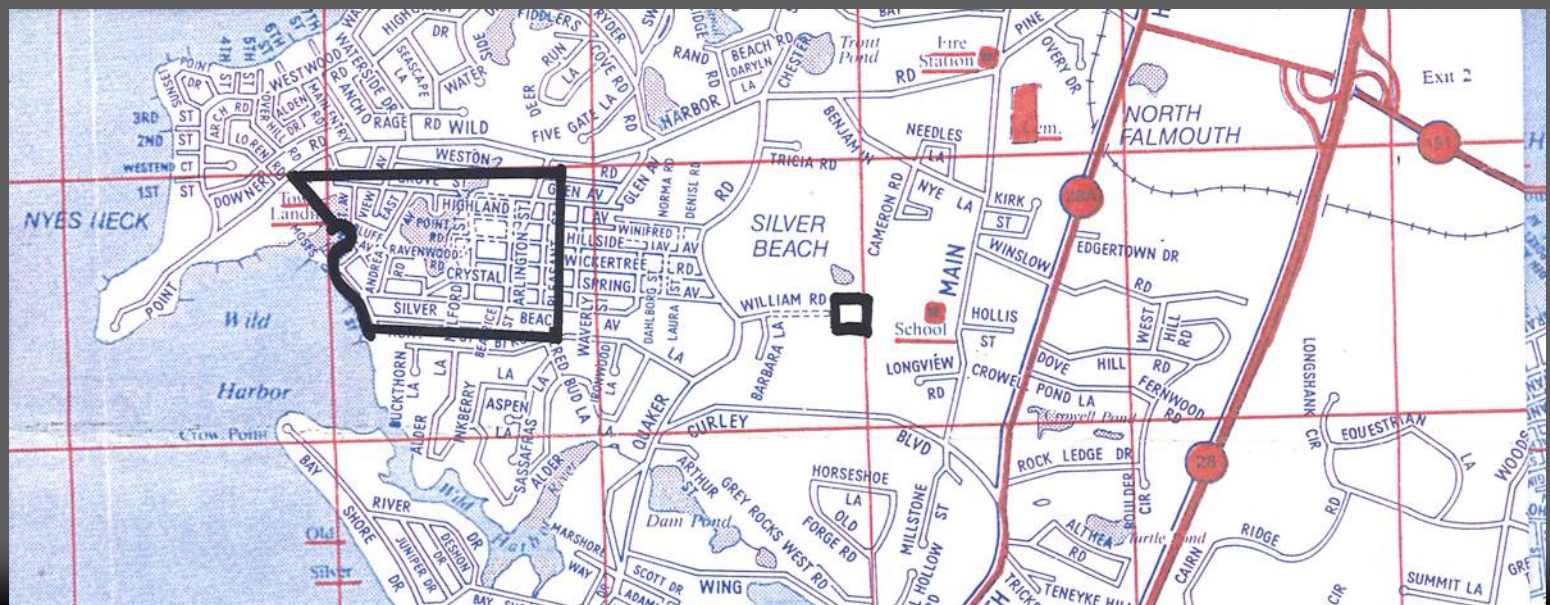
On-Site System for Nitrogen Removal



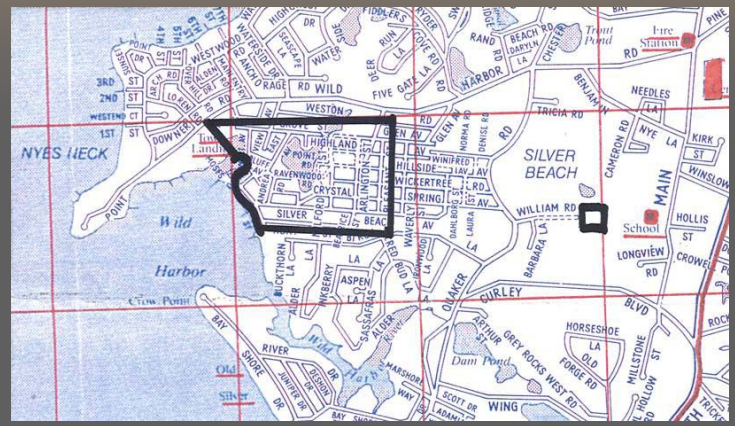
Cost Considerations:

- $30,000 capital cost per property per Barnstable County estimates including site restoration engineering, and contingencies
- Monitoring costs unknown due to uncertain monitoring requirements for TMDL compliance

Community/Cluster System for Nitrogen Removal



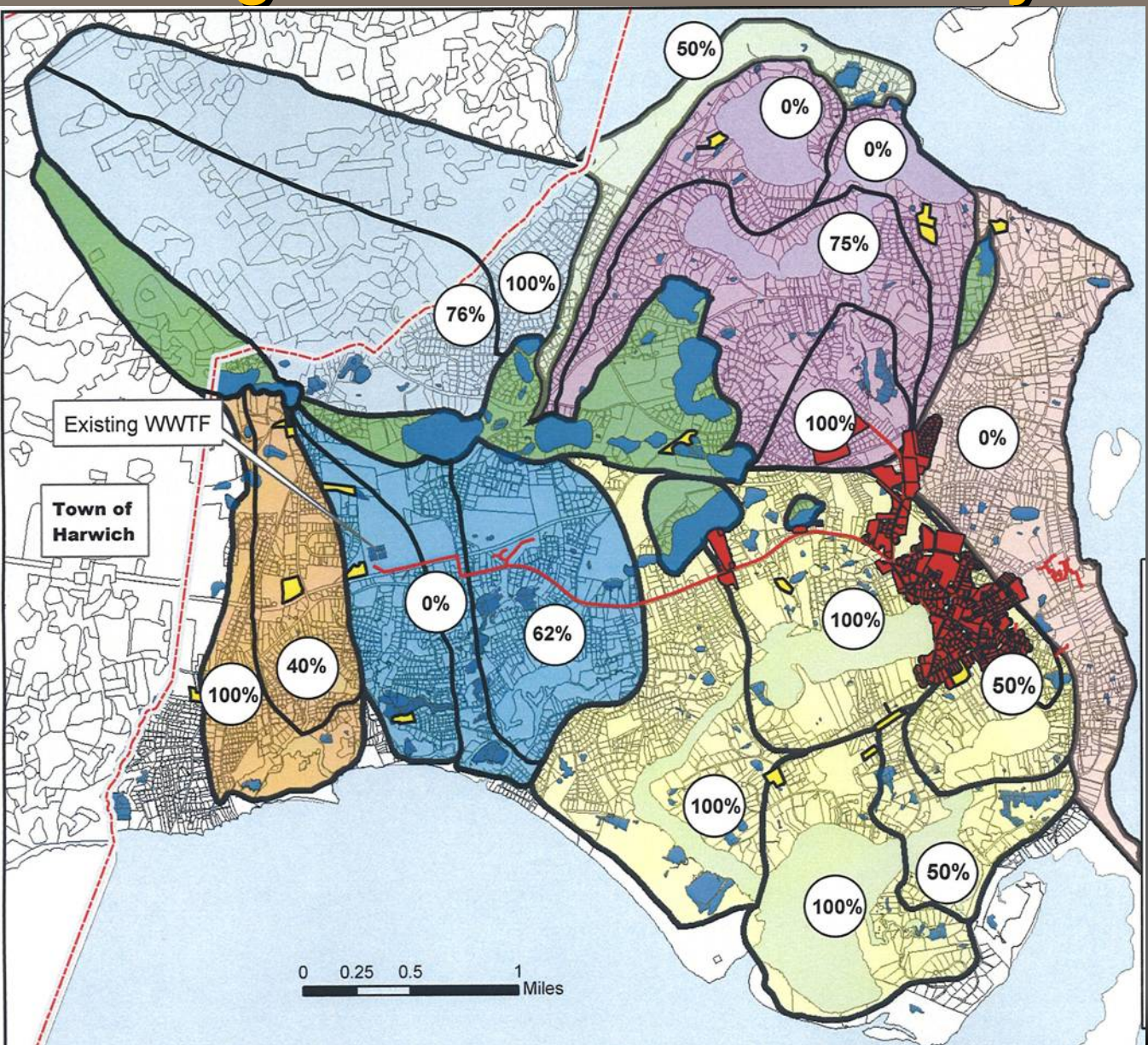
Community/Cluster System for Nitrogen Removal



