FUSS & O'NEILL
Disciplines to Deliver

Presentation to

Old Lyme Shores Beach Association

Wastewater Facilities Plan Update

June 18, 2011

HTTP://OLDLYMESHORES.COM/WPCA.html

Introduction

- Background
- Wastewater Questionnaire
- Individual Onsite Management (Septic Systems)
- Decentralized Management
- Small Community Systems
- Summary and Next Steps

Background

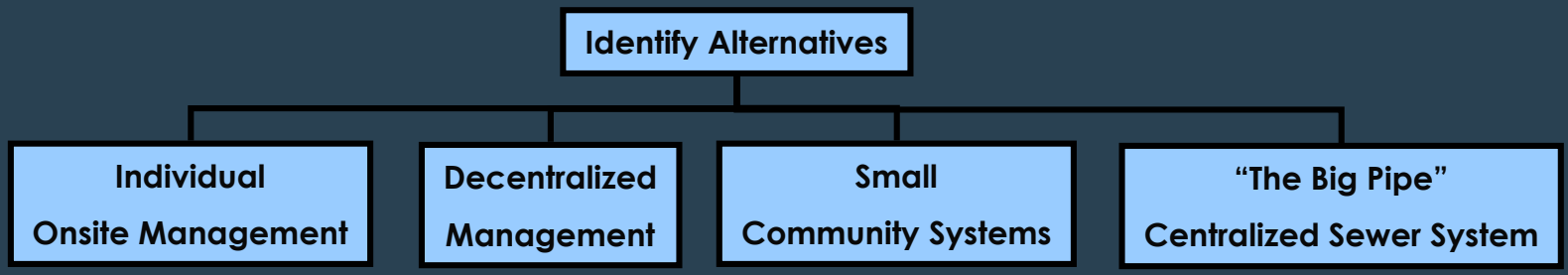
Background

- OLSBA working with Department of Environmental Protection on this Wastewater Management Plan
- Applying for Clean Water Funding 55% grant for study
- DEP approved engineering agreement

Takeaway: OLSBA WPCA is trying to keep costs low

The Engineering Report

- Fuss & O'Neill prepares an engineering report (also called a Facilities Plan) that
  - Evaluates the severity and extent of the existing or potential pollution problems
  - Evaluates alternatives to determine their suitability and cost effectiveness



  - Recommends an alternative or combination of alternatives
  - Recommends a schedule for implementing solution

Source: 2010 DEP Presentation to Old Lyme Shores

Takeaway: Fuss & O'Neill and OLSBA are following the DEP methodology

Study Area

- 192 developed lots
- About 56.8 total acres
- 750 ft of shoreline
- Designated Improvement District in 1947 by CT Legislature
- Authority to enact ordinances for wastewater disposal
- Advantage of being its own Municipality
- Unanimous vote to conduct study during September 2010 meeting

Takeaway: OLSBA is proactive

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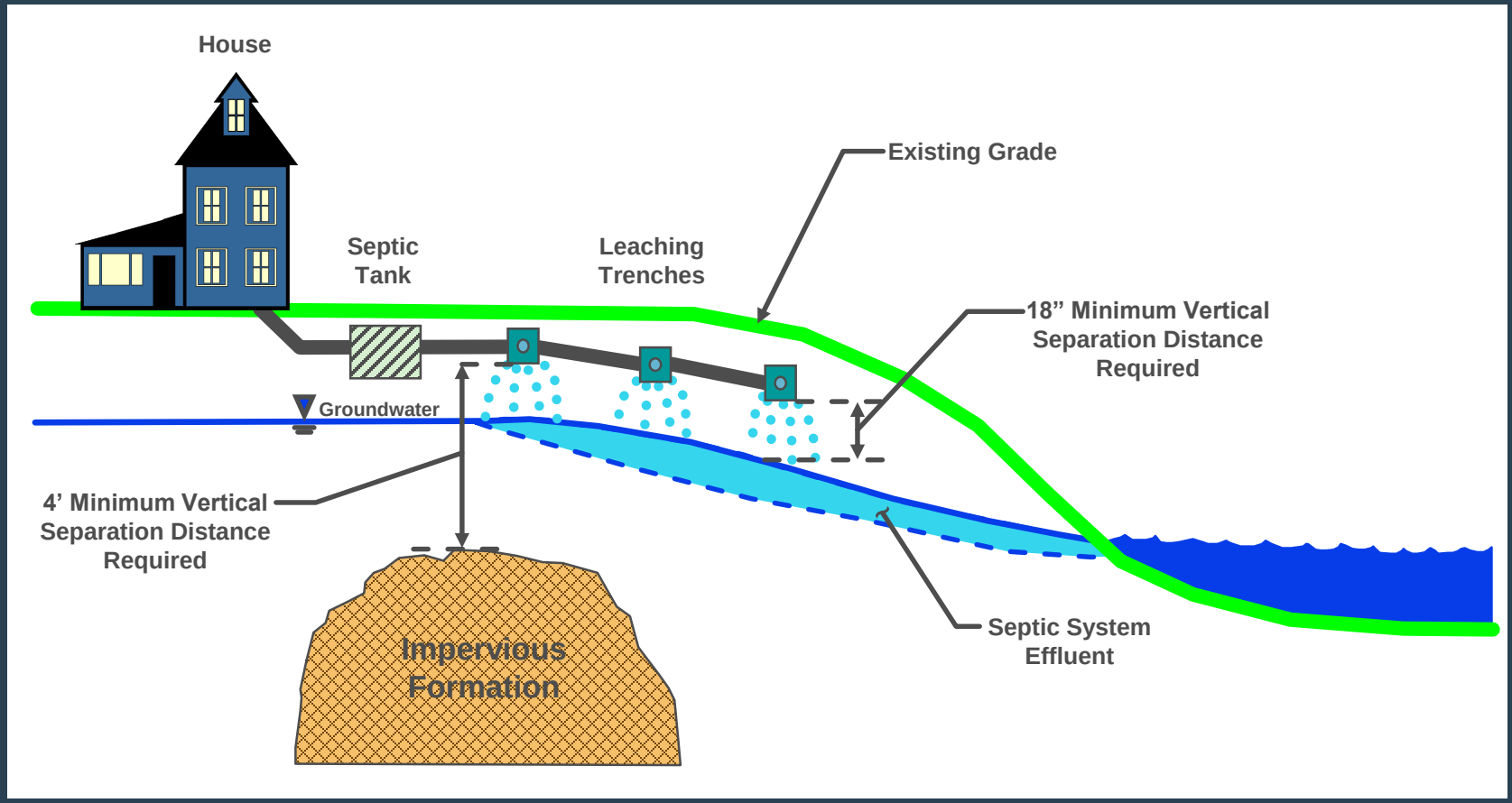
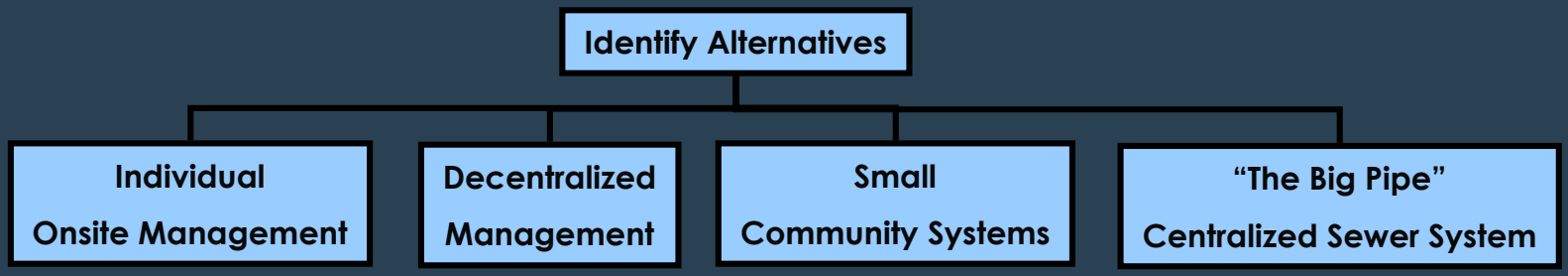
Public Health Code – Conventional Septic System

