ENVIRONMENTAL IMPACT EVALUATION

Project Name: Regional wastewater management project. Miami Beach, Old Lyme Shores Beach and Old Colony Beach Club Associations, Wastewater Facilities Plan.

Address: Miami Beach Association
P.O. Box 91
Old Lyme CT 06371

Old Lyme Shores Association
6 Tuscany Hills Drive
Middletown, CT 06457

Old Colony Beach Club Association
41 Old Colony Road
Old Lyme, CT 06371

Location: Town of Old Lyme. Miami Beach, Old Lyme Shores Beach and Old Colony Beach Club Associations. Route 156, Old Lyme, CT.

DEEP Staff Contact: Carlos Esguerra, CTDEEP, Municipal Water Pollution Section

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Project Summary:

The applicant's Facility Plan and all associated comments submitted in regard to this project have been reviewed by the Connecticut Department of Energy and Environmental Protection ("DEEP") in accordance with the Connecticut Environmental Policy Act ("CEPA") Regulations, Sections 22a-1a-1 through 22a-1a-12. The findings of this review are summarized below:

1. Project background, description and wastewater management needs:

Old Lyme Shores Beach Association ("OLSBA"), Old Colony Beach Club Association ("OCBCA") and Miami Beach Association ("MBA") (jointly "the Associations"), are located in the town of Old Lyme ("Old Lyme"). The Associations are located south of Route 156 and bounded to the south by Long Island Sound (See figure 1). The Associations were established through special acts enacted by the legislature during the 1930s and 1940s as special taxing districts. These special acts granted the board of governors the power to, amongst other responsibilities, take action if there is endangerment of public health associated with wastewater. The Associations primarily contain seasonal cottages with seasonal or permanent public water service and insulation, resulting in more frequent occupation. Wastewater treatment is conducted via onsite treatment systems which are mostly composed of drywells, septic tanks and leaching fields which do not meet current standards.

The Associations and Old Lyme hired independent engineering firms to study wastewater management needs within their respective regulated areas. The engineering firms came to the conclusion that the use of onsite systems was no longer adequate to protect the environment and public health on a long term basis. Construction of sanitary sewers to an off-site treatment location was identified as the most cost-effective alternative to address the identified issues in all study areas. OCBCA and OLSBA entered into consent orders with DEEP to implement the solutions recommended in their reports on August 14, 2012 and October 1, 2012, respectively. Understanding that a fragmented approach would make the project less cost effective, MBA agreed to work collaboratively with OCBCA and OLSBA to implement a unified and holistic solution to address the wastewater management challenges identified in the reports. The Associations have also expressed their desire to work on a collaborative basis with Old Lyme to implement a unified solution.

Figure 1. General View of Wastewater Planning Area.

Prevailing site conditions within the Associations, such as high density of development, limited lot size, shallow groundwater, risk of flooding, fast draining soils and climate change make the long term use of onsite wastewater treatment systems unfeasible. These limitations make septic system repairs or upgrades that comply with State of Connecticut Public Health Code ("PHC") requirements very difficult. Based on the identified wastewater management needs, a community pollution problems exists within the Associations pursuant to Connecticut General Statutes Section 22a-428. Below is a general summary of challenges associated with the onsite treatment systems documented in the engineering reports conducted by the Associations:

a. Lot size and density of development: Over 85% of developed lots located within the Associations are smaller than 0.25 acres. In order to properly treat sewage, a septic and leaching system need a certain amount of horizontal separation from other septic systems, or from other receptors of environmental or public health concern (e.g. stormwater swale, watercourse, inhabited dwelling, drinking well, etc). Given the high density of development coupled with small lot size, installing a code complaint septic system at the majority of properties within the Associations would be difficult without

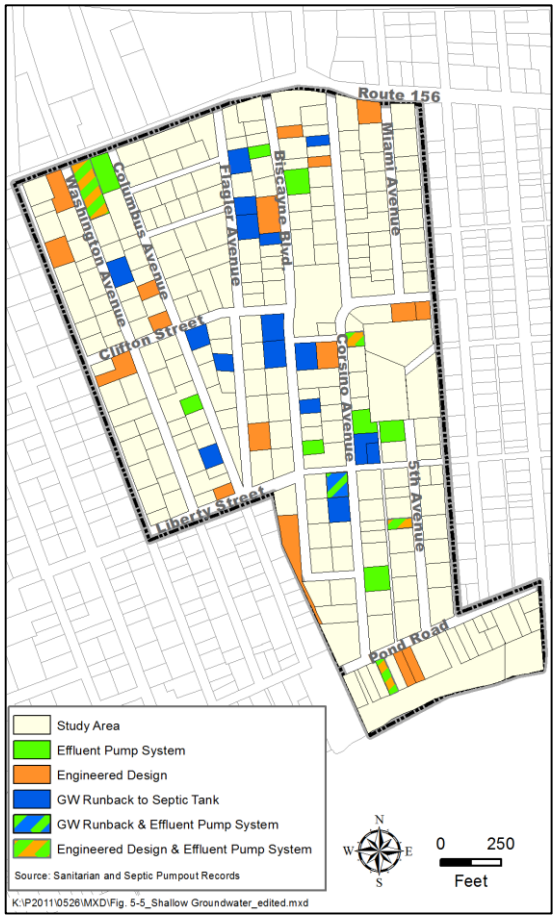
one or multiple PHC variances. The high density of development coupled with small lot sizes create an intermingling effect of the wastewater leaching areas thereby minimizing the effectiveness of wastewater renovation in the soil matrix.

b. Shallow Groundwater: High groundwater conditions are prevalent in the study area. PHC requires the bottom of leaching systems to be separated by at least 24" from the top of the mean seasonal high groundwater elevation in areas under tidal influence. Without an adequate minimum vertical separation, wastewater leaching into the ground may be reaching groundwater before receiving proper aerobic treatment.

   Based on numerous Old Lyme sanitarian and septic hauler pumpout records, there are numerous onsite wastewater treatment systems with clear indications of shallow groundwater conditions (See Figure 2). Groundwater backflow into leaching systems and septic tanks has been documented within the Associations, and several other properties have installed raised (mounded) leaching systems to maximize vertical separation from the bottom of the leaching field to seasonal high groundwater. Expected increases in sea level elevation due to climate change will have an impact on groundwater elevations, further reducing the aforementioned vertical separation.

Figure 2. Onsite Wastewater Systems Indicating Shallow Groundwater Conditions

MBA



OLSBA

Source: Wastewater Facilities planning reports by Fuss and O'Neill for MBA and OLSBA.

Test borings advanced by RFP Engineering within OCBCA in June of 2011 showed shallow groundwater conditions ranging between 22" to 43" below grade. Shallow groundwater conditions were further documented in 75 of the 217 properties within OCBCA via a sanitary survey conducted in August of 2011.

