

## PE 11.1 Innovative and Alternative Onsite Wastewater Treatment Systems (I/A OWTS)

### **Project Summary**

*“Water is the single most significant resource for which Suffolk County bears responsibility. As the impact of Superstorm Sandy underscored, more than at any time in our history, we are obliged to come to terms, in every sense, with the water that surrounds us.” – Suffolk County Executive Steve Bellone*

Suffolk County, a region with a federally designated sole source aquifer, must pay particular attention to the septic systems and cesspools that are degrading our marshland habitats that act as a second line of defense during storm events like Sandy. When flooded or submerged in groundwater, the 360,000 septic systems in Suffolk County do not function as designed and they fail to adequately treat pathogens. Excess nitrogen from this sewage threatens our valuable natural resources, coastal defenses, and human health.

Under the leadership of County Executive Bellone, the County is transitioning to the use of Innovative and Alternative Onsite Wastewater Treatment Systems (I/A OWTS) to effectively treat wastewater through the development of the County’s Reclaim Our Water program.

Suffolk County built the Reclaim Our Water program comprehensively – engaging stakeholders early and often in policy discussions, testing wastewater technologies locally before scaling up the program, working with the liquid waste industry to update licensing requirements and provide training for the industry, securing local and state funding and financing through a local nonprofit to create an affordable septic replacement program for homeowners, as well as launching a responsible management entity to monitor program performance, updating the County sanitary code to allow for the installation of these new technologies and ban the in-kind replacement of cesspools effective July 1, 2019.

*“We have a million and a half people, **approximately 70%**, or roughly a million people, who are **not sewered**. This is probably the only place in the world with that large a density in this tight a space where the waste is going into a sole source aquifer immediately beneath us that we’re drinking, and this is **a big concern**.”<sup>i</sup>*

As the New York State Department of Environmental Conservation’s Long Island Nitrogen Action Plan (LINAP) notes:

*“Nitrogen is the leading cause of water quality deterioration in Long Island’s surface and groundwater. Nitrogen comes primarily from wastewater, such as sewage treatment plants and residential cesspools, fertilizer and stormwater runoff. Discharge from onsite wastewater disposal systems (cesspools and septic systems) reaches groundwater, which ultimately flows to surface waters (bays and estuaries). Excess nitrogen in surface waters stimulates algal (plant) growth which can lead to low oxygen conditions, fish kills, and degraded marine habitats such as marsh land. Nitrogen also contaminates the groundwater which is the sole source of Long Island’s drinking water.”<sup>1</sup>*

According to findings from the County’s Subwatershed Plan, nitrogen pollution from cesspools and septic systems has been identified as the largest single cause of degraded water quality contributing to beach closures, restrictions on fishing, toxic algae blooms, and massive fish kills. Conventional onsite septic systems were never designed to remove nitrogen. Therefore, the average residential septic system discharges approximately forty pounds of nitrogen per year into the local groundwater. These discharges can rapidly reach surface waters where the impacts contribute to the ecological degradation of our marshes,

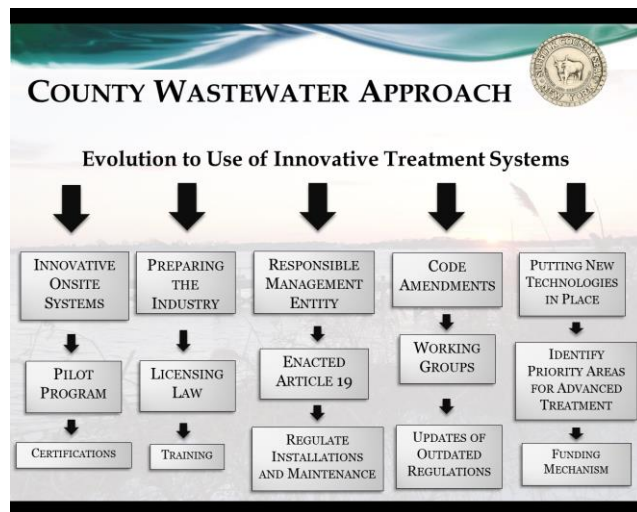
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<sup>1</sup> [https://www.dec.ny.gov/docs/water\\_pdf/linapfactsheet.pdf](https://www.dec.ny.gov/docs/water_pdf/linapfactsheet.pdf)

bays, and beaches. Even inland, nitrogen from septic systems will eventually reach both the groundwater and local surface waters.