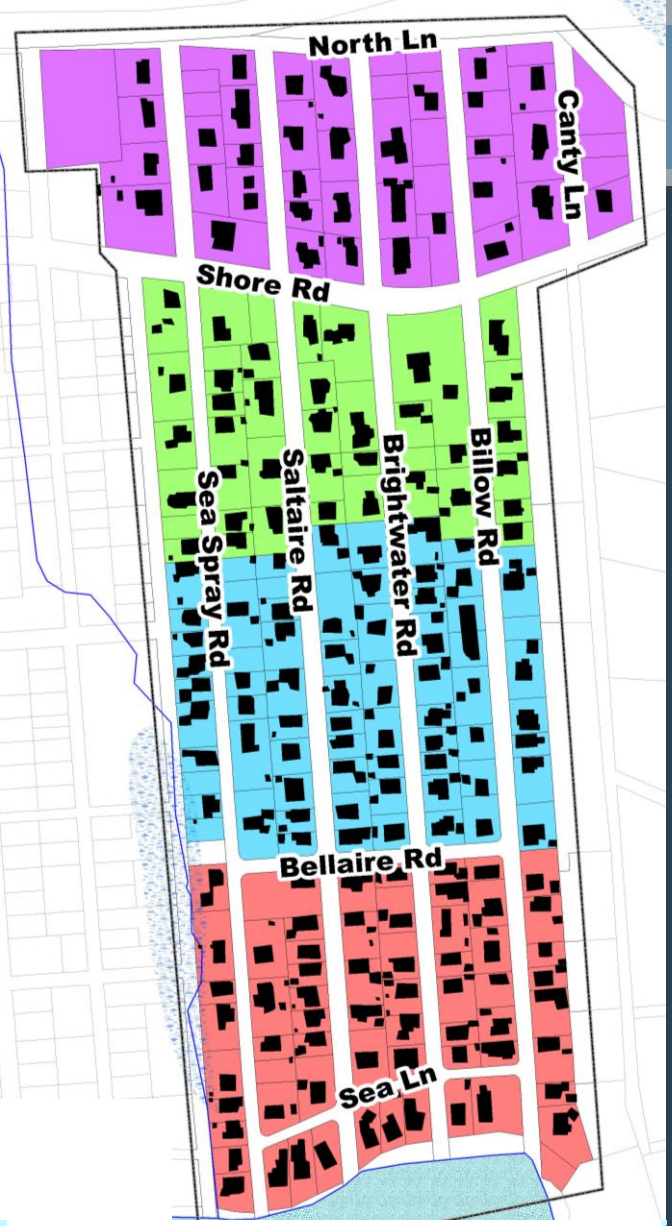


18-inch separation distance to groundwater is an important Health Code requirement for wastewater treatment

Questionnaire Results



Questionnaire Results



- Sent questionnaires to 192 parcels using winter mailing addresses
- 131 responses – 68.2%
- Grouped responses into zones
- Aggregated results to keep individual responses confidential
- All results are as reported

Takeaway: High response rate

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Questionnaire Results – Entire Study Area

Entire Study Area

Questionnaires Sent: 192
Questionnaires Returned by Property Owner: 131
Percent of Questionnaires Returned: 68.2%

Do you currently or plan to live in house year round within the next 10 years?
47% Yes 40% No

How long have you owned or lived at this location? 28.6 years

Age of main building: 59.9 years

Number of bedrooms: 3.2

Number of permanent residents: 2.2

Number of seasonal residents: 4.2

Length of seasonal resident stay: 105.1 days

How many seasonal residents plan to become permanent residents?
51% None 78.0 (People) in 6.0 (Years)

Property Use
91% Single family residential
2% Vacant
8% Other: Responses Vary

Septic System Location
5% Front yard
69% Backyard
2% Other: Responses Vary
17% Left of Main Building
14% Right of Main Building

What type of wastewater disposal system do you have?
92% Septic Tank to a Leaching Field
2% Cesspool
3% Dry Wells
0% Pressure Distribution
1% Surface Discharge
2% Don't Know
0% Other: Responses Vary

Do you share the wastewater disposal system with another entity (i.e. multi-tenant building, neighbor)?
0% Yes, who: Responses Vary 98% No

How old is your septic system disposal (leaching) field? 42% Don't know 24.9 (Years)

Are any of the following connected to your wastewater disposal system?
48% Washing Machine
48% Dishwasher
5% Garbage Disposal
2% Sump Pump
0% Jacuzzi Tub
1% Water Softener
0% Water Chlorinator
0% Oil/Water Separator
0% Grease Trap

Approximately how often do you get your septic tank pumped?
4% More than 5 years
69% Every 3 to 5 years
16% Once every 2 years
4% Once per year
2% More than once per year
2% Never

Do you have a separate leaching field or dry well for "gray water" (sinks, showers, washing machine) 15% Yes 63% No 19% Don't Know

How much would you guess it might cost to replace a septic system disposal (leaching) field?
$18,480

8% I paid for a repair before
59% I've never paid for a repair

Do you have any of the following problems with your wastewater disposal system?
65% This property has never had any problems