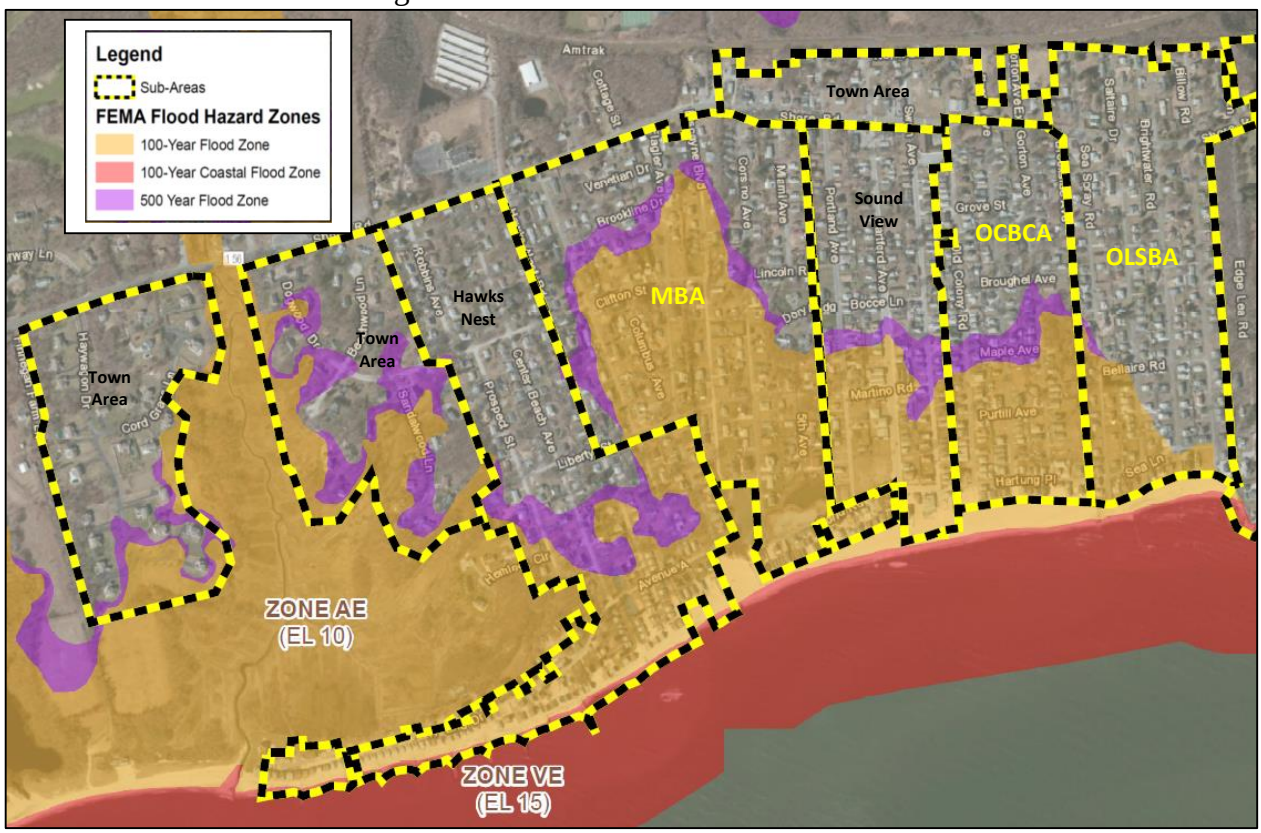
c. Flood Risk: Severe storm events such as Hurricane Irene and Storm Sandy caused significant flooding damage in the project area. Storm surge brought ocean water further inland than normal damaging property, polluting drinking water sources and rendering several onsite wastewater treatment systems ineffective for treatment. The Federal Emergency Management Agency ("FEMA") created 100-year and 500-year maps for delineating the extent of areas in the United States that are susceptible to flooding. A 100-year event is an event that has a statistical probability of occurring once every 100 years or that has a 1% probability of occurring on any given year (See figure 4). Wastewater infrastructure that will be located in flood prone areas (for a 100- year event) need to be flood-proofed. For instance, electrical components inside the proposed pump station need to be placed in elevated platforms and inside watertight compartments. Flood proofing design elements associated with the proposed pump station will be compliant with requirements included in the federal executive order No. 13690 of January of 2015, and other applicable state regulations.

d. Climate change: Changes in climatic patterns are also expected to result in heavier precipitation levels, and have a direct impact on the duration, frequency and intensity of severe weather events in the northeast coast of the United States which in turn can further reduce wastewater renovation efficiency in the project area. Anecdotally, it has been documented that during heavy rainfalls groundwater ponds in certain areas onto the surface including above existing septic systems and leaching areas. Green infrastructure best management practices located upgradient of the low-lying areas may increase resiliency and help reduce flooding within the project area.

Figure 3. Coastal Flooding along streets of OLSBA recorded in April 2014.

Photo courtesy of Fuss and O'Neill, Inc.

Figure 4. FEMA Flood Hazard Zones

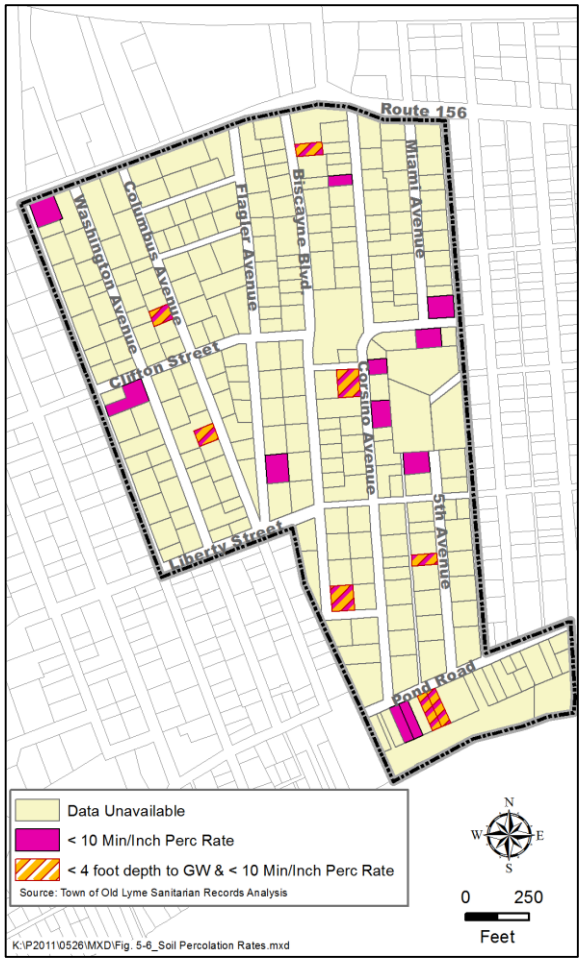


Source: Woodard and Curran. Town of Old Lyme, Coastal Wastewater Management Report, December 2014.

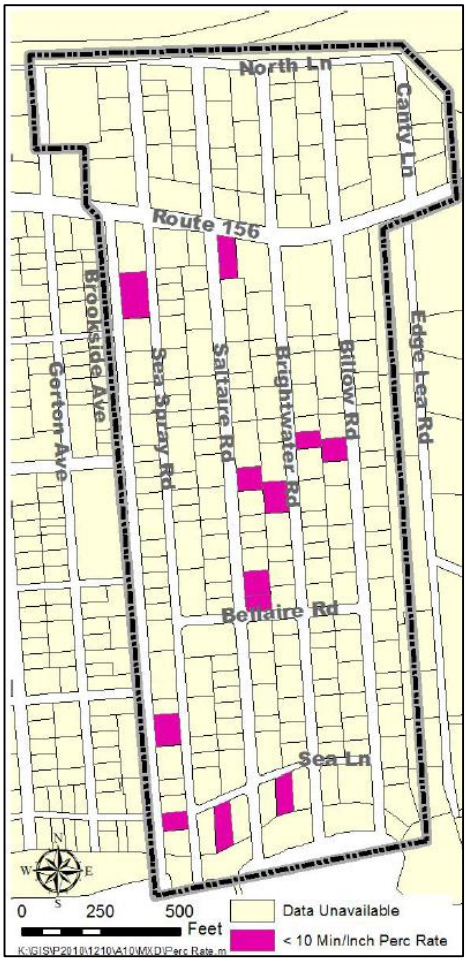
e. Soil percolation: An adequate travel time through unsaturated soil facilitates Nitrogen compounds conversions into simpler forms, and enables the deactivation of harmful pathogens. Fast soil percolation rates (i.e., < 10 minutes/inch of soil traveled) area are common throughout the Associations (See figure 5). The documented percolation rates are generally consistent with soil characteristics usually found in coastal environments. The percolation rates recorded in Old Lyme records show that the wastewater may be traveling too rapidly within the soil matrix to receive proper aerobic treatment before reaching seasonal high groundwater, or other sensitive receptors.