Cost Considerations:

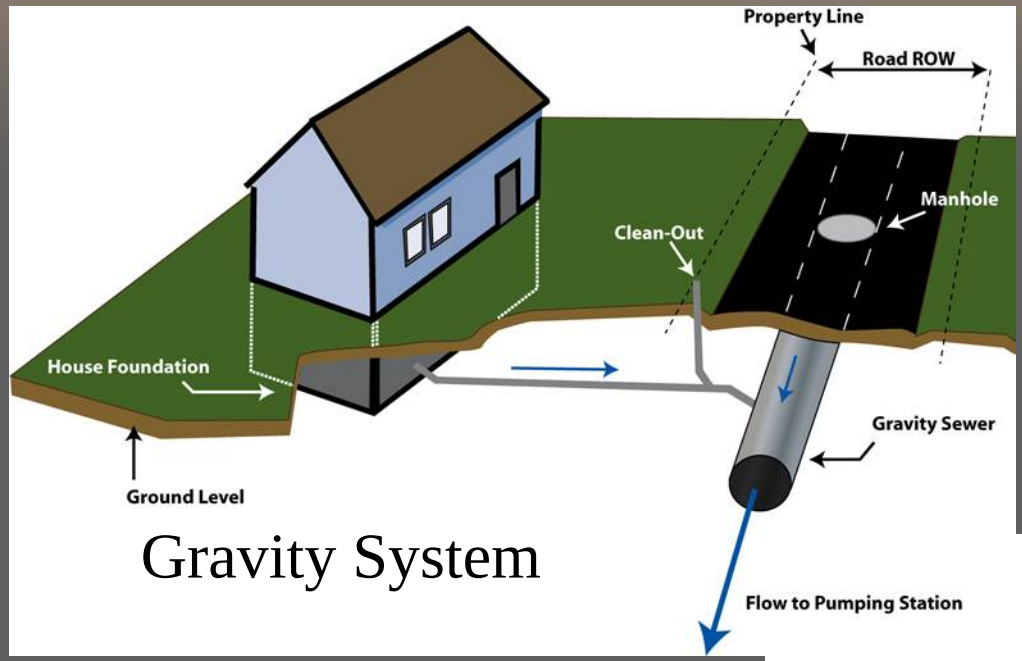
- $50,000 capital cost per property including property purchase, legal fees for law suits, engineering, and contingencies
- Designed for a 10 mg/l TN discharge limit