	Spring	Summer	Fall	Winter
Disposal field is muddy	3%	1%	1%	1%
Drains slowly or backs up	2%	2%	1%	1%
Flows onto ground surface	2%	2%	1%	1%
Odors	2%	3%	1%	1%
Other (Describe)	1%	2%	1%	1%

Does the problem seem to be linked to a specific event (washing clothes, heavy rains, visitors, etc)?
Responses Vary

Has your wastewater disposal system ever been repaired?
21% Yes 59% No 16% Don't Know

Has more than one repair been made?
2% Yes 62% No 21% Don't Know

When was the repair made? Responses Vary (MONTH/YEAR)

Highlighted questions examined in future slides

SURVEY CONTINUES ON BACK

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Takeaway: Individual results kept confidential

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Questionnaire Results – Entire Study Area

What was done? (Check all that apply)
16% Replace septic tank
6% Add to leaching field
11% Replace leaching field
6% Replace septic tank baffle
21% Not Applicable
7% Other: Responses Vary

What was the approximate repair cost? $8,161

Are you aware of other wastewater disposal problems in your neighborhood? Yes 15% No 75%

What type of water supply do you have?
1% Unknown Water Supply
33% Private Well: 5% Dug Well 20% Drilled Well
6% Community Well
59% Public Water Company: Responses Vary

If you have a well, have you had your water tested?
33% Yes
11% No Reason: Responses Vary

Do you have any of the following low-flow appliances?
21% Front Loading Washing Machine
23% Faucet flow restrictors
62% Toilet with 1.6 gallon per flush (or less)
36% Low-flow showerheads
2% Other: Responses Vary

Which soil type is at your property?
44% Sand 15% Clay 12% Till 7% Other: Responses Vary

At your property, what is the approximate depth of groundwater?
83% Don't Know 70 feet

Have you ever experienced flooding or surface drainage problems on your property?
21% Yes 72% No 2% Don't Know

Are you aware of any local wells or springs that may have been adversely affected by septic system flow? 4% Yes 95% No

Even if no obvious problems exist, are you concerned that your septic system is not properly treating the wastewater which passes through it? 11% Yes 84% No

How concerned are you that installed septic systems will have an adverse affect on ground and surface water quality in your area?
9% Extremely Concerned
8% Very Concerned
21% Concerned
23% Somewhat concerned
34% Not concerned

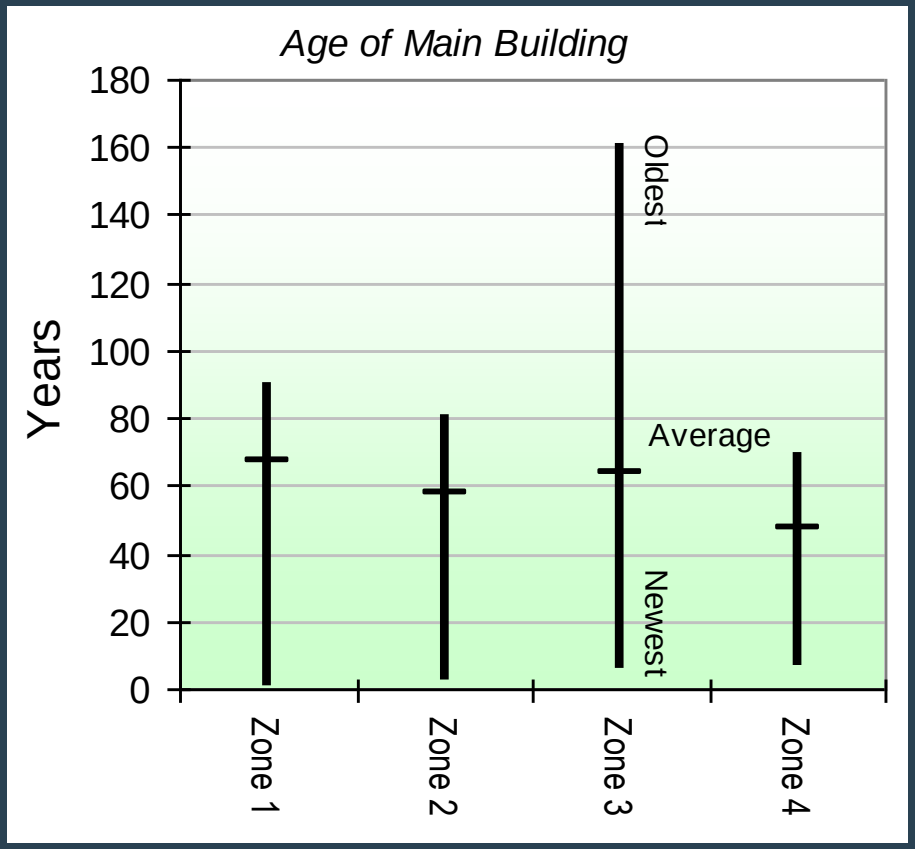
Would you be willing to have a soil test on your property at no charge to you?
67% Yes 21% No