Figure 5. Soil Percolation Rates

MBA



OLSBA



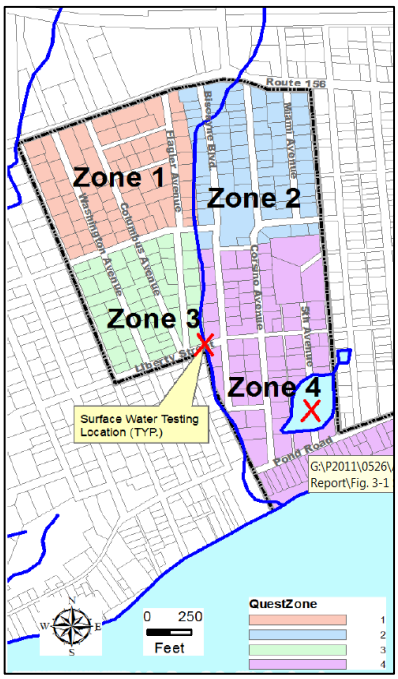
Source: Wastewater Facilities planning reports by Fuss and O'Neill for MBA and OLSBA.

f. Groundwater and surface water sampling program: As discussed in 1(a) and 1(b) above, wastewater discharged into the ground needs to have an adequate, vertical and horizontal, separation from sensitive receptors, coupled with adequate soil percolation rates, in order to maximize wastewater renovation within the soil matrix.

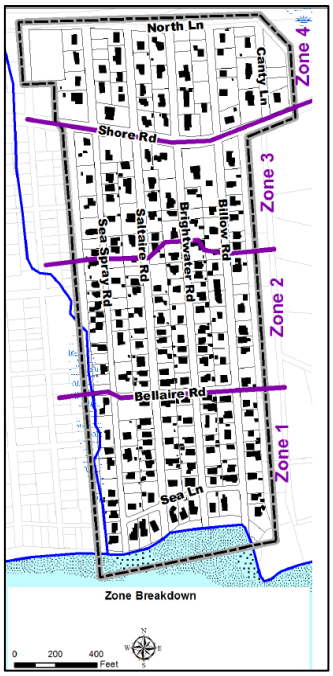
To further understand the existing groundwater quality conditions within the project area, OLSBA and MBA conducted groundwater sampling during the summer of 2011 and 2013, respectively. These two associations were divided into 4 distinct zones and a total of 8 monitoring wells (2 in each zone) were installed down to an average depth of 10'. Within MBA, groundwater was found in six of the eight sampling locations at an average depth of (+/-) 30". Within OLSBA, groundwater was found in 3 of the 8 sampling locations at a depth of approximately 24", with deeper depths in areas closer to the Route 156 corridor. OCBCA tested groundwater quality in August of 2011 and documented groundwater depths throughout the association, ranging between 22" to 43".

The following figure shows approximate sampling locations within the Associations.

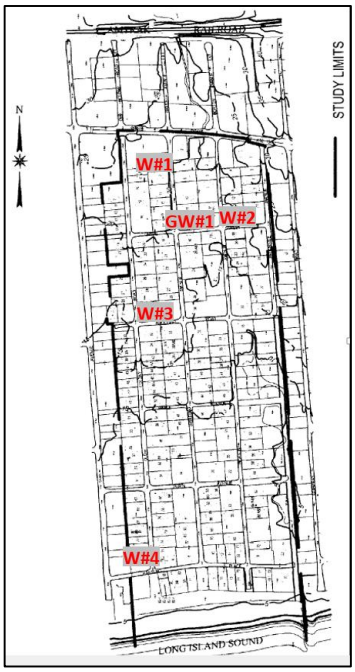
Figure 6. Surface and Groundwater Sampling Areas



MBA



OLSBA



OCBCA

Tables 1, 2 and 3 are summaries of the ground and surface water quality testing results associated with the aforementioned sampling program.

Groundwater Monitoring Results

Table 1

Miami Beach Association								
	Zone 1		**Zone 2**		**Zone 3**		**Zone 4**	
Description	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Total Coliform	>2,000 [B]	14,140 [A]	6,130 [A]	380 [B]	4,880 [A]	>24,200 [A]	6,130 [A,B,C]	190 [A]
Fecal Coliforms	<10 [A,B,C]	70 [A]	>2,000 [B,C]	<10 [A,B,C]	1,800 [B]	1,500 [A]	<10 [A,B,C]	<10 [A,B,C]
Enterococci Bacteria	<10 [A,B,C]	120 [B]	2,500 [B]	20 [A]	<10 [A,B,C]	<10 [A,B,C]	<10 [A,B,C]	20 [A]
Escherichia Coli	<10 [A,B,C]	<10 [A,B,C]	>2,000 [B]	<10 [A,B,C]	40 [B]	<10 [A,B,C]	<10 [A,B,C]	<10 [A,B,C]
Ammonia as Nitrogen	0.45 [A]	16.8 [C]	1.75 [C]	0.15 [C]	16.9 [A]	0.17 [A]	43.4 [B]	5.68 [B]
Total Kjeldahl Nitrogen	1.8 [A, B, C]	1.8 [A, B, C]	4.17 [B]	1.31 [A]	18.2 [A]	1.20 [A]	44.9 [B]	6.32 [B]

Source: Page 55. Miami Beach Facilities Plan by Fuss & O'Neill (April 2015)

Sample results from: (A) 6/26/2013 (B) 7/24/2013 (C)8/21/2013

Bacteria testing results presented in colonies/100 ml. Other parameters shown in mg/l

Table 2

Old Lyme Shores Beach Association								
	Zone 1		Zone 2		Zone 3		Zone 4	
Description	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Total Coliform	>2,000 [C]	>2,000 [C]	>10,000 [B]	>2,000 [C]	>2,000 [C]	>2,000 [A,C]	>10,000 [B]	>2,000 [B]
Fecal Coliforms	<10 [A,B,C]	>1,000 [C]	<100 [B]	<10 [A,B,C]	<10 [A,B,C]	>2,000 [C]	>1,000 [C]	>1,000 [C]
Enterococci Bacteria	<10 [A,B,C]	30 [A]	>1,000 [A]	<10 [A,B,C]	10 [B]	20 [B]	2500 [B]	30 [C]
Escherichia Coli	<10 [A,B,C]	>600 [C]	<100 [B]	<10 [A,B,C]	<10 [A,B,C]	>2,000 [C]	>600 [C]	>600 [C]

Source: Old Lyme Shores facilities planning report by Fuss & O'Neill (2011)

Sample results from: (A) 8/8/2011 to 8/9/2011 (B) 8/14/11 – 8/17/11 (C) 8/24/2011

Bacteria testing results presented in colonies/100 ml. Other parameters shown in mg/l

Table 3

Old Colony Beach Club Association					
Private Wells					
	Nitrate	TKN	Ammonia	Escherichia Coli	Total Coliform
W#1	3.5	8.1	5.8	>1,000	>2,000
W#2	7.1	1	0.04	<10	40
W#3	<0.05	0.18	0.03	<10	<10
W #4	4.5	<0.01	<0.02	<10	50
W#5	1.5	2.1	0.32	>60	>2,000
Groundwater Sump Pump Discharge					
GW#1	7.5	1.8	0.47	20	610

Source: RFP Engineering. OCBCA, Wastewater Management Plan. January 2012.