luster/Community System
or Nitrogen Removal: Feasibility in Chatham

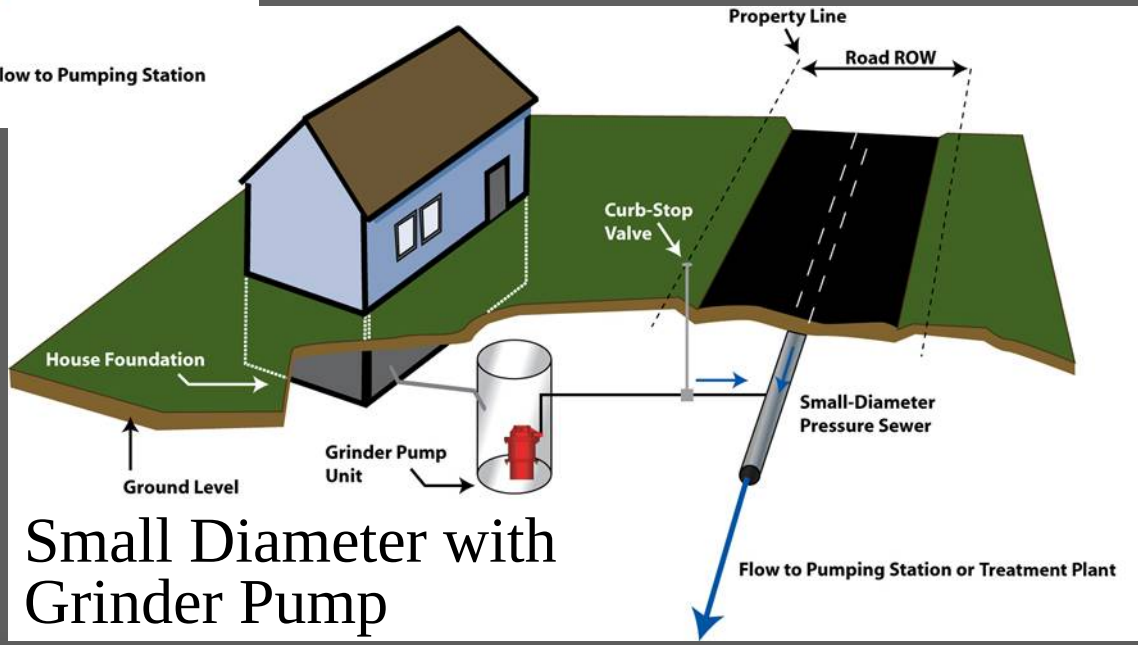


- Few available sites
- Multiple Town-Owned WWTF?
- Objections from neighbors?