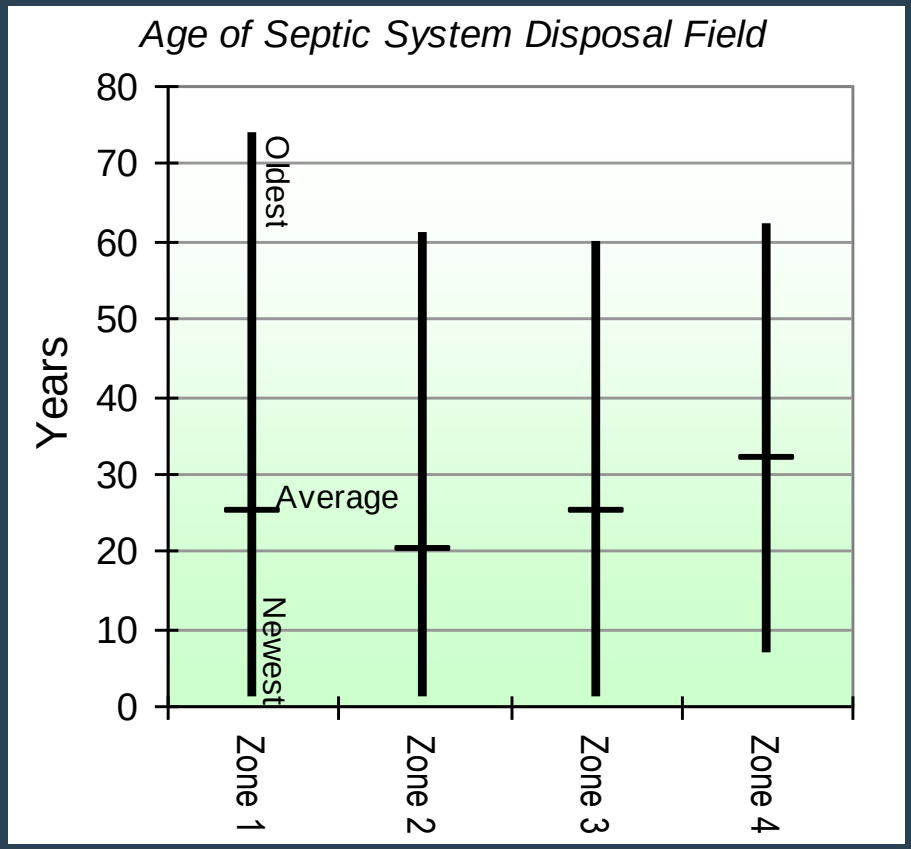
Entire Study Area

Highlighted questions examined in future slides

Takeaway: Individual results kept confidential

Questionnaire Results – Breakdown by Zone



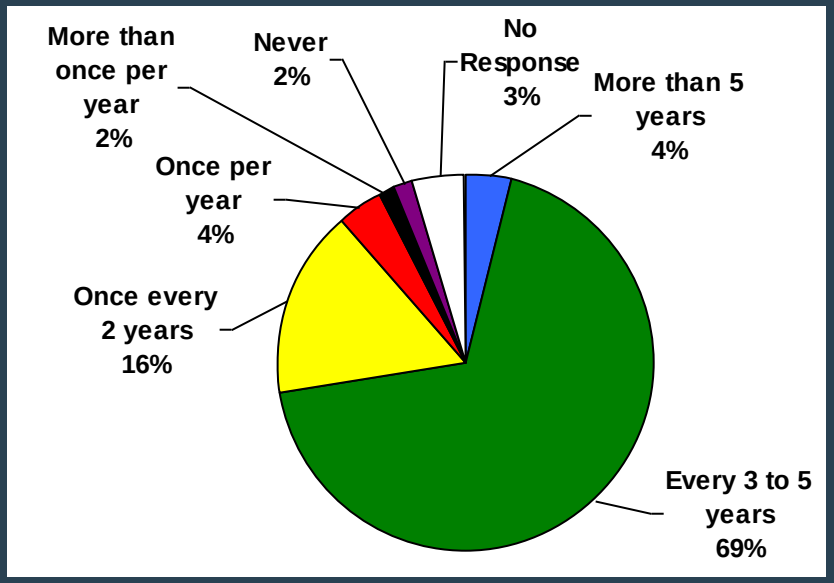


- Average life expectancy for a typical septic system leaching field is about 25 years.

Takeaway: Old buildings with septic systems at the end of their design life

Questionnaire Results - Entire Study Area

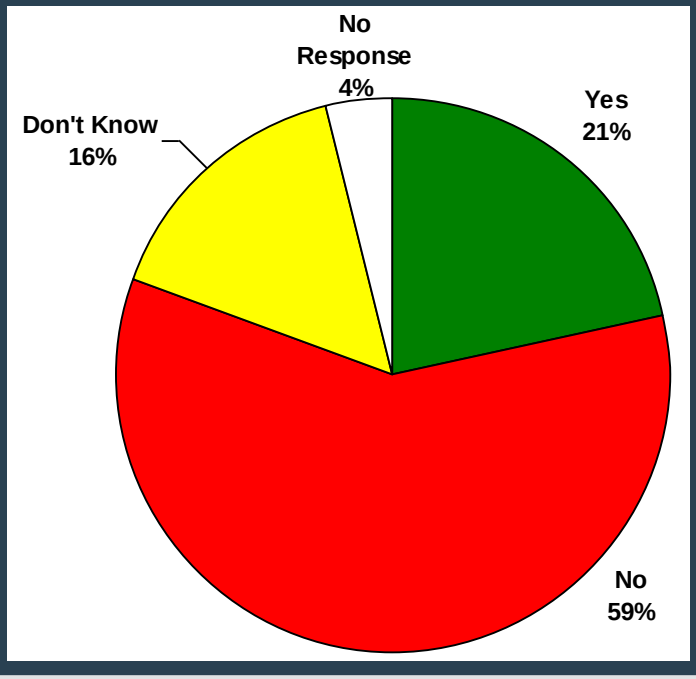
Approximately How Often Do You Get Your Septic Tank Pumped?



- 6% frequent pump-outs (more than once every 2 years) suggests failing septic system

- 59% of septic systems at the end of their design lifespan and not yet repaired may soon need repairs

Has Your Wastewater Disposal System Ever Been Repaired?



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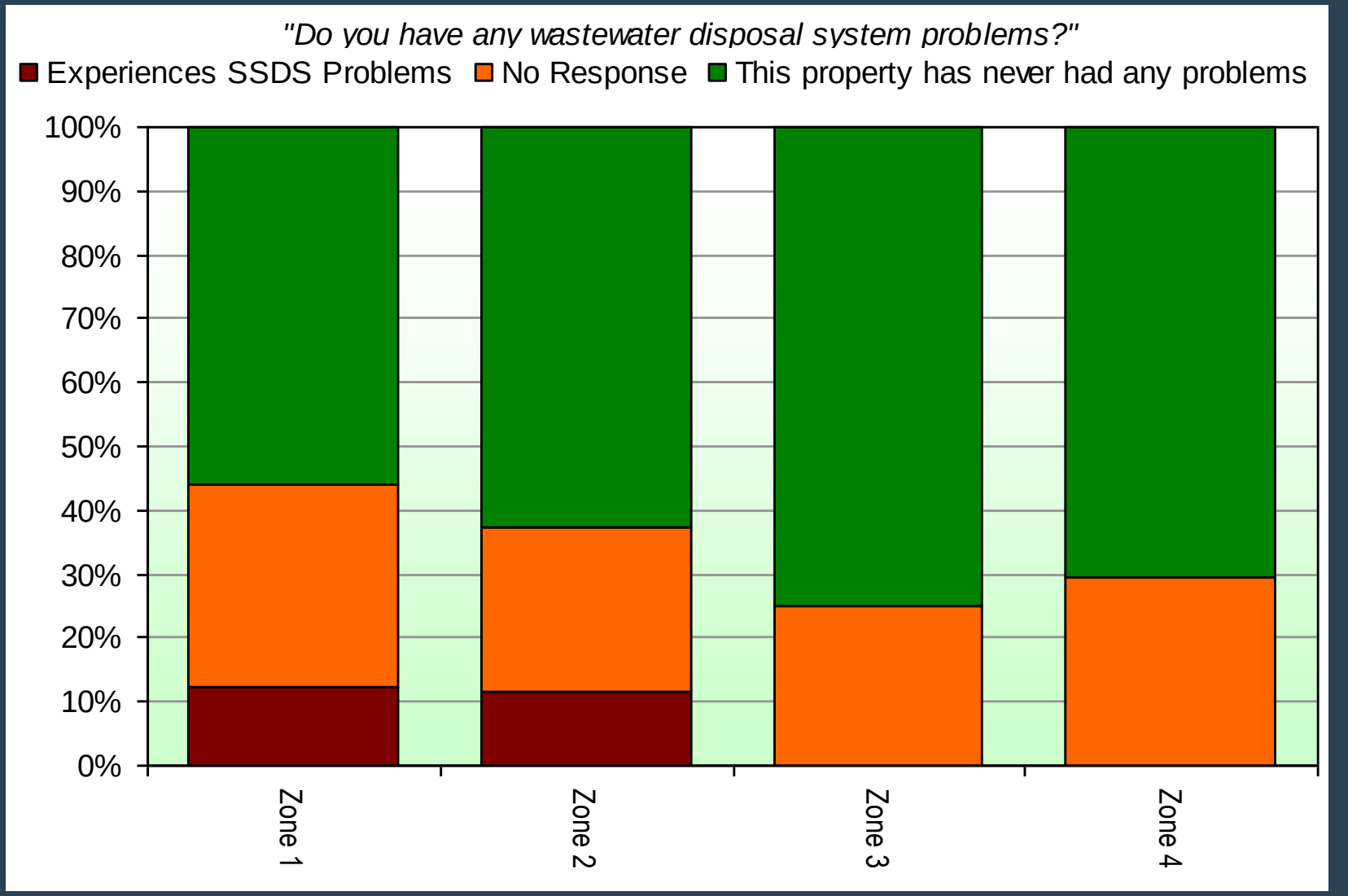
Questionnaire Results – Breakdown by Zone