Samples taken in August of 2011

Bacteria testing results presented in colonies/100 ml. Other parameters shown in mg/l

In the case of MBA, monitoring results showed in all zones very high levels of total coliform exceeding US-EPA drinking water quality requirements. MBA samples showed high levels of Ammonia in areas 1, 3 and 4 indicating raw sewage pollution. Total Kjeldahl nitrogen was also high in areas 1, 3 and 4, exceeding state and federal requirements. Other parameters of concern were also detected at high levels in one or more sampling events as summarized in this section.

Monitoring results within OLSBA consistently showed high bacteriological counts in all areas in one or more sampling events. High levels of coliform bacteria and E. Coli were also detected within OCBCA with higher levels of Ammonia in areas closer to the shoreline. High bacterial concentrations may indicate the presence of disease causing organisms. Public health code requirements indicate that drinking water must be free of bacteria in order to be considered safe for human consumption.
Samples obtained from surface waters within the associations (i.e. stormwater swales

in all three associations and pond at MBA) predominantly showed very high bacterial counts. Given prevailing area conditions, shallow groundwater may be surfacing in stormwater swales and work as a conduit for polluted waters to reach Long Island Sound. High bacterial loadings in groundwater may be drawn into the Sound by the "pulling" effect exerted by tidal movement.

In summary,

- The Federal Safe Drinking Water Act ("SDWA") does not allow any concentration of total coliforms in groundwater, which includes fecal coliform and Escherichia Coli. High concentrations of various pathogenic organisms were detected in all three Associations in several of the samples.

- Additional nutrient and pathogenic testing data available with Old Lyme for OCBCA shows high ammonia and pathogenic concentrations of parameters in several of the samples taken within this association.

- The maximum Total Nitrogen concentration allowed in state drinking water quality standards is 10 mg/l. Total Nitrogen is the sum of total Kjeldahl nitrogen plus Nitrite and Nitrate. Presence of nitrates and ammonia (above background levels) in some of the samples is a clear indication of incomplete wastewater renovation.

2. Analysis of Alternatives

In order to address the community pollution problem posed by the aforementioned conditions, the studies looked at several alternatives. The alternatives evaluated included the following:

a. Conventional septic system upgrades: Conventional upgrades of the existing onsite wastewater treatments systems that meet current health code requirements is not a long term alternative for addressing the community pollution concerns given the high density of development, septic system crowding, prevalent subsurface site conditions and climate change.

b. Small community systems: Under this alternative, the combined wastewater flows would be conveyed to a centralized location for treatment and subsurface disposal. However, no suitable sites within the corporate limits of the Associations were identified for achieving this purpose. The Associations, and Old Lyme, evaluated a local small community system with a treatment facility and discharge into a large underground dispersal system at the site referred to as "Cherrystones". A detailed engineering evaluation of this site identified significant limitations for its use which included potential impacts on a nearby public well field administered by Connecticut Water Company. This alternative was ruled out due to its high construction and operational costs, and potential impact on nearby drinking water sources.

c. Decentralized wastewater management: Under this alternative each lot would have its own "miniature" wastewater treatment plant with a site specific engineered septic system design. A spring system "start-up" would be needed every year before seasonal houses are occupied to ensure proper operation during the summer months. An operation and maintenance contract would also be needed for the life of each

system. This alternative was ruled out due to its excessive cost coupled with inherent challenges associated with siting a significant number of these systems in a flood prone area.

d. Centralized sewer system: Gravity pipes would collect wastewater within the Associations and conveyed to East Lyme via a centralized pump station and force main pipe. From East Lyme the wastewater is conveyed through Waterford for ultimate treatment at the New London wastewater treatment facility. The centralized sewer approach has the lowest capital, operational and maintenance cost of all the alternatives evaluated as shown in the summary table below. Additional project cost reductions could be achieved on shared conveyance infrastructure, should Hawks Nest and Sound View Beach participate in implementing a unified solution with the Associations.

Table 4. Estimated Capital & Operations and Maintenance Costs of Wastewater Management Alternatives Evaluated

Wastewater Management Alternative	**Collection System Type**	**Opinion of Capital Cost ($)[2]**	**Estimated Annual Operation and Maintenance cost ($)**	**20-year Capital Cost per Typical Household ($)**
Advanced Treatment Units [1]	None	19,980,000	340,000	38,000.00
Small Community System [3]	Gravity Sewer within Associations. Pump station and force main to local treatment facility and subsurface disposal site.	25,950,000	317,900	39,000.00
Centralized sewer (Regional Shoreline Approach)[4][5]	Gravity Sewer within Associations, Centralized Pump Station and Force Main to East Lyme	15,900,000	61,000	24,000.00

1. Cost per household may vary as Advanced Treatment Unit would have to be custom designed on lot-by-lot basis.
2. Costs include Clean Water Fund grant funding and low interest loans for capital costs. 20 Year Cost shown on a per parcel basis for 666 sewer connections (Developed lots plus vacant lots meeting R-10 zoning requirements). Cost estimates are presented in 2013 dollars.
3. Small Community System Opinions of Cost based on Coastal Wastewater Management Plan Local Alternative draft dated December 20, 2014 by Woodard & Curran, reduced by ratio of EDUs from 1,391 to 666.
4. Other centralized alternatives evaluated in Fuss and O'Neill report are not included in this table due to their higher Capital and O&M cost.
5. Cost include gravity sewer within MBA OLSBA and OCBCA and shared pump station and force main. Cost of green infrastructure, potable water and extensive roadway reconstruction are not included in the cost estimate.

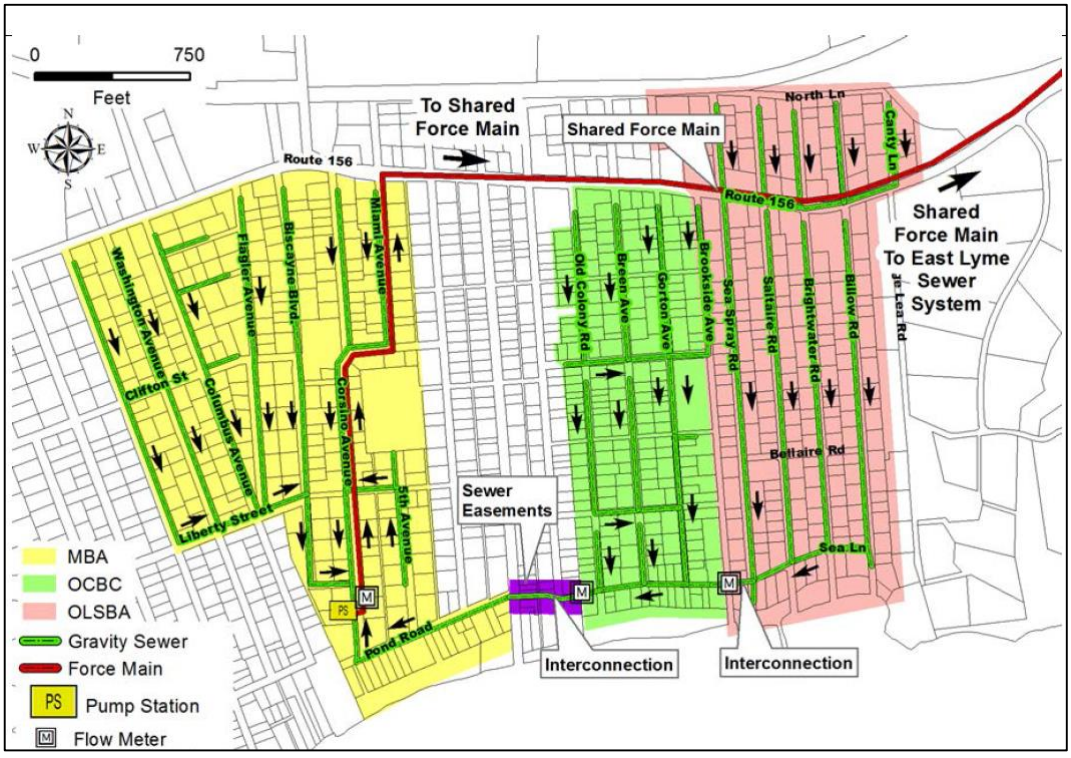
3. Recommended alternative:

The centralized gravity sewer system constructed by the three beach Associations has been identified the most cost effective and technically feasible solution. Wastewater within MBA, OCBCA and OLSBA, would be collected via gravity pipes and conveyed through one shared pump station and force main. It is currently envisioned that the centralized pump station would be located within MBA. Wastewater from OCBCA would be transported to MBA through an easement located within Sound View. The pipe traversing across Sound View would enable this community to tie-in, should Old Lyme join the Associations in the future.