Collection System Evaluation

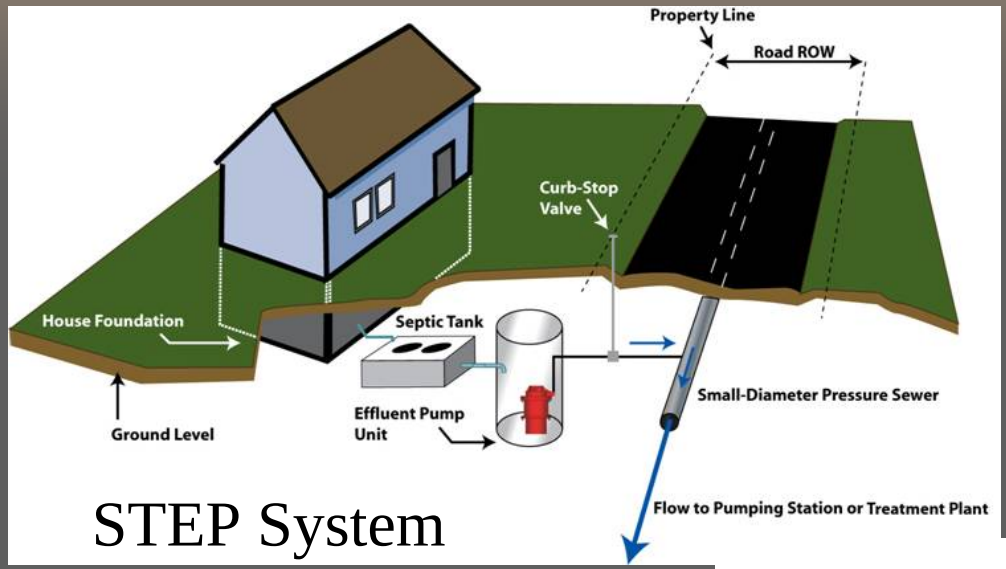


Gravity System

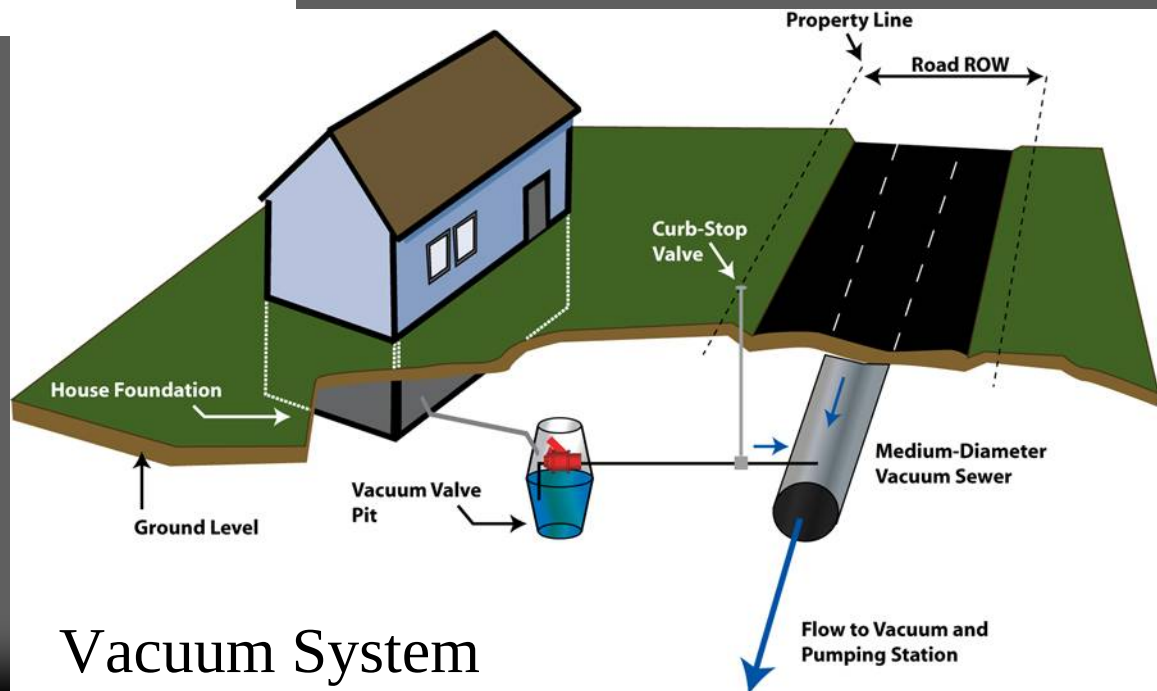


Small Diameter with Grinder Pump

Collection System Evaluation (cont)