Takeaway: 12%+ experiencing [septic system] problems

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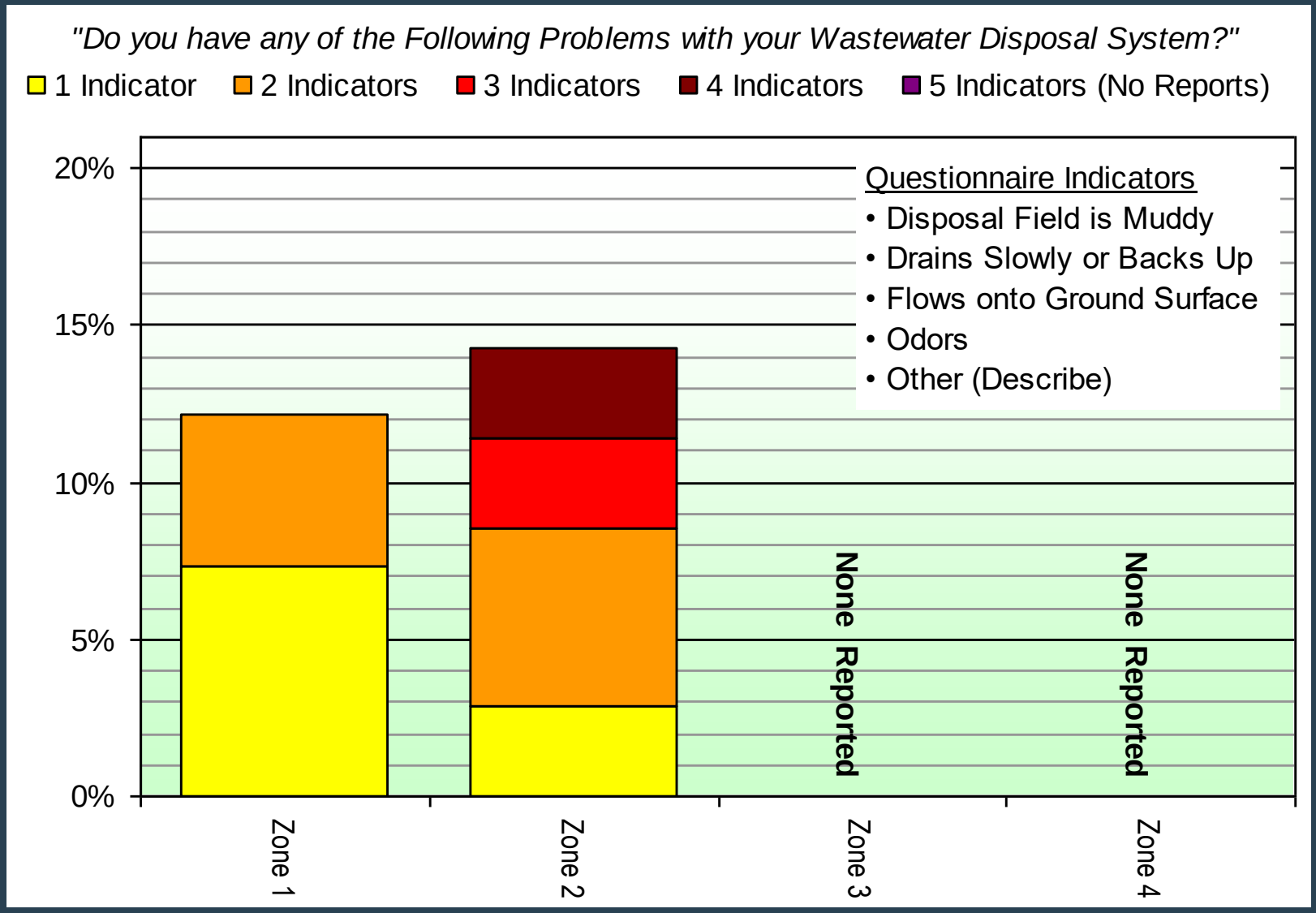
Questionnaire Results – Breakdown by Zone



Takeaway: Multiple indicators suggest more serious <u>community</u> wastewater issues