From the Associations, wastewater would be conveyed through the towns of East Lyme and Waterford collection systems for final treatment at the New London Water Pollution Control Facility (tri-town system). Ample conveyance and treatment capacity has been documented to exist within the tri-town system to address the identified community pollution problems. It is expected that an Intermunicipal Agreement, and an accompanying buy-in payment, will be necessary to allow the Associations to utilize the tri-town wastewater system. The centralized sewer alternative includes a conservative buy-in payment estimate to downstream municipalities. Upgrades to a limited amount of wastewater infrastructure components within the tri-town system may be implemented in lieu of a "cash" buy-in payment.

The associations would seek state funding assistance through the Reserve for "Small Community Projects" included in DEEP's Clean Water Fund priority list. Funding under this category would enable the Associations to qualify for a 25% grant, and a 20-year low interest loan for eligible portions of the project. Concurrently, MBA and OLSBA intend to seek funding assistance from the Connecticut Department of Public Health Drinking Water State Revolving Fund to implement upgrades to their water supply systems.

Figure 7. Proposed regional solution



Source: Fuss and O'Neill, MBA Wastewater Facilities Planning Report, April 2015

Flow from the Associations is expected to vary significantly due to fluctuations in population between the summer months versus other times of the year. An estimated 30% of the total number of households in MBA, and 10% of homes at OCBCA and OLSBA are occupied on a year-round basis, and therefore it is expected that during the "off season" flows will decrease substantially. The Associations are nearly fully built out with low potential for new development (20 lots pursuant to local R-10 zoning regulations) thereby minimizing concerns associated with induced-growth. The tables below summarize the expected flows from the regional project area during summer months:

Table 5. Estimated Wastewater Flows from the Associations

Beach Association	**Number of EDU's**	**Average Daily Flow (gallons per day)**	**Maximum Daily Flow (gallons per day)**
MBA	234	55,000	110,000
OLSBA	196	46,000	92,000
OCBCA	236	55,000	111,000
TOTAL [(1)]	**666**	**156,000**	**315,000**

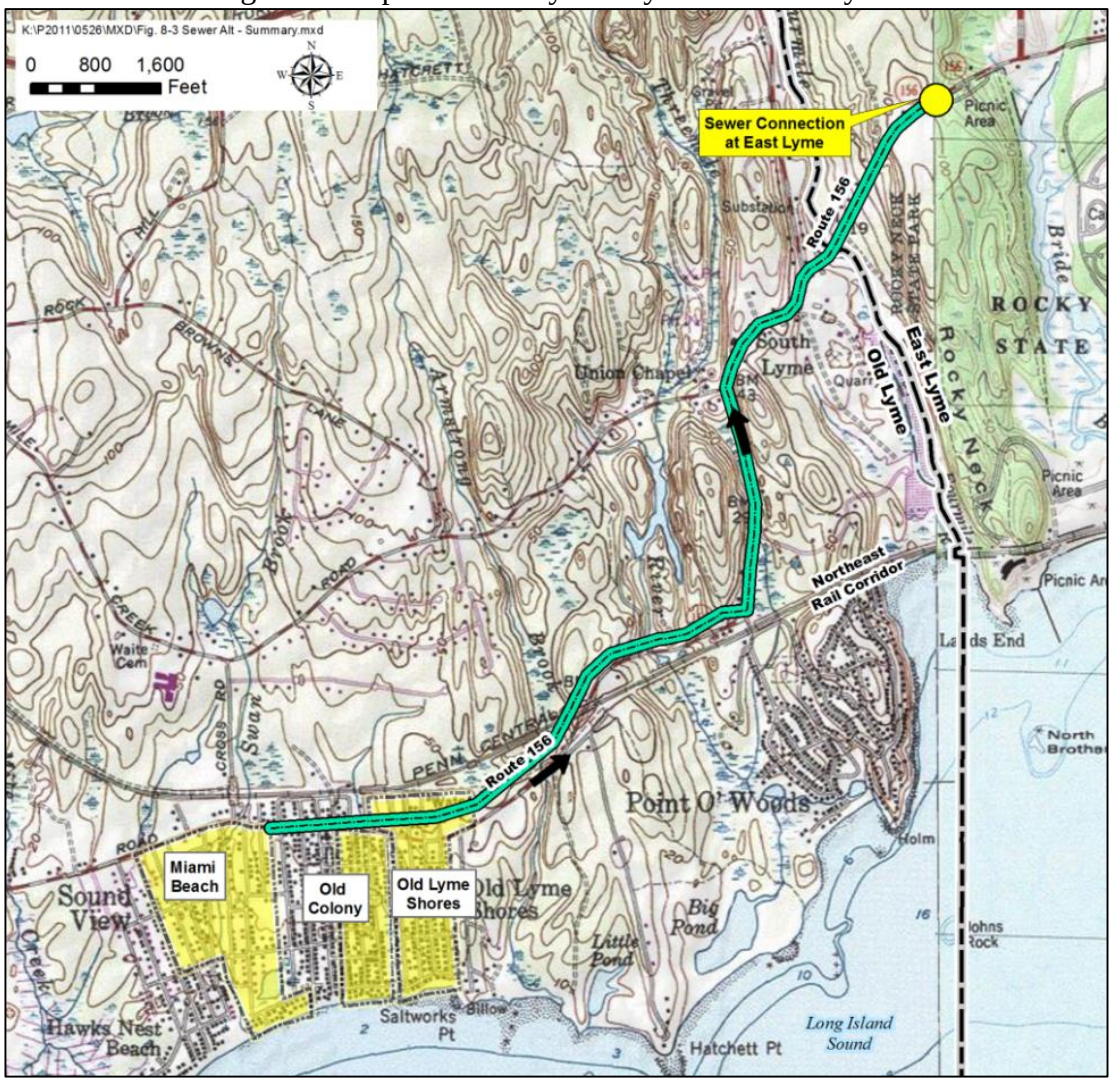
Source: RFP Engineering and Fuss & O'Neill, Inc., facilities planning reports.

1. Shared conveyance infrastructure would be designed with enough capacity to handle additional flows from Hawks Nest and Sound View areas. This would add approximately 100,000 GPD to the total average design flow listed above. Source: Woodard and Curran 2012 Coastal Wastewater management report, December 2014.

It is important to note that based on existing flow data provided by the Town of East Lyme for the recently sewered Point O'Woods Beach Community ("POW"), actual wastewater flows from the regional beach neighborhoods are expected to remain below design estimates for the initial years after project completion. The lower flows will expectedly result in reduced operation and maintenance costs. Between June 2013 and September 2014, POW discharged an average of 20,011 GPD versus the estimated average design daily flow of 105,000 GPD. The peak month wastewater flow recorded was 40,569 in September 2014.