Nitrogen has adversely affected groundwater and has caused impairments of all three major estuaries and numerous freshwater lakes and streams, resulting in eutrophication, hypoxia, and harmful algal blooms. Nitrogen has also decimated submerged aquatic vegetation and fragile wetland ecosystems, it has diminished coastal resiliency, and has contributed to the demise of a once nationally significant shellfish industry. This is largely due to the fact that greater than 70% of Suffolk County residents rely on antiquated cesspools and septic systems to dispose of their household waste.

Over the past three years, Suffolk County, under the Reclaim Our Water Program, set the stage for the transition to innovative wastewater treatment systems. Specifically, the County certified 14 advanced wastewater technologies for installation at homes that have demonstrated an ability to reduce nitrogen by at least 50%, adopted of Article 19 of the Sanitary Code (the first significant addition to the sanitary code in since 1973) to establish a responsible management entity to monitor septic technology performance and maintenance, launched the Septic Improvement Program to provide homeowners with funding (up to \$30,000 through State and County funding sources) and financing options to replace their outdated cesspools and septic systems with 1050 total combined applications (installed, under review and permitted), of which 218 advanced septic systems were installed in the past two years and 106 pending installations (as of April 11, 2019) at an average cost of \$22,216, trained 90% of the liquid waste license holders (400 individuals) in Suffolk County to install and maintain I/A OWTS by receiving an endorsement on their license, and is finalizing the Subwatersheds Study that will provide recommendations to policymakers on how to implement a countywide phased wastewater upgrade program that considers priority areas, load reduction goals, potential revenue streams, and timing. Please see the graphic below that provides an illustration of the steps the County has taken under the Reclaim Our Water Program.



Initial findings from the County's Subwatershed Study indicate that within a single generation we can Reclaim Our Water with significant water quality improvement through wastewater management alone in 75% of our waterbodies, protect our public and private supply wells from wastewater derived nitrogen and other contaminants, and reduce Countywide wastewater nitrogen in priority areas by greater than 70 percent. Furthermore, the models suggest in the County's Subwatershed Study that all nitrogen reductions are expected to have an incremental benefit to water quality and protection of eelgrass.

The costs of redressing water-related issues are significant. The IBM Smarter Cities Report for Suffolk County estimated the cost to provide advanced wastewater treatment to all homes in Suffolk County (a combination of sewer and septic) at \$8 Billion. The economic consequences of not doing so are potentially devastating in property values alone. According to 2012 research published in the journal Natural Hazards by Christine Shepard, a postdoctoral fellow with the Nature Conservancy's Global Marine

Team, "Assessing future risk: quantifying the effects of sea level rise on storm surge risk for the southern shores of Long Island" <sup>ii</sup> in the table below:

**Table 1: Comparison of hazard zones and exposure:**

Exposure measure	Storm surge	Storm surge and Sea Level Rise
Inundated block groups	214	263
Total area inundated (ha)	18,399	24,174
Total persons affected	88,885	130,718
Total property losses (\$1000)	4,299,336	7,424,455