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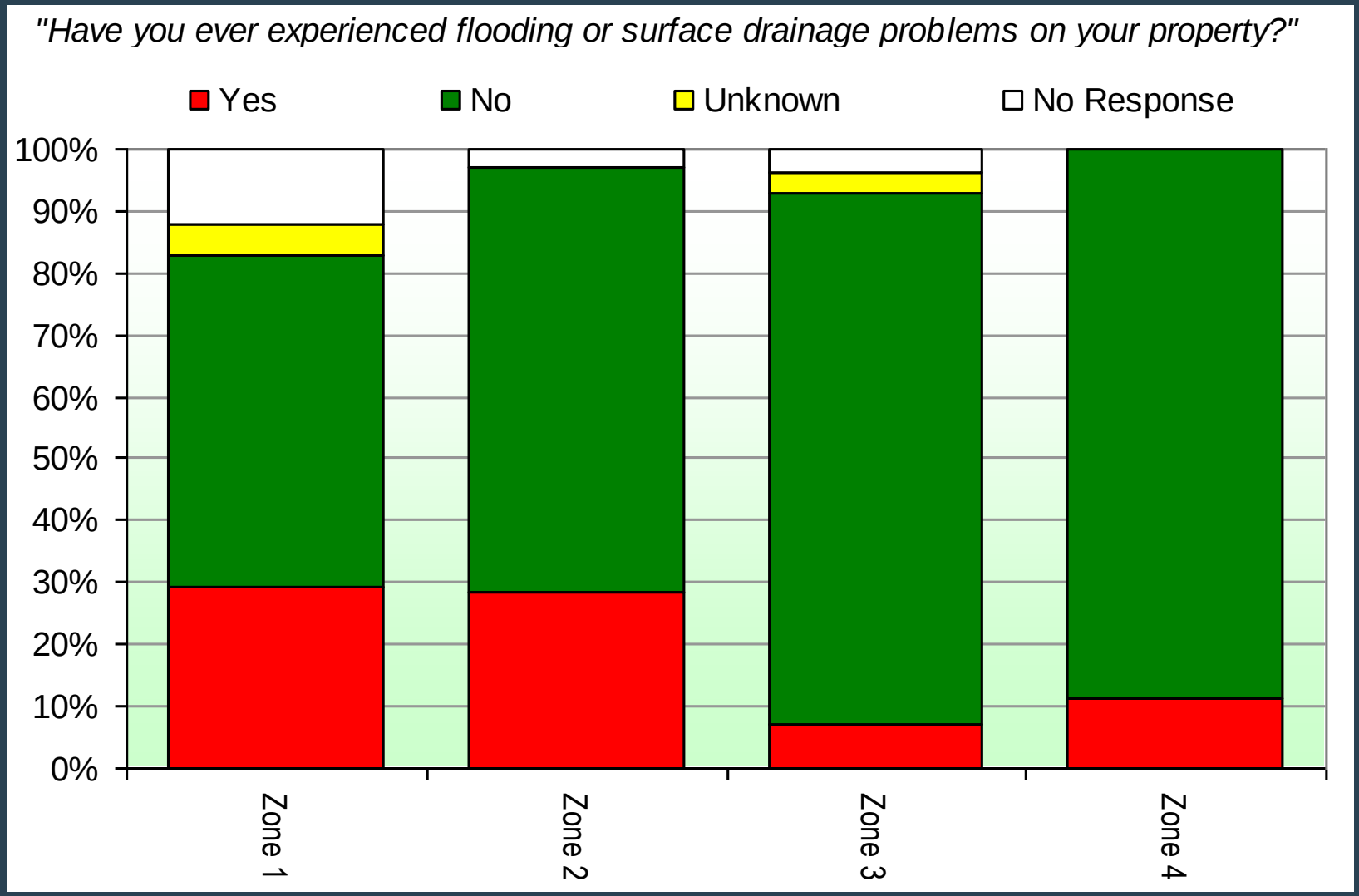
Questionnaire Results – Breakdown by Zone



Takeaway: Poor surface drainage is a sign of poor wastewater treatment

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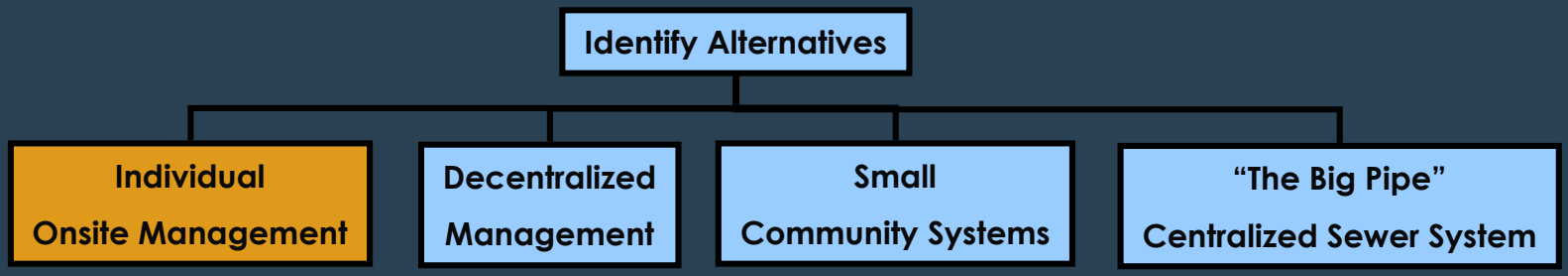
Questionnaire Results – Key Concepts

- High response rate and individual results kept confidential
- Old buildings with septic systems at the end of their design life
- 6% frequent pump-outs suggests failing septic system
- 59% of septic systems at the end of their design lifespan and not yet repaired may soon need repairs
- 12%+ experiencing [septic system] problems
- Multiple disposal system problem indicators suggest more serious community wastewater issues
- Poor surface drainage is a sign of poor wastewater treatment

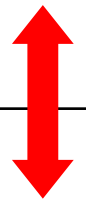
Takeaway: Questionnaire results reveal community septic systems issues

Individual Onsite Management (Septic Systems)



Small Lot Size

Lot Size (Acres)	# of Lots	% of Lots
< 0.10	73	33%
0.10 to 0.25	119	53%
0.25 to 0.50	30	13%
0.50 to 0.75	0	0%
> 0.75	2	1%



86%

Takeaway: Small lot sizes make septic system repairs difficult

Systems Built in Shallow GW

- 55 lots have had challenges with wastewater treatment
- Shallow groundwater is everywhere (Green)
- Leaching systems with little or no treatment ability (Blue)
- Some expensive repairs with Public Health Code exceptions may limit system life (Orange)
- Neighboring lots likely have similar undocumented issues

Source: Examination of Old Lyme Town Sanitarian's Public Records

Soil Drainage Capacity

- Soils allow extremely fast water movement
- Fast water movement and shallow groundwater are a bad combination
- Effluent drains into shallow groundwater table too quickly for proper wastewater renovation
- Backyard drainage trenches are conduits for potentially polluted water to reach the shoreline