The facility planning reports identified other capital project needs within the Associations, such as improvements to the drinking water systems within MBA and OLSBA, upgrades to stormwater infrastructure which will include, where feasible, green infrastructure, and improvements to community roadways. It is envisioned that execution of these projects will be conducted concurrently with the installation of the sewer system, thereby maximizing the cost effectiveness and minimizing construction-related impacts.

Figure 8. Proposed Conveyance system to East Lyme



Source: Fuss and O'Neill, MBA Wastewater Facilities Planning Report, April 2015

Evaluation of Environmental Impacts

1. Impacts on air quality, ambient noise levels, and water quality and quantity.

   a. Air Quality – It is expected that short-term effects on the air quality in the immediate vicinity during construction would occur with the primary pollutant of concern being dust and construction vehicle exhaust. In order to minimize air quality issues, the contractor will be required to mitigate levels of excessive dust through the application of calcium chloride or water to unpaved areas subject to vehicular traffic. Contractor will be required to implement best management practices such as covering stockpiled materials as necessary and spraying water and/or applying chemical treatments (calcium chloride) to minimize dust as needed.

   The Department typically encourages the use of newer off-road construction equipment that meets the latest US-Environmental Protection Agency or California Air Resources Board (CARB) standards. If that newer equipment

cannot be used, equipment with the best available controls on diesel emissions including retrofitting with diesel oxidation catalysts or particulate filters in addition to the use of ultra-low sulfur fuel would be the second choice that can be effective in reducing exhaust emissions. The use of newer equipment that meets EPA standards would obviate the need for retrofits.

The Department also encourages the use of newer on-road vehicles that meet either the latest EPA or California Air Resources Board (CARB) standards for construction projects. These on-road vehicles include dump trucks, fuel delivery trucks and other vehicles typically found at construction sites. On-road vehicles older than the 2007-model year typically should be retrofitted with diesel oxidation catalysts or diesel particulate filters for projects. Again, the use of newer vehicles that meet EPA standards would eliminate the need for retrofits.

Additionally, Section 22a-174-18(b)(3)(C) of the Regulations of Connecticut State Agencies (RCSA) limits the idling of mobile sources to 3 minutes. This regulation applies to most vehicles such as trucks and other diesel engine-powered vehicles commonly used on construction sites. Adhering to the regulation will reduce unnecessary idling at truck staging zones, delivery or truck dumping areas and further reduce on-road and construction equipment emissions. Use of posted signs indicating the three-minute idling limit is recommended. It should be noted that only DEEP can enforce Section 22a-174-18(b)(3)(C) of the RCSA. Therefore, it is recommended that the project sponsor include language similar to the anti-idling regulations in the contract specifications for construction in order to allow them to enforce idling restrictions at the project site without the involvement of the Department.

b. Noise - Current noise levels in the vicinity of the construction area are typical of those expected in a commercial/residential setting with the primary source of noise being vehicular traffic. Construction of the sewer will result in a temporary increase of noise. Construction activity will occur during daytime hours when higher sound levels are generally more tolerable at nearby receptors. Adverse noise impacts due to construction activities would be temporary in nature.

c. Water Quality and Quantity- A positive impact to the environment and to public health will result from the elimination of substandard subsurface disposal systems which discharge partially treated sewage into the groundwater and to surface waters. This project will result in improvements to surface water and groundwater in the immediate vicinity of Long Island Sound. Groundwater may be encountered during construction; in order to minimize impacts, the contractor will have sedimentation basins in areas where dewatering activities are occurring so that particulate matter will settle out prior to being discharged to the ground or surface water. Implementation of green infrastructure principles including Best Management Practices such as rain gardens, pervious pavers at the pump station, infiltration basins beneath the roadways and bioretention swales will further reduce pollutant loads to the Sound.

Stormwater discharges from construction sites where one or more acres are to be disturbed, regardless of project phasing, require an NPDES permit from the Permitting & Enforcement Division. The General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities (DEEP-WPED-GP-015) will cover these discharges. The construction stormwater general permit dictates separate compliance procedures for locally approvable projects and locally exempt projects (as defined in the permit).

Locally exempt construction projects disturbing over 1 acre must submit a registration form and Stormwater Pollution Control Plan ("SWPCP") to the Department. Locally approvable construction projects with a total disturbed area of one to five acres are not required to register with the Department provided the development plan has been approved by a municipal land use agency and adheres to local erosion and sediment control land use regulations and the CT Guidelines for Soil Erosion and Sediment Control. Locally approvable construction projects with a total disturbed area of five or more acres must submit a registration form to the Department prior to the initiation of construction. This registration shall include a certification by a Qualified Professional who designed the project and a certification by a Qualified Professional or regional Conservation District who reviewed the SWPCP and deemed it consistent with the requirements of the general permit. The SWPCP for Locally Approvable projects is not required to be submitted to the Department unless requested.

The SWPCP must include measures such as erosion and sediment controls and post construction stormwater management. A goal of 80 percent removal of total suspended solids from the stormwater discharge shall be used in designing and installing post-construction stormwater management measures. The general permit also requires that post-construction control measures incorporate runoff reduction practices, such as low impact development techniques, to meet performance standards specified in the permit. For further information, contact the division at 860-424-3018. A copy of the general permit (Stormwater and Dewatering Wastewaters from Construction Activities) as well as registration forms can be downloaded from DEEP's website.

Development plans for utilities in urban areas that entail soil excavation should include a protocol for sampling and analysis of potentially contaminated soil. A soil management plan should be developed for the project to deal with soils during construction. The Department's Guidance for Utility Company Excavation should be used a guide in developing the plan. The guidance is available on DEEP's website.

2. Impact on a public water supply or adverse effects on groundwater

   a. Groundwater - The proposed project will provide the minimum separation distance from sanitary sewer, manholes, pump station and cleanouts to public water supply wells or lines pursuant to the Regulations of Connecticut State Agencies (RCSA) section 19-13-B51 (d). In addition to ensuring that the

sanitary sewer system is designed to be protective of public health, during construction and commissioning of the proposed sewer system the recommendation in the "General Construction Best Management Practices for Sites within Public Drinking Water Supply Area" will be adhered to.

The United States Geological Survey presented three technical papers based on a hydrogeological study conducted of the Sound View Well Field in Old Lyme. Study results demonstrated that groundwater in the project area flows predominantly in a North-South direction. The Associations are located at the most downgradient position of the groundwater aquifer in this area and therefore, it is highly unlikely that sewers will have a negative impact on groundwater replenishment in project area. There are no aquifer protection areas mapped in Old Lyme based on DEEP GIS mapping.

b. Public Water Supply – There are public wells in the immediate vicinity of the project area. Three wells within MBA are administered by the Miami Water Company (no relation to MBA). The withdrawal rate of the wells is being kept under 10 gallons per minute to maximize the protective sanitary buffer of the wells given the location of nearby wastewater septic systems. With the reduced water supply, only 117 households can be served by the public wells. The remaining properties rely on onsite water supply and will likely continue to do so.

The public water system supplying water to OLSBA is owned and operated by the Connecticut Water Company ("CWC"). One of the wells supplying water to OLSBA is located northwest of the association on the north side of the Amtrak's railroad. The water system within OLSBA is unreliable with the supply lines buried above-the frost line. In order to address this issue, OLSBA intends to partner with CWC to upgrade this system.

Abandonment of the onsite septic systems and conversion to public sewers will reduce the pollutant discharge to the groundwater which may affect public and private drinking water wells. The sewer system will be designed and constructed to be protective of existing water supply infrastructure. It is expected that OCBCA won't be implementing any upgrades to its water supply system.