With nearly 1,000 miles of coastline, beaches, bays and harbors located within the County are prime attractions, providing swimming, boating and fishing activities for visitors and residents alike. Long Island is the second most popular tourist destination in New York State after New York City. Environmental concerns often lead to closed beaches. Coastal related tourism in New York State was \$12.2 billion in 2007.<sup>iii</sup> According to the Trust for Public Land, tourism is one of Long Island's largest industries; producing revenues of \$4.7 billion a year, with approximately 28% of visitors – 5.1 million a year – coming for the purpose of visiting parks, such as beaches. These visitors spend \$615 million annually in the local economy and generate \$27.3 million in sales tax.<sup>iv</sup> Tourism on Long Island is a \$5.9 billion annual industry. Tourism on Long Island supports more than 81,000 local jobs. Tourism on Long Island generates more than \$725 million in local and state tax revenues. Were it not for tourism-generated state and local taxes, the average household in the region would have to pay an additional \$779 to maintain the same level of government revenue. According to a 2013 study released by the Natural Resources Defense Council, New York ranked 22<sup>nd</sup> in beach water quality out of 30 states; 9% of samples exceeded national standards for designated beach areas in 2012.<sup>v</sup> A study by local economist Martin Cantor, Dowling Colleges cites that municipal and state beach closures from Memorial Day through Aug. 3, 2007 cost Long Island's tourism industry \$60 million. Cantor's report estimated the average beachgoer spends \$20 a day on parking, food and drinks, and pegged lost car attendance because of closures at nearly \$1.9 million during the combined 1,155 lost beach days. Cantor said his conservative report used two people per car. The report contends the closures cost state and local governments \$4.8 million in sales tax revenue.<sup>vi</sup>

Suffolk County has outreached to stakeholders including environmental groups, state, county, and municipal officials, septic industry consistently throughout the entire program. At the beginning of the Reclaim Our Water program we invited staff from the NYS Environmental Facilities Corporation, the Nature Conservancy, the US Environmental Protection Agency, and local County legislator to participate in a septic tour of 4 states in the northeast (Maryland, New Jersey, Rhode Island, and Massachusetts) with County staff representing the County Executive, County Planning, and the County Health Department, to understand how septic replacement programs function, perform and how they were financed. More recently through the Article 6 Working Group, SUNY Stony Brook's Center for Clean Water Technology, local environmental groups, town planners, county legislators, representatives from the building and contractor industries, and realtors participate in the development of policy proposals to advance the Reclaim Our Water Program. Specifically out of the Article 6 Working Group the County decided to ban the in-kind replacement of cesspools by amending the Sanitary Code. In addition, County staff has made more than 30 presentations over the past two years to local civic and homeowner groups about advanced septic technologies and the County's grant/loan program for septic replacements. As a result of the local presentations, the County has received 1,600 applications to replace antiquated septic systems with advanced technologies.

## **Innovation, Sustainability and/or Partnerships**

The Reclaim Our Water program is innovative because of the way it was comprehensively designed and implemented:

The Reclaim Our Water Program addressed and continues to provide training to the local septic industry at least three times a year to prepare for a departure away from outdated technology. Industry trainings began two years prior to the full scale roll out of a grant program for homeowners to allow the industry to effectively have time to learn the new technologies and learn how to service them in the future. The Long Island Liquid Waste Association regularly features the County's Reclaim Our Water Program and its developments in their newsletter.

The Reclaim Our Water program was designed to make the homeowner's financial decision about replacing failing systems easier to choose an advanced wastewater system by providing grant funding up to \$30,000 and an option to access low-interest loans to cover the difference. The County has acted upon the input from local community groups and Legislators to address concerns around affordability of these advanced systems for 17,418 low-income households with a median income less than \$80,000 annually by updating the program last year to provide additional funding for low-income residents. The County is currently exploring partnering with a local Community Development Financial Institution to provide low-cost financing for low-income residents to cover the ongoing maintenance costs (\$300/annually) of these advanced systems modeled off of the Craft3 program that operates in the Pacific Northwest.

The County has also decided to model best practices by investing \$4.7 million to install advanced septic systems at approximately 10 County Parks to reduce nitrogen and will provide homeowner information about the Reclaim Our Water Program within each bathroom stall where an advanced system is installed. We do not know of any other municipality who has voluntarily invested resources to replace municipal septic systems at park facilities. The installation of an innovative septic system at Lake Ronkonkoma County Park removes 2,100 pounds of nitrogen annually and was installed in early 2018.

The Reclaim Our Water Program is unique from other septic upgrade programs operated in Maryland, Rhode Island, and Massachusetts because the County has the only program that comprehensively integrates the most functional parts of other state-run programs in the Northeast into one program administered at a County level: provides funding in the forms of grants and loan to homeowners for the entire cost of the installation (Maryland provides funding for just the "black box" technology, Rhode Island provides financing), training for the industry (University of Rhode Island provides industry training), and technology certification (modeled off of the Massachusetts program).