Source: Examination of Old Lyme Town Sanitarian's Public Records

Takeaway: Water movement through soil too fast for proper wastewater treatment

Public Health Code Buffers

- 35%+ cannot meet Public Health Code separation requirements (assuming 3 bedroom houses)
  - Wastewater treatment reduced
  - Leaching system lifespan shorted
  - Difficulty obtaining building permits
  - Potential for water use restrictions
- Drinking water wells close to leaching systems
- Many lots have no room for septic system repairs

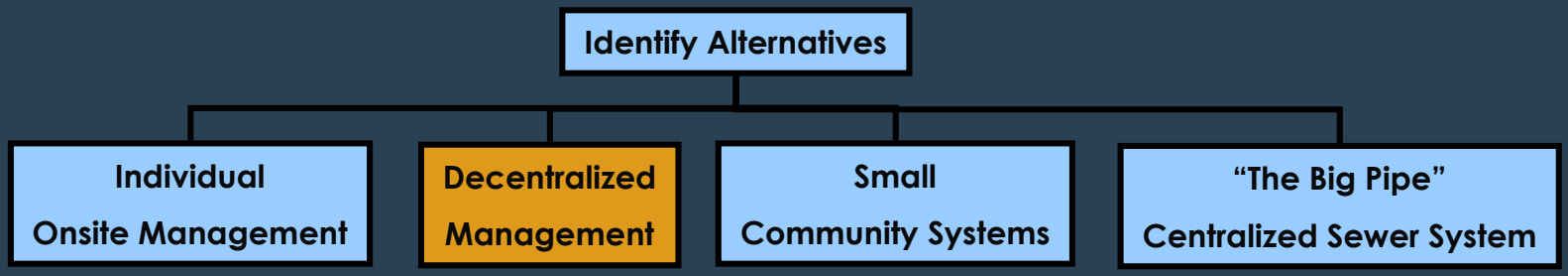
Source: Public Health Code Septic System Regulations

Individual Onsite Management – Key Concepts

- Small lot sizes makes septic system repairs difficult
- Shallow groundwater is everywhere
- Leaching systems with little or no treatment ability
- Some expensive repairs with Public Health Code exceptions may limit system life
- Water movement through soil too fast for proper wastewater treatment
- Backyard drainage trenches are conduits for potentially polluted water to reach the shoreline
- 35%+ cannot meet Public Health Code separation requirements
- Drinking water wells close to leaching systems
- Many lots have no room for septic system repairs

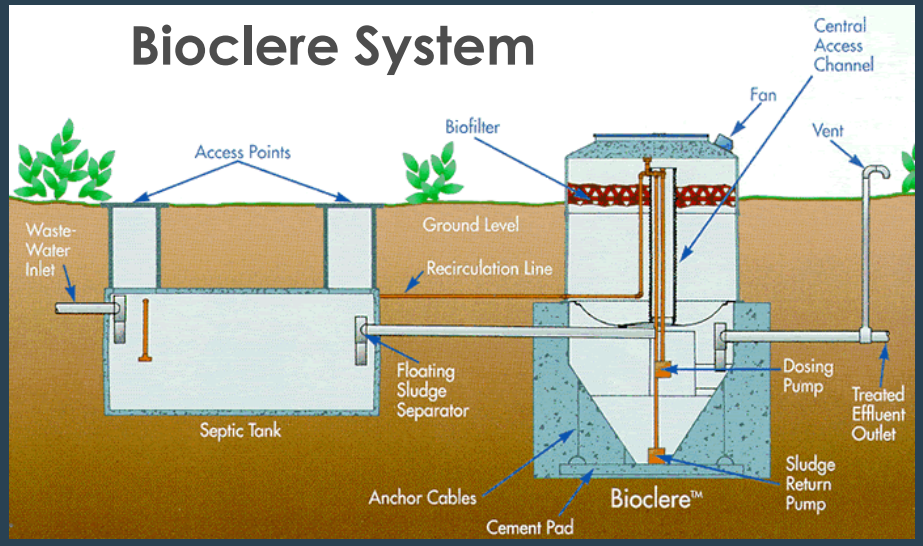
Takeaway: Individual Onsite Management is a serious and worsening community problem

Decentralized Management



What is Decentralized Management?

- Use of an Advanced Treatment System at each house
  - Provides higher degree of treatment than conventional septic systems by using mechanical and biological processes
  - Wastewater renovated before discharging into the soil
- Combine with an effluent dispersal systems



Takeaway: Decentralized systems are based on Advanced Treatment Systems

Decentralized Management – Examples

Peat Filter

Media Filter

Textile Filter

Example of an Installed System

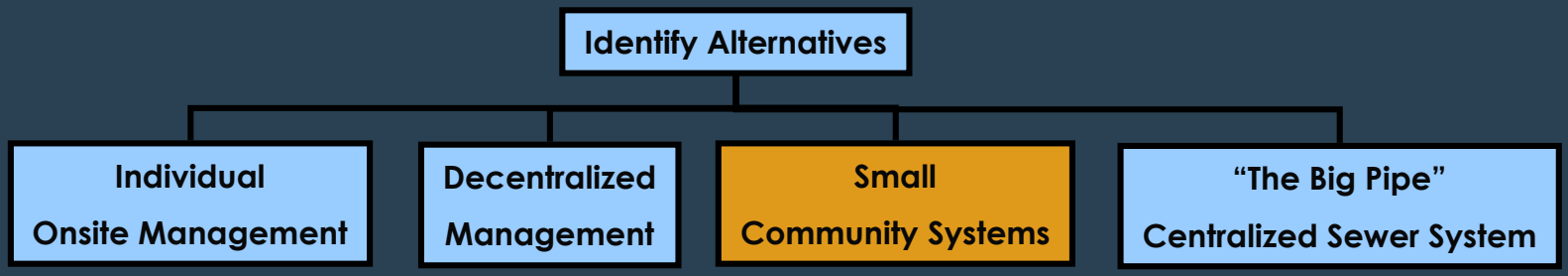
Takeaway: Advanced treatment systems are complex mini-treatment plants