3. Impacts to Flood Plains, coastal zone, tidal and inland wetlands, erosion, or sedimentation.

a. Flood Zones – The Associations are located in an area that would be impacted by floodwaters of some depth, and which are delineated by the Federal Emergency Management Agency (FEMA). The proposed project is located within the 100-year and 500-hundred year elevation shown on FEMA DFIRM flood zone map. With increased resiliency and safety, the Association sewer, the proposed infrastructure will be built to withstand impacts of large storm events as a result of climate change. All construction grades associated with the installation of the sewers will be reestablished to pre-construction conditions to minimize concerns associated with displacement of available flood storage volume.

Existing and future wastewater infrastructure must be designed with a much greater emphasis on the ability to either survive or restore operational capability as soon as possible after a major climatic event. In light of actionable guidance such as federal executive order # 13690 of January 2015, the proposed wastewater infrastructure will be designed to ensure conformance with applicable standards related to this matter.

b. Coastal zone - The project area is located within a state designated coastal boundary and therefore a coastal consistency review with DEEP office of Long Island Sound programs may be necessary for the project. No significant impacts to coastal resources are expected associated with the project. The project area is densely developed and all construction will take place within existing pre-disturbed areas.

c. Aquifer protection - The project area is not within an Aquifer Protection area.

d. Tidal wetlands – Gravity sewers and shared wastewater infrastructure will be installed within pre-disturbed roadways, therefore no direct impacts to tidal wetlands are currently envisioned. The force main line that will convey flow to East Lyme will have a tidal wetland jurisdictional crossing underneath the 3-mile river, and also an aerial crossing across the 4-Mile River. It is currently envisioned that the 3-Mile River crossing will be conducted via trenchless pipe installation technology thereby negating the need to disturb surficial tidal substrate or vegetation. The force main pipe will be suspended from the bridge that crosses the 4-Mile River. A permit from DEEP Office of Long Island Sound programs will be needed for both jurisdictional crossings.

e. Inland wetlands - There are inland wetlands adjacent to the Project Area; however, there are no anticipated direct/indirect impacts to federally-recognized and state inland wetlands since work will be done outside of existing wetland areas. An Old Lyme Wetlands Permit may be required for construction activities occurring on land within 100 feet of any wetland or watercourse (upland review area) or 400 feet from a vernal pool. No structures will be installed in wetland areas.

f. Impacts associated with erosion or sediment migration - Erosion and sediment controls will be maintained and silt fence, silt sacks and haybales will be installed where deemed necessary within project area. Erosion and sedimentation control measures will comply with the Connecticut Guidelines for Erosion and Sedimentation Control, as amended.

4. Disruption or alteration of an historic, archeological, cultural or recreational building, object, district, site or surroundings

a. Impacts to artifacts of archeological value - A review request was submitted to the State Historic Preservation Office (“SHPO”), up until the day this document was completed no response had been received from the SHPO. Given the proximity of the project area to the shoreline, a Phase I archeological survey may be necessary prior to construction initiation, though the project area has been

significantly disturbed.

b. Connecticut Natural Diversity Database ("NDDB") – A preliminary review of "State and Federal Listed Species and Significant Natural Communities Maps" dated December 2014 and NDDB database indicates that no endangered or threatened species were found to exist within the Associations or within the conveyance corridor to East Lyme along Route 156. NDDB mapping identifies general areas of concern for known occurrences of State and Federally-listed endangered, threatened and special concern species and significant natural communities.

5. Use of pesticides, toxic, or hazardous materials or any other substance in such quantities as to create extensive detrimental environmental impact – No significant impact expected. The proposed pump station will be equipped with a back-up emergency generator with diesel fuel and a chemical dosing facility for odor control. These components will be designed to meet State and Federal flood and spill proofing requirements in order to restore operational capability as soon as possible after a major weather event, and to protect the surrounding environment.

6. Substantial aesthetic or visual effects – the project is not expected to cause substantial aesthetic or visual impacts in the area. The proposed pump station will be housed inside a building that will be designed to blend-in with the architectural character of the surrounding area.

7. Consistency with state Conservation & Development plan ("C&D")- This project is generally consistent with the three of the growth management principles identified within the C&D Plan; specifically Principles #4, #5, and #6.

Principle #4 of the C&D plan is concerned with the conservation and restoration of the natural environment. The Associations are located within a hurricane inundation zone. Resiliency in the face of an impending climate change storm event is a major theme throughout the conservation and development policies.

Utilizing a combination of green infrastructure and appropriate flood proofing measures within regional project area will minimize potential adverse impacts on nearby environmental resources and at the same time increase resiliency of proposed wastewater infrastructure during large storm events. Increased resiliency in this flood-prone area is also critical to avoid health hazards such as the documented risk for flooding septic systems throughout the area. Implementation of adequate flood proofing measures will allow proposed wastewater infrastructure to restore operational capability as soon as possible after large storm events.

Green infrastructure improvements proposed to be incorporated (where technically feasible) in the project area may include: rain gardens, bio-swales, stormwater, retention basins, infiltration basins, pervious pavement, rain barrels, and/or flow-through planters.

Principle #5 of the C&D plan is concerned with the protection of environmental assets which are critical to public health and safety. Sewer construction is in sync with environmental pollution prevention and protection of public health and

safety. Sewer strategies to adapt to climate change are critical to protect the integrity of environmental assets directly linked to public health. The development of a sewer system will inherently protect the availability of safe and adequate public water supplies, particularly during severe storm events. Due to the fact that the Associations are located in a Hurricane Inundation zone, our recommended alternative will be designed with considerations for wastewater infrastructure in flood prone areas.

Resiliency efforts support the introduction of a public sewer system to minimize the risks associated with onsite wastewater systems. This project will introduce sewers at a scale specifically designed to minimize environmental and public health risk without encouraging extensive development. The funding agreement between the State and the associations will include conditions to allow the development of vacant parcels only if two conditions are fully met: 1) A code-compliant onsite wastewater renovation system could be built on the proposed lot and 2) the vacant lot meets minimum zoning regulations. If any of these two conditions are not full met, then the vacant lot will not be allowed to be developed. These elements are consistent with the policies outlined within the 2013-2018 C&D plan.

Principle #6 references coordination between local and state governments. CEPA, the Connecticut Environmental Policy Act, provides a framework for policy and planning for actions of the state government. CEPA confirms consistency with local planning documents and the State C&D Plan to provide a fully integrated and collaborative approach. The regional alternative enables the Associations to implement a unified and holistic solution for addressing common wastewater management needs in coordination with the tri-town municipalities. As previously mentioned, the proposed solution would also allow Old Lyme to participate, should they desire to do so in the future.

The C&D Interactive Locational Guide Map identifies the Associations as predominantly in a Balanced Priority Funding Areas ("BPFAs") with some portions located in a Priority Funding Area ("PFA"). This classification is mostly given due to the fact that the Associations are located in an urban area (2010 census) and in a Hurricane inundation zone.

8. Displacement or addition of substantial number of people – Development of commercial and industrial land is not expected to increase the number of people. There is no area currently zoned industrial or commercial within the Associations.

9. Substantial increase in congestion (traffic, recreational, other) – the proposed project may cause temporary traffic backups or detours during construction. Since the Associations are nearly fully built-out, no significant long term increases in traffic are expected due to the sewer extension.

10. Substantial increase in the type or rate of energy use as a direct or indirect result of the action – The pump station will be designed with state of the art technology to achieve maximum energy efficiency and operational reliability.

11. The creation of hazard to human health or safety – The project is not expected to

create a hazard to human health or safety. The project will improve public health through elimination of subsurface sewerage disposal systems which have the potential to pollute groundwater beneath the project area and leach into surface waters.

12. Impacts to agricultural land - No impacts to agricultural land will take place associated with this project.

13. Any other substantial impact on nature, cultural, recreational or scenic resources – No significant impacts are expected as part of the project. As previously discussed, proposed sewers will serve existing development.