STEP System

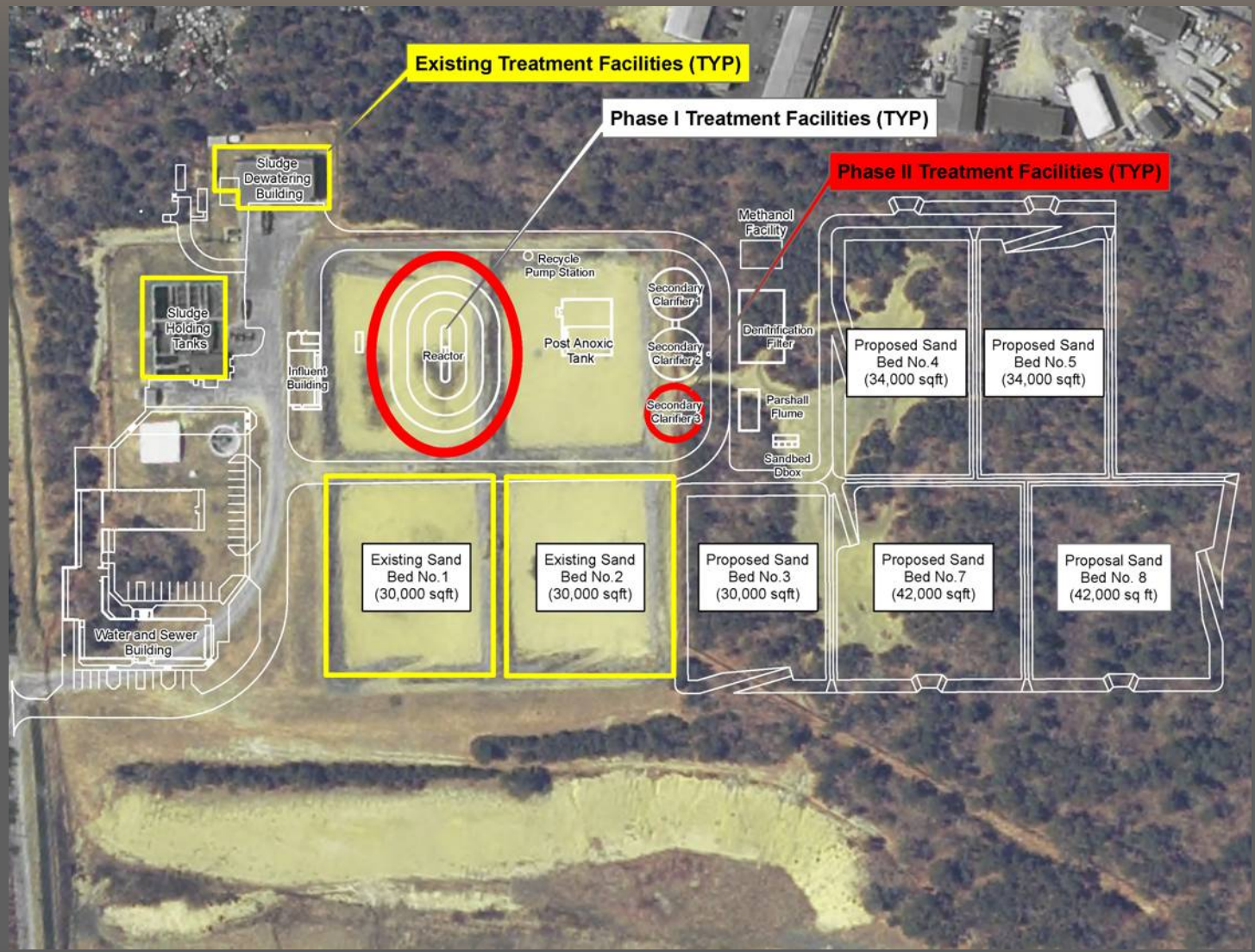


Vacuum System

The Recommended Plan:
Orbal Treatment Process

- Nitrogen removal to < 3 mg/l TN on average
- Oxidation, nitrification, denitrification, and phosphorus removal in one basin
- Modular design
- Common-wall construction
- Low capital costs
- Lowest operating cost
- Well proven

The Recommended Plan:
Efficient Use of the Site and reuse of existing tankage



The Recommended Plan:
Phase 1 Sewer Extension to meet the TMDLs

- Average annual flow is ~ 1.3 mgd for the buildout conditions with allowance for future I/I

The Recommended Plan:
Costs to meet the TMDLs at the end of Phase 1

Component	Capital Cost(1)
WWTF upgrade and expansion	**$40 M**
Collection System Expansion	**$170 M**
Total Capital Costs	**$210 M**
Average Cost Per Property(2)	**$28,000**

(1) All costs include allowances for contingency , fiscal, legal, and engineering costs.
(2) Based on 7,500 properties

Cost Comparison to meet the TMDLs

Alternative	Cost per property (1)	Feasibility
Individual On Site Nitrogen Removal systems	**$30,000**	**No**
Community/Cluster Systems	**$50,000**	**In limited areas**
Centralized (2)	**$28,000**	**Yes**

(1) All costs include allowances for contingency , fiscal, legal, and engineering costs.
(2) Based on 7,500 properties

QUESTIONS AND DISCUSSION

The FCWMP/FEIR is located on the Town Web Site:

http://www.chatham-ma.gov/public_documents/ChathamMa_CWMPlan/CWMP