Decentralized Management – Key Concepts

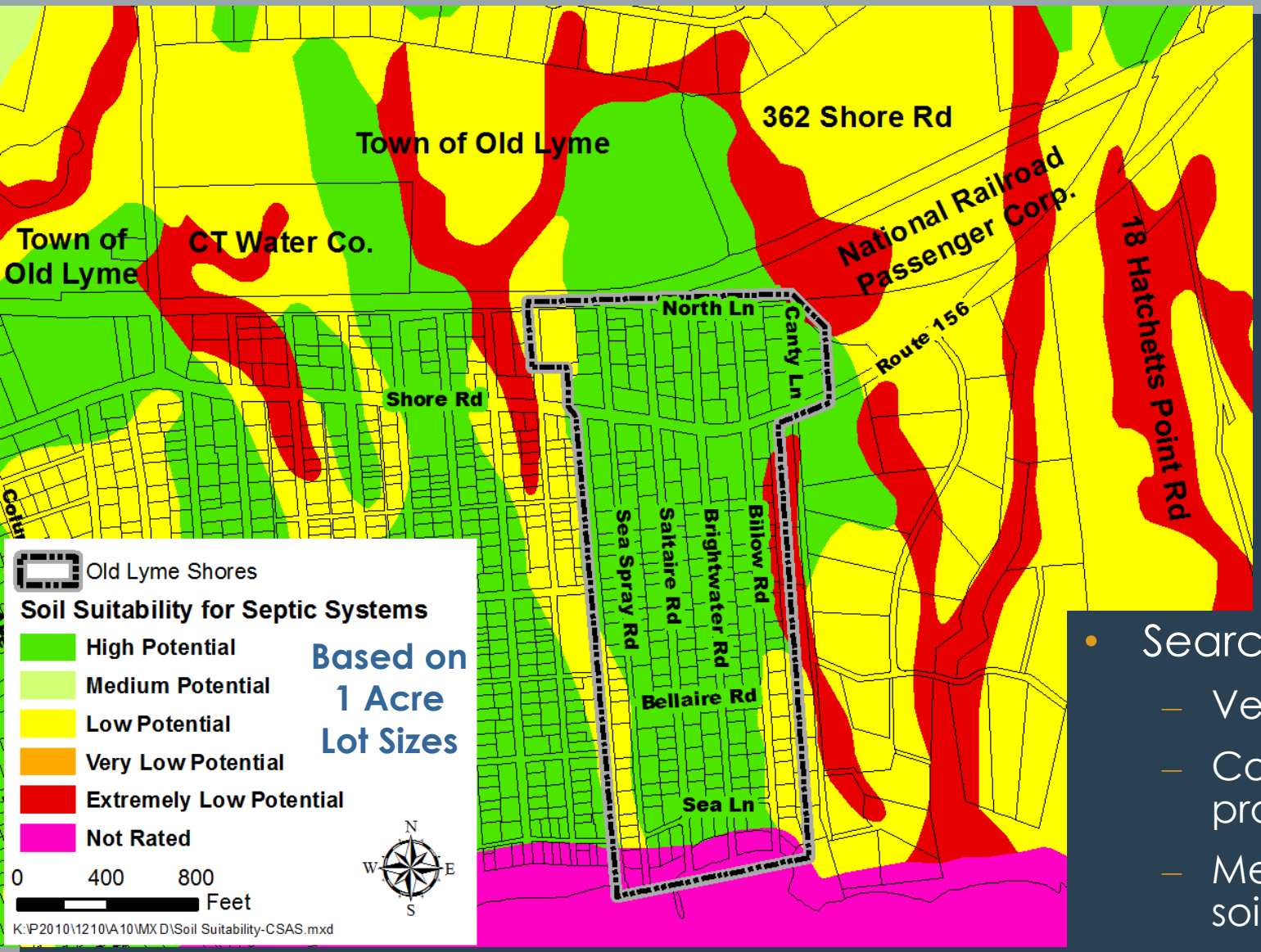
- Advanced treatment systems are complex treatment systems
- **EACH** lot would have its own mini-treatment plant
- Spring start-up needed a few weeks before seasonal houses are occupied
- Requires operations & maintenance contract
- Must be an engineered septic system design
- Very expensive ($35k to $40k)
- Still may **NOT** comply with all Public Health Code requirements

Takeaway: Decentralized Systems are not a "one size fits all" solution

Small Community Systems



Septic System Soil Suitability and Land Ownership



- Search Criteria
  - Very large lot
  - Cooperative property owners
  - Medium or high soil suitability

Takeaway: Suitable accessible land is not available for a Small Community System

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OLSBA Site Available for Small Community System

- Need 60+ sites of ball field size for summer sewage flows
- Surface water ponding is problematic here
- DEP permitting requirements are much more stringent than the Health Department

  (Exceptions are not allowed)

Small Community Systems – Key Concepts

- Suitable accessible land is reportedly not available for a small community system
  - Need a very large lot, Cooperative property owner, and Medium or high soil suitability
- Need 60+ sites of ball field size for summer sewage flows
- Surface water ponding is problematic
- DEP permitting requirements are much more stringent than the Health Department (Exceptions Are Not Allowed)

Takeaway: There are no suitable sites reportedly nearby for a small community system

Summary and Next Steps

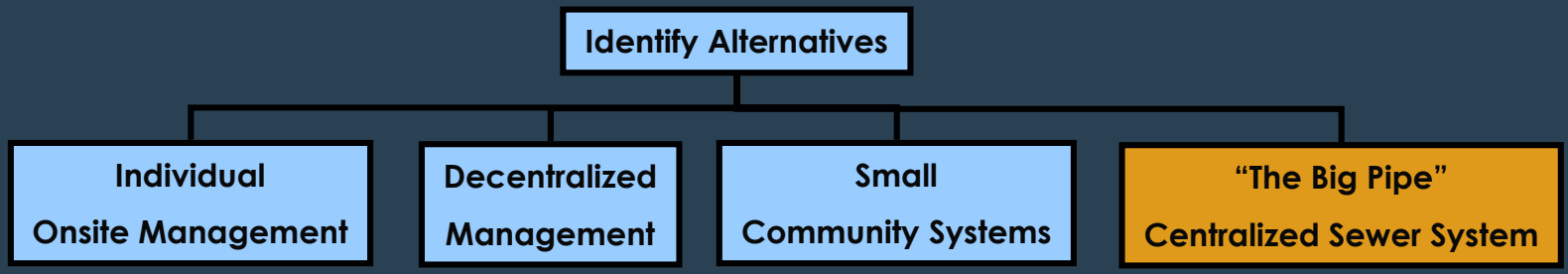
Summary of Engineering Report Analysis

- Fuss & O'Neill and OLSBA are following the DEP methodology
- Questionnaire results reveal community septic systems issues
- Individual Onsite Management is a serious and worsening community problem
- Decentralized Systems are not a "one size fits all" solution
- There are no suitable sites reportedly nearby for a Small Community System

Takeaway: Subsurface wastewater disposal does not appear to be the solution

Next Steps

- Commence on-site groundwater testing
- Study the 'Centralized Sewer System' alternative:



- Costs for implementable solutions
- Hold a public hearing September 10th, 2011 to discuss remaining engineering analysis & recommendations
- Present Wastewater Facilities Planning Report for DEP review and comment

Takeaway: The study's not finished yet....

Questions

HTTP://OLDLYMESHORES.COM/WPCA.html