Scoping notice comments

In accordance with Connecticut Environmental Policy Requirements, a scoping notice was issued on July 22, 2014 for the town of Old Lyme study. The Associations are subset communities located within the overall shoreline project area and therefore the scoping notice issued for Old Lyme suffices the initial public notice requirements for the Associations.

- *Eric Thomas of CT-DEEP (email, dated August 20, 2014), inquired as to whether a new pump station would be required at the location of the existing Niantic Pump Station in East Lyme due to the additional flows Old Lyme beach communities.* The existing tri-town conveyance and treatment system has ample capacity to handle the additional wastewater from Old Lyme shoreline communities. No upgrades or reconstruction of the Niantic pump station is necessary. However, as mentioned above, upgrades to a limited amount of wastewater infrastructure components within the tri-town system to increase operational reliability and resiliency may be implemented in lieu of a "cash" buy-in payment**.** The town of East Lyme through its water and sewer department is ultimately responsible for implementing an operation and maintenance program of its wastewater collection system.

- *Marcy Balint of CTDEEP (email dated August 20, 2014). Her comment related to the construction of sewers in areas under the regulatory purview of the Connecticut Coastal Management Act ("CCMA"), as codified in Connecticut General Statutes Section 22a-95(b)(1)(B).* The proposed sewer system is being built to address on a long term basis community pollution within the Associations. While the proposed project area is densely developed with a prevalence of small size lots, a number of different controls will be put in place to minimize the potential for additional growth or intensification of use. These will include development of an ordinance which defines and controls the sewer service area. Such ordinances and regulations have been adopted in other Connecticut communities with great success. The project area is nearly fully built out with low infilling potential. There are approximately 20 potential developable lots within the Associations (i.e. meeting R-10 zoning requirements) which would, under such an ordinance, require confirmation that a code compliant system could be constructed on the lot prior to development. In other words, if an existing "R-10" vacant lot is not developable at the present time, that is, if an approvable conventional septic system cannot be constructed to current public health code standards on the property (without any variances to State Health Code), then the property owner will not be provided with the means to develop that otherwise

undevelopable property. Additional restrictions are being evaluated which may restrict the enlargement of existing homes unless the property owner can demonstrate that a code compliant septic system can be installed to support a proposed building addition. Properties that fail to successfully demonstrate this condition, without any variances to State Health Code, and compliance with additional local zoning requirements would not be allowed to perform such modifications.

Since state funding is expected to subsidize the project under the "Small Community Reserve" administered by the Clean Water Fund Program, there will be conditions specified in the funding agreement that will incorporate the above-mentioned conditions. Additional control measures will include the implementation of an inter-municipal agreement with the "tri-town" municipalities which will limit the amount of flow that can be discharged into the system from the project area. Sanitary sewers will ultimately be limited to the confines of the Associations boundaries as identified in the sewer service maps for the project.

- *Ellen Blaschinski of the Department of Public Health (email dated August 22, 2014). The letter included questions relating to the sewers supporting existing needs and minimizing induced-growth concerns in the proposed service area. Said letter also stated that State health code regulations governing the intensification of use activities in areas relying on septic systems ensure that development does not expand beyond the capacity of the land to renovate and dispose of wastewater.* Given the documented conditions, the capacity of the land to satisfactorily renovate wastewater has been surpassed. This project will introduce sewers at a scale specifically designed to minimize environmental and public health concerns associated with the existing high density of development and septic system crowding conditions, without encouraging additional development. As discussed above, vacant lots would have to be compliant with existing local zoning regulations and demonstrate that can sustain a fully code compliant septic system in order to be allowed to tie into the sewer system. Other collateral concerns associated with intensification of use and induced growth relate to the expansion of home footprints once septic systems are removed. As discussed above, any propose home expansions of the property would have to be fully compliant with health code regulations.

  The Connecticut Coastal Management Act ("CCMA") and State Flood Management program contain regulatory tools codified in Connecticut General Statutes Sections 22a-92(b)(1)(B) and 25-68 respectively, for evaluating and restricting potential collateral impacts associated with these concerns. Based on these regulatory powers coupled with the induced-growth control measures discussed above, the state funding agreement will include restrictive language to minimize these concerns. While it is expected that environmental and public health benefits that will be achieved through the implementation of the proposed sanitary sewers will significantly offset any other collateral concerns, it is also the state's priority to minimize the exposure of lives and property to flood hazards, reduce non-point source pollution impacts and avoid potential overloading of other infrastructure in the project area. The Associations, with DEEP oversight, will be responsible for implementing tools for developing a methodology for implementation of mitigative measures to address these concerns.

  Construction of the sewer system will be conducted in a manner that is protective of water supply infrastructure. Existing septic system will be abandoned in accordance

with Public Health Code requirements once the sanitary sewer system is constructed.

- *Bruce Wittchen, Connecticut Office of Policy & Management submitted a letter to CT-DEEP on August 22, 2014. The letter is requesting clarification on the rationale for the alternative selection, expectations for expansion of sewer service area, and how climate change considerations are being incorporated.* The Associations, and Old Lyme, evaluated several wastewater management alternatives which included a local small community system with a treatment facility and discharge into a large underground dispersal system at the site referred to as "Cherrystones". A detailed engineering evaluation of this site identified significant limitations for its use which included potential impacts on a nearby public well field administered by CT Water Company. As a result, the recommendation of the engineering studies is to convey the wastewater to the New London Regional wastewater treatment plant. The regional alternative has a significantly lower capital and O&M cost associated therewith and for this reason was selected to address the identified wastewater management needs in the project area. The proposed sewer system will serve existing developed properties with the potential of serving additional vacant lots if the conditions discussed in the preceding paragraphs are met. It is envisioned that upgrades to other infrastructure within the Associations such as stormwater and drinking water systems will be conducted concurrently with the sewer system to maximize project cost efficiency, and to increase storm resiliency and preparedness. Substandard septic systems which are prone to flooding will be eliminated which may facilitate the retrofitting of existing properties to better withstand the effects of flooding events and improve community recovery times after severe climatic events. Proposed wastewater infrastructure will be designed and constructed to meet resiliency and preparedness requirements in flood prone areas.

- *David Potts of Killingworth, Connecticut submitted a letter to CT-DEEP on August 8, 2014. The letter advocates for the continued use of on-site wastewater management systems.* The documented limiting site conditions make cost effective onsite repairs infeasible as a long term alternative. The proposed project is to address existing pollution concerns associated with excessive densities of development coupled with septic system crowding and poor soil conditions; while minimizing to the maximum extent possible any additional development pressures that may arise associated with the project. Implementation of decentralized alternatives were evaluated and ruled out due to the unavailability of suitable land and high density of development. Sewers will be designed to address identified needs within a clearly delineated sewer service area and will not result in additional encroachments of adjacent coastal resources.

  Monitoring data clearly indicates elevated concentrations significantly above background levels of not only parameters such as ammonia, but also pathogens, both of which are strong indicators of wastewater pollution. Nitrogen and pathogenic contamination is a significant concern during the summer months when people use, very actively, the shoreline for swimming or fishing. Summer months is when people are most likely to come into contact with contaminants. Sampling results are further corroborated by monitoring records maintained by the town sanitarian which show a prevalence of shallow groundwater conditions and ammonia pollution, especially, within the Sound View beach community. Proposed infrastructure will be kept to a minimum with one pump station and force main shared by the three associations (and potentially by Old Lyme). Wastewater within the associations will be collected via

gravity pipes which will further reduce the need for additional pumping equipment within the flood zone. The project will also include, where feasible, the implementation of green infrastructure enhancements to more effectively manage storm water pollution concerns in the project area.

With effective implementation of low impact development, green infrastructure measures and other growth control measures discussed above, secondary effects associated with the proposed project will be minimized substantially.