As to the measurable environmental benefits that have resulted because of this program, more than 218 advanced septic systems were installed in the past two years and 106 pending installations (as of April 11, 2019) at an average cost of \$22,216, and trained 90% of the liquid waste license holders (400 individuals) in Suffolk County to install and maintain I/A OWTS by receiving an endorsement on their license contributing to a trained workforce that is advancing sustainability.

With funding from New York State, the Reclaim Our Water Program has hired 6 additional staff within the Department of Health Services to administer all aspects of the Program. In addition, the County has hired Peter Scully as the Water Quality Czar to expand the County's capacity for sustainability. The County has recently undertaken a feasibility study with the consulting firm Raftelis to develop a financial model and identify recurring revenue sources for long-term program expansion.

## **Superior Practices**

The Reclaim Our Water Program is designed to fundamentally transform the wastewater industry and the way homeowners treat their wastewater in an effort to reduce nitrogen and improve water quality. The LINAP briefing sheet discussed in an earlier section of the application notes the ecological impacts of nitrogen. The advanced wastewater systems reduce more than 50% of the nitrogen loading from traditional septic systems. Continuing to use standard systems in Suffolk County will only exacerbate water quality issues and will not achieve any environmental benefit. The County's current Sanitary Code requires the use of either a cesspool or septic system. As of July 1, 2019 cesspools will no longer be allowed to be installed and all wastewater systems will have to meet the 1973 County requirement for at least a septic system (tank and leaching rings). Therefore, the Reclaim Our Water program that facilitates the installation of advanced wastewater treatment systems that reduces nitrogen by 50% exceeds the County's and State's regulatory requirements. It should be noted that the County is exploring the option of mandating the installation of advanced wastewater treatment systems at various triggers like at the time of property transfer.

The Reclaim Our Water Program as described previously has taken the best parts of other state-run septic programs and incorporated elements into our county-run program. The Reclaim Our Water Program is unique from other septic upgrade programs operated in Maryland, Rhode Island, and Massachusetts because the County has the only program that comprehensively integrates the most functional parts of other state-run programs in the Northeast into one program administered at a County level: provides funding in the forms of grants and loan to homeowners for the entire cost of the installation (Maryland provides funding for just the "black box" technology, Rhode Island provides financing), training for the industry (University of Rhode Island provides industry training), and technology certification (modeled off of the Massachusetts program). In addition and not previously mentioned, the County implemented with the help of the septic industry an online tracking system (Septic Haulers Information Portal) to note which homes (by address) are being serviced, when each home is being serviced by the septic industry, and the amount of septage being removed from each home to begin to identify homes that might be experiencing septic failure (three or more pump outs per year) as candidates for advanced septic systems.

### **Measurable Environmental, Economic and/or Social Benefits**

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### **Transferability to Other Users**

County staff regularly receives visits from national environmental organizations like the Nature Conservancy as well as from employees from other states like Connecticut interested in replicating the County's Reclaim Our Water Program. The documents that are the basis of the program are available on the County's website in an effort to promote transparency and technology transfer to serve as a model for other successful projects. Furthermore, the County is involved in a data sharing agreement with the US Environmental Protection Agency and a half dozen states in the Northeast to share our data regarding advanced septic technology performance.

### **Funding Sources**

Since the launch of the Reclaim Our Water Program, the County has invested more than \$10 million in its funding to advance this program. The County is currently conducting a feasibility study to identify recurring revenue streams for long-term financial sustainability. Last year the County received \$10.25 million in funding from New York State to implement the homeowner septic upgrade program. The County has also received \$3 million in 1:1 match funding each year for at least the past three years from New York State through the budget. In addition, the County is working with Federal and State officials to implement the \$390 million sewer expansion coastal resiliency project. The County received the in-kind donation of time during the IBM Smarter Cities Challenge. As the officials at IBM estimated, replacing all of the outdated septic systems is an \$8 Billion proposition. The County is currently conducting a feasibility study to identify recurring revenue sources to scale up the program into the future.

Below is a timeline of the Reclaim Our Water Project:

