Watershed Plan for Suffolk County Nitrogen Priority Waters

Organization

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Project Title

Suffolk County Subwatersheds Wastewater Plan

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Introduction

Excess nitrogen which enters ground and surface waters of Long Island has been shown to degrade water quality and threaten designated uses. Due to this widespread issue, and hydrology of the area, a county-wide plan to address the problem is the ideal way to move forward to find a solution.

The Long Island Nitrogen Action Plan (LINAP) is a New York State Governor's initiative led by the New York State Department of Environmental Conservation and grew out of local stakeholder support for actions to reduce the nitrogen entering the waters. It uses State-led programs, as well as, local stakeholders' projects and programs to make changes that will improve the water quality by lessening the nitrogen loads from all sources.

Suffolk County, with support from LINAP, developed the *Suffolk County Subwatersheds Wastewater Management Plan* (SC SWP), a county-wide plan to address the nitrogen loads coming from all sources in the county. This included bringing together stakeholders and experts in the field to ensure the plan met the county's needs and had the technical merit to ensure progress would be made toward clean water. The plan exceeded expectations and is an approved New York Nine Element (9E) Plan.

As a 9E Plan, the waterbodies covered in the document have been thoroughly analyzed to determine the source loadings, needed reductions, and implementation activities needed to ensure the waters are continuously meeting their designated uses. The SC SWP includes a robust implementation plan. As the plan's implementation progresses at the local level, reporting on the outcomes will be critical to see where improvements are made or where course corrections are needed.

DEC Division of Water believes the local actions slated to occur via the implementation plan will improve and/or maintain water quality in the waterbodies that are listed in Table 1.The following sections detail how the 9E Plan determined the loads and reductions needed for each waterbody, as well as the plan for achieving those reductions. Following the full implementation of the SC SWP, DEC will assess the results of the implementation of the plan to determine its effectiveness in keeping the waterbodies from becoming impaired and ensuring their intended uses are maintained. If at some point in the future these waterbodies become impaired, NY would consider prioritizing these waterbodies for TMDL development.

Description of the Applicable Water Quality Standards and Numeric Water Quality Target

Nutrients are regulated in New York State Waters by a narrative water quality standard rather than a numeric standard. The narrative standard for phosphorus and nitrogen is:

None in amounts that result in the growths of algae, weeds and slimes that will impair the waters for their best usages.

The *Suffolk County Subwatersheds Wastewater Plan* (SC SWP) details how they plan to ensure the waterbodies within the county are continuously meeting their designated uses in order to meet New York's narrative nutrient standard. In Section 1 of the SC SWP, the County describes their current nitrogen situation and their goals for the SC SWP.

> "The Suffolk County Subwatersheds Wastewater Plan ("SC SWP") was identified as the platform to fulfill this need and provide a recommended Countywide wastewater management roadmap targeting the reduction of nitrogen loading from wastewater sources. Implementation of the recommendations of the SWP will support the arrest and reversal of the nutrient-related ecosystem degradation observed in Suffolk County which is primarily attributable to nitrogen over-enrichment, with wastewater being the dominant nitrogen source. A reduction in nitrogen loading will establish the conditions necessary to support restored ecosystems, increased biodiversity and provide numerous economic benefits and protection of human health." (SC SWP Page 1-2)

Additionally, Suffolk County describes their nitrogen reduction goals as:

> "The recommendations provided in the SWP are intended to improve water quality in Suffolk County waters so that they can be used for their full environmental, recreational and economic potential as currently classified under NYSDEC designated uses." (SC SWP Page 2-80)

As such, all waterbodies included in the SC SWP will be addressed and, therefore, be able to be meet or maintain their designated uses. Actions taken as a result of the SC SWP will improve water quality.

Ecological Endpoints

Due to the nature of nitrogen's impacts on Long Island's surface waters, ecological endpoints were developed to stand in for a numeric nitrogen water quality endpoint. The ecological endpoints used in the SC SWP, and here in this Watershed Plan, are an interpretation of NY's narrative water quality standard for nutrients. The ecological parameters included:

1. Dissolved Oxygen
    a. > 4.8 mg/l
2. Chlorophyll-a
    a. < 5.5 µg/l
3. Water Clarity (/Secchi depth)
    a. > 2 meters Secchi depth
4. Harmful Algal Blooms – Environmental
    a. No more than one in the past 10 years
5. Harmful Algal Blooms – Human Health
    a. None within the past 10 years

These parameters are considered the ecological endpoints which the load reduction goals are targeted to achieve. The reasoning behind the end point selection is described below. *More information on the ecological endpoints can be found in Section 2.1.8 of the SC SWP.*

Dissolved Oxygen

"Low dissolved oxygen levels are one of the most direct impacts of nitrogen loading on poorly flushed surface waters. Recognizing that dissolved oxygen concentrations may be very variable, dissolved oxygen levels greater than NYSDEC's chronic water quality standard of a daily average of 4.8 mg/L in 90 percent of all samples was selected as a desired ecological endpoint for evaluation using the statistical approaches discussed herein. The identification of water bodies with no dissolved oxygen excursions below NYSDEC's acute standard of 3.0 mg/L in all samples was selected as the criterion for the identification of dissolved oxygen reference water bodies. Dissolved oxygen concentrations are reported in mg/L." (SC SWP Page 2-77)

"The long-term objective of the SWP initial load reduction goal for dissolved oxygen is to minimize the frequency of excursions below NYSDEC's acute standard of 3.0 mg/L that would not have occurred under natural conditions (without anthropogenic influence) to the maximum extent possible." (SC SWP Page 2-77)

Chlorophyll-a

"Excessive primary productivity, as indicated by elevated chlorophyll-a concentrations, can contribute to low dissolved oxygen levels as well as to reduced light penetration (as indicated by secchi depth) and reduced light availability to support seagrasses. A range of chlorophyll-a concentrations that support seagrass habitat have been reported in the literature, as summarized in the **Final Report of the New York State Seagrass Task Force,** from the range of 4.6 to 13.2 µg/L reported by Greening et al (Tampa Bay), up to < 15 µg/L reported by Batiuk for Chesapeake Bay. A maximum chlorophyll-a concentration of 5.5 µg/L was selected as a desired ecological endpoint, based on the recent Long Island Sound based studies completed by Vaudry and by Yarish, and further corroborated by the relationship between natural log of secchi depth and chlorophyll-a concentrations measured in marine water bodies during the growing season shown by Figure 2-35. Based on data collected in Suffolk County marine waters, a chlorophyll-a target of 5.3 µg/L is associated with the 6.56-foot (two-meter) secchi depth identified as protective of eelgrass." (SC SWP Page 2-77)

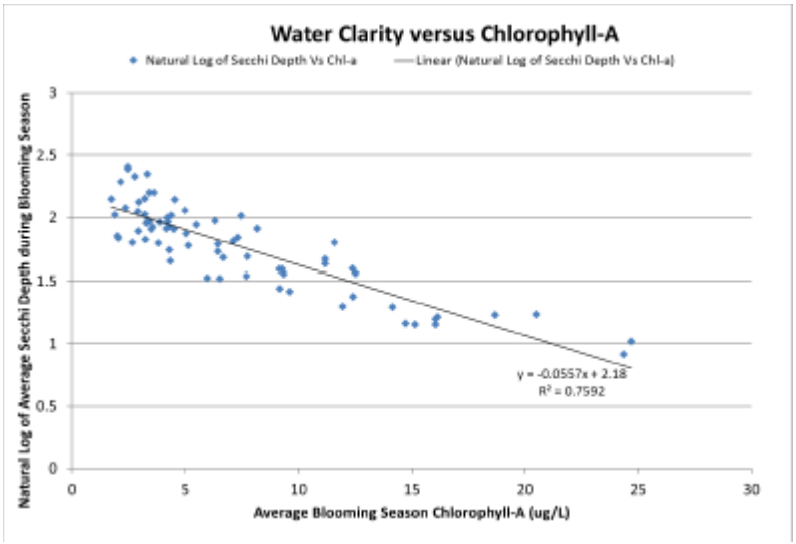
"The SWP evaluates load reduction goals for chlorophyll-a under two approaches. Both approaches are intended to result in sufficient water clarity for sustaining healthy eelgrass beds as follows:

1. Minimum goal (chlorophyll-a probabilistic approach) - Create conditions conducive for achieving a target chlorophyll-a target of 5.5 µg/L with an 80 percent probability; and,

2. Maximum goal (reference approach) – Achieve a chlorophyll-a target of 5.5 µg/l 90 percent of the time or maintain an average chlorophyll-a target of 5.5 µg/l during the blooming season.

All approaches allow for occasional excursions of chlorophyll-a above the target threshold to accommodate beneficial algal productivity." (SC SWP Page 2-78)

SC SWP Figure 2-35: Water Clarity and Chlorophyll-a



Secchi Depth

"Water clarity was identified as another desirable ecological endpoint. SCDHS measures secchi disk depth, one measure of water clarity, as part of their water quality sampling program. Published information, including the **Final Report of the New York State Seagrass Task Force**, 2009, identifies a secchi depth of two meters as protective of eelgrass, a flowing aquatic plant that is important to marine habitats. Maintenance of secchi depths at two meters or greater was identified as a desired ecological endpoint for the protection of eelgrass based upon previous studies including the above referenced **New York State Seagrass Task Force Final Report**, Dahl and Simpson's **Eelgrass and Water Quality: A Prospective Indicator for Long Island Nitrogen Pollution Management Planning** (2017), and Vaudrey's **Establishing Restoration Objectives for Eelgrass in Long Island Sound** (2008)."

"The long-term objective of the SWP initial load reduction goal for secchi depth is to maintain an average secchi depth of at least two meters during the growing season." (SC SWP Page 2-79)

Harmful Algal Blooms

"Both harmful algal blooms (HABs) with primarily health impacts and HABs with primarily environmental impacts are monitored in Suffolk County water bodies. The number of years of HABs with primarily health impacts and the number of years of HABs with primarily environmental impacts over the past ten years of water quality

monitoring were reviewed for each subwatershed where HAB monitoring was conducted…" (SC SWP Page 2-78 & 79)

"The long-term objective of the SWP initial load reduction goal for HABs is to create nutrient enrichment-related conditions (e.g., nitrogen loads to surface waters) that minimize the intensity and frequency of HABs in Suffolk County with the ultimate ("ideal") goal of no HABs with primarily health impacts and no more than one HAB with primarily environmental impacts over a ten year period. As discussed throughout the SWP, it is acknowledged that nutrient enrichment is just one factor contributing to the occurrence, intensity, and frequency of HABs in Suffolk County." (SC SWP Page 2-79)

Identification of Waterbody, Pollutant of Concern and Pollutant Sources

Priority Water Segment(s)

The SC SWP encompasses all waters within the county. Of the waters included in the SC SWP, there are 11 surface water embayments being prioritized for nutrient and/or nitrogen reduction, that are addressed by this watershed plan. The goal for these waterbodies is to improve and/or maintain their current water quality. These priority waters are not listed on NY's 2018 Section 303(d) list for nutrient related impacts. However, on New York's PWL fact sheets, nitrogen is listed as a known pollutant[1]. For a list of the water segments included in this watershed plan, see Table 1.

Table 1: Waterbody Segments Covered Under this Plan

Assessment Unit ID	Waterbody Name	Waterbody Classification	Pollutant	Vision Waterbody List (Y/N)
NY1701-0035	Sag Harbor and Sag Harbor Cove	SA	Nitrogen	Y
NY1702-0015	Port Jefferson Harbor, North, and tribs	SA	Nitrogen	Y
NY1702-0019	Mt Sinai Harbor and tidal tribs	SA	Nitrogen	Y
NY1702-0047	Stony Brook Harbor and West Meadow Creek	SA	Nitrogen	Y
NY1702-0091	Conscience Bay and tidal tribs	SA	Nitrogen	Y
NY1702-0227	Lloyd Harbor	SA	Nitrogen	Y
NY1702-0228	Huntington Harbor	SA	Nitrogen	Y
NY1702-0229	Centerport Harbor	SA	Nitrogen	Y
NY1702-0230	Northport Harbor	SA	Nitrogen	Y
NY1702-0242	Setauket Harbor	SA	Nitrogen	Y

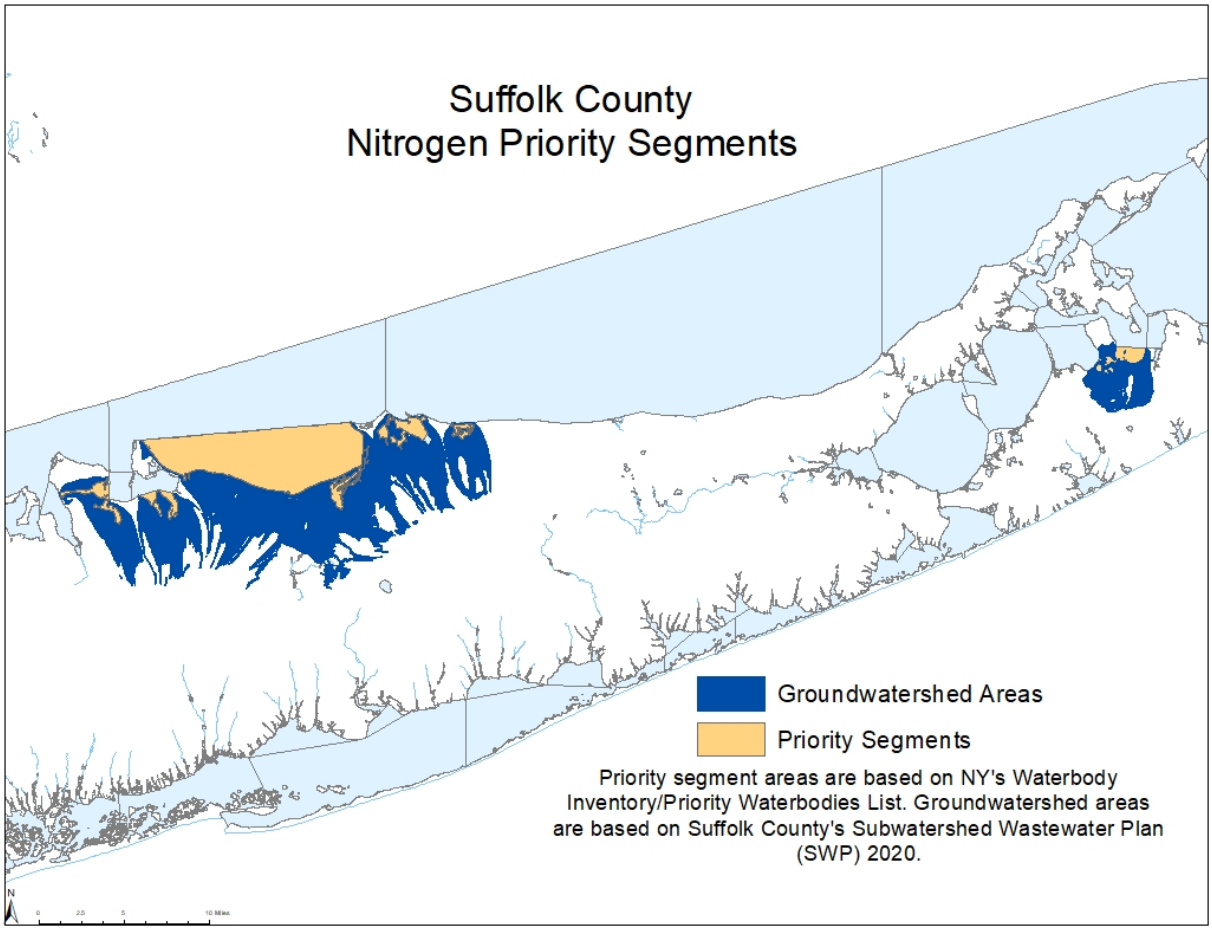
[1] (NYS DEC Divison of Water, 2016)

NY1702-0023	Smithtown Bay	SA	Nitrogen	Y

Map of Waterbodies

Maps of all waterbody catchment areas with associated land use designations can be found in Appendix B of this report. See Figure 1 below for a map of the locations of the water segments noted in Table 1 and their contributing groundwatershed areas.

Figure 1: Map of Priority Nitrogen Segments and Groundwatershed Areas



Pollutant Sources & Land Use

Pollutant sources for nitrogen include sanitary wastewater, fertilizer, pets, and wet and dry atmospheric nitrogen deposition. Parcel-specific nitrogen loads for existing conditions were calculated using parcel-specific land uses defined by an updated version of the County's 2016 land use coverage the parcel specific land use type information. Below is a summary of the SC SWP's source descriptions, including the loading associated with the pollutant source or land use.

Appendix A includes Table D-2 of the SC SWP, which has a land use breakdown for each waterbody. Table 2: Nitrogen Loadings for Priority Waterbodies (page 15) provides the source loadings for the eleven waterbodies. Appendix B includes land use maps for

all the subwatersheds that discharge into the waterbodies listed in Table 1 above. Appendix C includes Table D-3 of the SC SWP, which has a list of all the wastewater facilities (SPDES permitted facilities) included.

Section 2.1.5, of the SC SWP provides more details on the sources, their loadings, and any assumptions made. Table D-3 in Appendix D of the SC SWP lists all the State Pollutant Discharge Elimination System (SPDES) permits included in the analysis. More information for land use can be found in Section 2 and in Appendix D, Table D-2 of the SC SWP.

Wastewater

Wastewater as a source of nitrogen includes wastewater from both SPDES permitted facilities and on-site wastewater treatment systems (OWTS).

Appendix C lists the over 200 sewage treatment plants that discharge in Suffolk County. Estimates of discharge rates from 2013 were used with 2016 average annual effluent nitrogen concentrations. Loads from wastewater facilities were attributed based on if they discharged to groundwater or surface water. For the facilities that discharge to groundwater, loads were attributed to the parcels of the sewage treatment facility where the point discharge occurs. Facilities that discharge to surface water had their loads included in the overall nitrogen load for the associated subwatershed. (SC SWP 2-34, 2-35)

The nitrogen load for OWTS was calculated per parcel category. Each parcel category had different assumptions due to their differences in uses and therefore would differ in the nitrogen loading to the groundwater. Parcel categories include:

- Unsewered Residential Areas
- Unsewered Non-Residential Areas
- Downtown Areas (Additional Loads)
- Unsewered Parks
- Mobile Home Parks

To estimate nitrogen loads from the unsewered residential areas, the following data and assumptions were use.

SC SWP Table 2-7: Data Used to Estimate Nitrogen Load from Sanitary Wastewater in Unsewered Residential Areas

Data/Assumption	Data/Estimate Used	Data Source
Parcel-specific Land Use	2016 Land Use coverages for Babylon, Brookhaven, East Hampton, Huntington, Islip, Riverhead, Shelter Island, Smithtown, Southold	Suffolk County Department of Economic Development and Planning
Household size*	2010 Population Data and Number of Households	Suffolk County Planning Department, 2010 U.S. Census

Unsewered Parcel Locations	Sewer District Coverages and unconnected parcels in SWSD coverages	Suffolk County Department of Economic Development and Planning, Suffolk County Department of Health Services, and Suffolk County Department of Public Works coverages
Nitrogen Loading Rate	10 pounds/capita/year	New Jersey Nitrate Dilution Model (Hoffman and Canace (2009), Vaudrey (2016), Valiela (1997))
Nitrogen Attenuation	6% attenuation in septic tank, 10% attenuation in the unsaturated zone	Valiela (1997), Lloyd (2016), Vaudrey (2016) and Stinnette (2014), Desimone and Howes (1998), Chesapeake Bay Partnership (2014), recommendations of the Nitrogen Load Modeling Focus Area Workgroup

*Adjusted for seasonal population for East Hampton, Riverhead, Shelter Island, Southampton and Southold.

More information about OWTS loads can be found in the SC SWP pages 2-31 – 2-35.

Fertilizer

Nitrogen loads from fertilizer come from residential, golf course, parks and recreation, and agriculture parcel types. Loads from the different parcel types are based on studies and were vetted through the Nitrogen Load Model Focus Area Work Group that was formed by the County. Leaching rates were applied based on the type of parcel with residential, parks and reactional parcels having a 30 percent leaching rate, golf courses a 20 percent leaching rate, and agricultural fields having a 40 percent leaching rate (SC SWP page 2-35).

To be conservative, all residential parcels were assumed to be fertilized. The rate of fertilizer application modeled was 2.04 pounds per 1,000 square feet based on values derived from a 2016 Long Island Sound survey (Vaudrey 2016). A percentage of the parcel area was given the fertilizer application based on building footprint information and assuming for other impervious areas such as driveways, patios, etc. (SC SWP page 2-36). The 30 percent leaching rate was then applied, with a 15 percent added where till materials are present in the soil.

For golf courses, a nitrogen application rate of 3.89 pounds per 1,000 square feet based on the same 2016 Vaudrey study. The fertilizer was applied to a percentage of the golf course parcel that is assumed to be fertilized. The 20 percent leaching rate was applied, with a 15 percent added where till materials are present (SC SWP page 2-36).

Parks and recreational areas were fertilized at a rate of 0.92 pounds per 1,000 square feet and an assumption that 50 percent of the parcels in this land use category are fertilized. Fertilizer application was then modeled on 75 percent of the area of a parcel and parcels that were predominately forest or vegetation were not given a fertilizer application in the model. The 30 percent leaching rate as applied (SC SWP page 2-36).

The fertilizer application rates for agricultural parcels varies by crop type, which can vary from year to year. Therefore, the fertilizer application rates for the agricultural parcels were based on the best available information (SC SWP page 2-36). The table below details some of the agricultural nitrogen figures that were used (SC SWP page 2-37). The nitrogen load was applied to 90 percent of each agricultural parcel and then the 40 percent leaching rate was applied.

SC SWP Table 2-12: Nitrogen Applications to Agricultural Land Use from Fertilizer

Crop Type	Nitrogen (lbs/N/1,000sf/year)
Pasture/Hay	0.46
Orchards	1.61
Vineyards	0.34
Sod	5.74
Other Crops (1)	2.91

(1) Represents a weighted average of nitrogen use as specified by Cornell Cooperative Extension.

Pets

The nitrogen source load from pets (dogs and cats) was included in the model study based on input from stakeholders. The table below shows the nitrogen loads used and the assumptions made, based on the literature and pet ownership data (SC SWP page 2-39).

SC SWP Table 2-14: Assigned Nitrogen Load from Pet Waste

Pet Type	Number of Pets per Household	Annual Nitrogen Load per Pet (lbs/year)	Percent Lost to Volatilization
Dogs	1.4	4.29	50
Cats	1.9	3.22	50
Outdoor Cats	0.74	3.22	50
Indoor Cats	1.16	0	n/a

Atmospheric Deposition

Nitrogen loads for both wet and dry atmospheric depositing was included as a source in the study. The National Atmospheric Deposition Program's National Trends Network monitoring station at Cedar Beach in Southold provided nitrogen concentration in rainfall that was used to calculate the wet atmospheric nitrogen deposition. Data from the

USEPA Clean Air Status and Trends Network was used to calculate total nitrogen deposition. Both sets of data were scaled to cover the county (SC SWP page 2-39).

All parcels within the County received an atmospheric deposition nitrogen load on their entire area. Leaching rates were also applied to the land receiving the load, shown in the table below (SC SWP page 2-40).

SC SWP Table 2-15: Assigned Nitrogen Load from Atmospheric Deposition

Ground Cover	Leaching Rate (%)	Nitrogen Load (lbs N/1,000 sqft/year)
Natural Vegetation	25	0.103
Turf	30	
Agriculture	45	

Nitrogen Modeling

Multiple models were employed to determine the nitrogen loading to the waterbodies. Long Island is unique from the rest of New York in that its geology is characterized by its sandy soils and groundwater dominance. Therefore, the models used to determine the loading to the surface waters focus on groundwater loading. The models are described below.

Section 2 of the SC SWP details all models used and can be reviewed for more information.

Groundwater Solute Transport Model

The groundwater solute model is a steady-state model using the 2016 land use information as inputs and ran over a 200-year timeframe. Additionally, the model was run again to determine build-out concentrations. The groundwater model is described below. *More detail in Section 2.1.4 of the SC SWP*.

Four existing regional groundwater flow models were used to delineate the land surface area of groundwatersheds in the County. The existing models represent the Main Body, North Fork, South Fork, and Shelter Island areas. (SC SWP Page 2-10) These groundwater flow and contaminant transport models were used to simulate nitrogen concentrations within the aquifer system and the migration of nitrogen through the aquifer to surface water receptors based on loads by tax parcel.

> "The existing, calibrated models have been utilized for nearly two decades to evaluate various water resources management strategies, contaminant transport and salt-water intrusion investigations throughout Suffolk County. The Suffolk County Main Body Flow Model was originally developed and calibrated as a cooperative effort with SCDHS [Suffolk County Department of Health Services], Suffolk County Department of Public Works (SCDPW) and Suffolk County Water Authority (SCWA) in 1996 and 1997, with guidance and input provided by NYSDEC and the Suffolk County Planning Department. Working together with SCDHS and SCWA, dual-density groundwater models were developed and calibrated in 2001-2002 for the North and South Forks and Shelter Island. The three dual-density

models were developed using DYNSWIM, a dual-density three- dimensional finite element code that allows for the simulation of multiple salt-water interfaces. The dual-density models were later converted to freshwater models for use in the New York State Department of Health (NYSDOH) Source Water Assessment Program (SWAP) and the Suffolk County Comprehensive Water Resources Management Plan (2015). A detailed description of the development and calibration of each of these models can be found in CDM Smith (2003) and is not repeated here. The original Suffolk County model was calibrated to hundreds of water levels and to stream baseflows measured during two independent time periods representing different conditions of precipitation, recharge and development. The model was validated to a third set of water level measurements and stream baseflows. The model's ability to represent the aquifer's response to changing conditions of recharge and water supply pumping was further confirmed by a semi-transient simulation of the period from 1981 through 1994. The models' continued ability to represent observed conditions in response to changing water supply pumping and precipitation and recharge conditions has been evaluated through the years on a project-specific basis. The existing groundwater modeling framework (e.g., model stratigraphy, hydrogeologic properties) was not changed for this model application." (SC SWP Page 2-11)

The models were updated for use in the SWP analysis. This included additional discretization, conversion to NAD 1983 State Plane New York Long Island (feet) coordinate system, addition of Light Detection and Ranging (LiDAR) data, updated boundary conditions including precipitation, recharge, water supply pumping and sea level information, and addition of a model level to improve vertical model discretization. (SC SWP Page 2-11) *A detailed summary of each of these updates and refinements can be found in the SWP on pages 2-12 through 2-18.*

The groundwater solute transport models were used to represent the conditions of the aquifer system on average using average annual conditions. These average annual conditions in water supply pumping, recharge and wastewater management were used to delineate the land surface area that contributes to the groundwater recharge to the surface waters, including the time it would take for the recharge to flow through the system and into the surface water (SC SWP Page 2-18).

The groundwater contributing areas for 191 individual surface waterbodies were delineated using the groundwater models. These contributing areas provided the boundaries for which the evaluation of nitrogen loads to each waterbody and, eventually, the development of the nitrogen load reduction plan, using 2016 land use parcel data (SC SWP 2-19). The land use parcel nitrogen loadings are described more in the Nitrogen Loading Model (NLM) section.

The groundwater models were run for a time period of 200 years to determine the contributing source areas and groundwater travel times to each surface waterbody. For some waterbodies, a 200-year simulation did not delineate the complete contributing area. This is because the groundwater travel times would have far exceeded 200 years

and additional centuries would have needed to be added to the simulation. However, most of the contributing areas were captured and the time period was determined to be reasonable for this analysis and nitrogen management decisions (SC SWP Page 2-19).

Nitrogen Loading Model (NLM)

The NLM model was used to determine the loading of nitrogen from land sources to the groundwater on a parcel-specific level. Land use data from 2016 was used for this analysis. Nitrogen from the following sources was incorporated into the model: sanitary wastewater (wastewater treatment facilities and on-site wastewater systems), fertilizer, pet waste, and atmospheric deposition.

The nitrogen source inputs and assumptions used in the NLM model are described above in the Pollutant Sources & Land Use section of this document.

The NLM model provided the nitrogen loads to each of the contributing areas for the 191 individual surface waterbodies. This load was then run through the 200-year simulation period to determine the nitrogen loadings to each waterbody using the groundwater transport models. *The NLM model is described in more detail in Section 2.1.5 of the SC SWP.*

Hydrodynamic Model(s)

To calculate the residence, or flushing, time within each of the surface waterbodies, hydrodynamic models were developed. The hydrodynamic models used varied based on location and type of waterbody. The models included Environmental Fluid Dynamic Code (EFDC), FVCOM, and the tidal prism model and are described below. *More detailed information on the hydrodynamic models can be found in Section 2.1.6 of the SC SWP.*

EFDC is a common hydrodynamic model used in coastal areas. Fourteen EFDC models were specifically developed for this plan that encompassed 146 PWL segments. The fourteen models included the embayments listed below. The remaining PWL segments were captured in the other hydrodynamic models, as described below.

SC SWP Table 2-21: EFDC Model Areas

EFDC Model Number	Model Name/Embayment
1	Western Great South Bay
2	Great South Bay (Bay Shore)
3	Great South Bay (Nicoll Bay)
4	Great South Bay (Patchogue Bay)
5	Great South Bay (Bellport Bay)
6	Moriches Bay/Quantuck Bay
7	Shinnecock Bay
8	Mecox Bay

9	Peconic Bay & Three Mile Harbor
10	Acabonack Harbor, Napeague Harbor, Lake Montauk
11	Huntington Bay
12	Smithtown Bay
13	Port Jefferson & Mount Sinai Harbors
14	Mattituck Inlet

The inputs used for the EFDC model included (SC SWP Page 2-53 & 2-54):

- Coastline and bathymetric data
- Annual average groundwater inflow
- Annual average surface water runoff
- Downstream or tidal boundary conditions (water elevation, salinity, temperature)
- Meteorological conditions (wind speed, direction)
- Point source discharges

After calibration of the models, they were used to calculate flushing times for the marine waterbodies. The flushing time was calculated out to a 10 percent initial mass reduction. *More detailed information on calibration and flushing time calculation can be found on page 2-55 of the SWP.*

The FVCOM model was used in areas of the Great South Bay where the developed EFDC models were not able to estimate flushing times. The State University of New York Stony Brook University's School of Marine and Atmospheric Science (SBU SoMAS) developed the FVCOM model for the Great South Bay. The areas for which the flushing times from the FVCOM model were used include Great South Bay West, Great South Bay Middle, Great South Bay East, Great Cove, Nicoll Bay, Patchogue Bay, and Bellport Bay. (SC SWP Page 2-56)

For eleven waterbodies, the tidal prism method was used to calculate flushing times. This method was used where a model was not developed and no grid was available. These waterbodies include Gardiners Bay, Georgica Pond, Goldsmith Inlet, Halsey Neck Pond, Hog Creek, Long Island Sound Central, Long Island Sound East, Long Island Sound West, Sagaponack/Poxabogue Ponds, Spring Pond, and Wading River. *The tidal prism method calculation and more details can be found on Page 2-57 of the SC SWP.*

For freshwater waterbodies (i.e. rivers and streams), flushing time was calculated as waterbody volume divided by flow.

Nitrogen Loads

The nitrogen loads to the waterbodies noted in Table 1 are shown in Table 2 below. This table gives the loadings from all the sources analyzed through the modeling efforts.

Table 2: Nitrogen Loadings for Priority Waterbodies

Assess-ment Unit ID	Waterbody Name	Onsite Sanitary Wastewater	Fertilizer	Pets	Atmospheric Deposition to Subwatershed	STP Discharge to Groundwater	STP Discharge to Surface Water	Atmospheric Deposition to Surface Water	Total Nitrogen Load
NY1701-0035	Sag Harbor and Sag Harbor Cove	176	89.3	9.8	13.1	0	6.9	17.52	312.9
NY1702-0015	Port Jefferson Harbor, North, and tribs	150.2	39.4	8.9	6.5	3.6	0	11.76	220.4
NY1702-0019	Mt Sinai Harbor and tidal tribs	240.4	80.5	15.1	12.4	2.7	0	3.79	354.9
NY1702-0047	Stony Brook Harbor and West Meadow Creek	328.6	114.8	21.2	23.2	5	0	6.58	499.4
NY1702-0091	Conscience Bay and tidal tribs	62.2	21.8	3	4	0	0	2.79	93.8
NY1702-0227	Lloyd Harbor	16.3	21.8	0.9	4.4	0	0	8.15	51.5
NY1702-0228	Huntington Harbor	428.6	77.2	23.9	15.1	0	72.2	4.17	621.2
NY1702-0229	Centerport Harbor	183.6	40.9	8.9	5.9	0	0	4.41	243.8
NY1702-0230	Northport Harbor	345.7	63.1	17.4	12.4	1.1	10.1	4.97	454.9
NY1702-0242	Setauket Harbor	137.7	38.6	5.9	6.8	0.3	0	2.41	191.7
NY1702-0023	Smithtown Bay	420.1	115.8	21.4	20.3	1.1	0	272.21	850.8

(Table adapted from Table 2-17 of the SC SWP. All sources in pounds per day).

Load Reduction Goals

To determine the nitrogen load reduction needed to allow waterbodies to meet their ideal water quality/ecological endpoints, a variety of approaches were investigated through the SC SWP process. Three approaches were considered, and the reference waterbody approach was ultimately selected. This approach uses the residence times and nitrogen loadings to waterbodies with "ideal water quality" to determine a target. This approach ended up giving a similar target as the National Strategy for the Development of Nutrient Criteria, which is a strategy developed by EPA. Due to the differences in the many waterbodies considered in the plan, a range of nitrogen load reduction targets were established to best meet the needs of the individual waterbody. *More detailed information on the load reduction approaches can be found in Section 2.1.9 of the SC SWP.*

New York State does not have a numeric nitrogen criteria for which to base nitrogen load reductions on. Therefore, Suffolk County evaluated several alternative approaches to determine the best way to identify the nitrogen load reduction needed for each subwatershed.

"Three approaches were identified and implemented for the establishment of load reduction goals within the SWP, including:

- Reference waterbody approach – this approach assumes that nitrogen loading to the priority subwatersheds should be reduced to the level of existing loading to subwatersheds with observed good water quality within Suffolk County
- Development of stress-response relationships – this approach assumes that mathematical relationships between nitrogen loads and desired water quality can be identified based on existing data, and that these relationships can be used to identify the nitrogen load reductions required to achieve the desired water quality outcomes.
- Use of published guidance values – this approach was to be used if the reference water body approach and the stress-response relationships were not successful in the identification of nitrogen load reduction goals. In addition, they provide a frame of reference against which the results of the first two approaches can be assessed." (SC SWP Page 2-81 & 82)

The reference waterbody approach was ultimately decided upon for the overall nitrogen reduction goals. The stress-response relationship was used in some cases for the ecological endpoint specific reduction analysis (chlorophyll-a endpoint). The published guidance values were used as the reduction goal for fresh waterbodies, due to the lack of data to establish an appropriate reduction goal using reference waterbodies. The reference waterbody is described below. *More detail can be found in Section 2.1.9.1 of the SC SWP. More detail on the stress-response relationship and published guidance values can be found in Sections 2.1.9.2 and 2.1.9.3, respectively.*

Reference Waterbody Approach

"The reference water body approach relies on establishing nitrogen load reduction goals by comparing local reference water bodies that achieve the water quality standards and ecological endpoints identified above to all water bodies included in the SWP. An unbiased way to characterize the subwatersheds was necessary to compare all subwatersheds. Each subwatershed's unit nitrogen load was multiplied by the residence time. This "unit nitrogen load * residence time" was calculated as:

pounds/day-m^3 *x* residence time (days) *x* 453592 mg/pound *x* 0.001 m^3/liter

The unit nitrogen load * residence time, expressed as mg/L, represents the incremental nitrogen load generated directly by the subwatershed loads, atmospheric deposition, and sewage treatment plant (STP) outfalls above the water body's boundary condition (or background load). It should be noted that this calculation DOES NOT represent an in-water concentration despite having the units of milligrams per liter. It merely represents a subwatershed's relative nitrogen enrichment/loading times its respective residence time." (SC SWP Page 2-82)

"The reference water bodies were established by identifying water bodies with at least ten sampling events over the past ten years that achieved all of the following desirable water quality criteria:

- Dissolved oxygen levels greater than NYSDEC's chronic water quality standard of a daily average of 4.8 mg/L in 90 percent of all samples;
- Chlorophyll-a levels less than 5.5 µg/L in 90 percent of all samples collected, OR average blooming season chlorophyll-a levels less than 5.5 µg/L. Elevated chlorophyll-a concentrations can contribute to low dissolved oxygen and to reduced light penetration (as indicated by secchi depth) and reduced light availability to support seagrasses. The blooming season for marine waters was defined as the period from April 1 through October 31. The blooming season was determined by evaluating trends in chlorophyll-a concentrations with time in all marine waters;
- Water clarity (as measured by secchi depth) greater than two meters (6.56 feet) during the blooming season for protection of eelgrass;
- No HABs with primarily health impacts during the past ten years, and
- A maximum of one HAB with primarily environmental impacts in the past ten years.

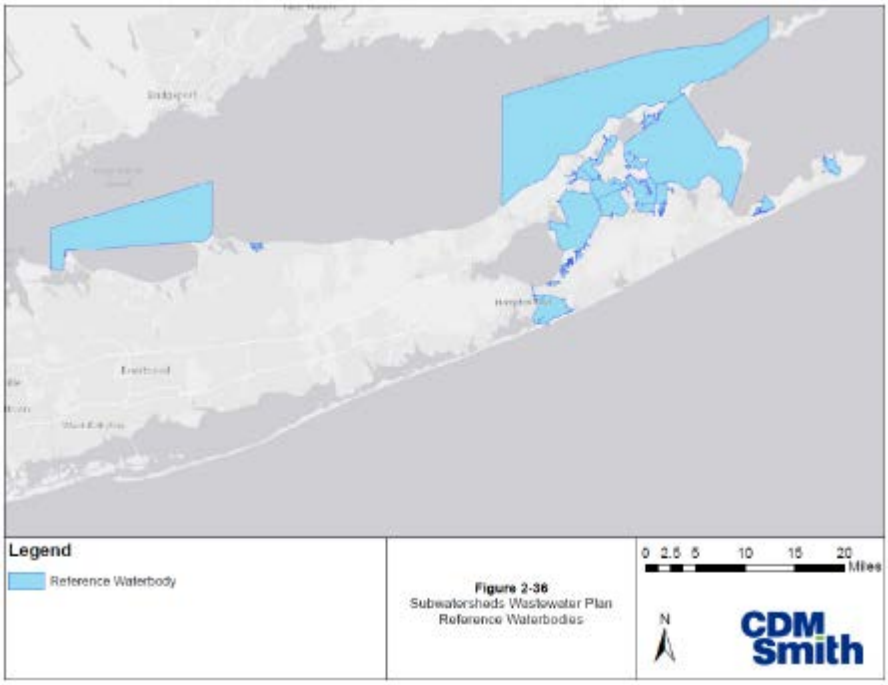
The reference water body approach was utilized to identify reference marine and mixed water bodies. Twenty-eight marine/mixed water bodies in Suffolk County met all of the water quality criteria identified; the reference water bodies are shown on Figure 2-36 and their respective unit nitrogen loads and residence times are provided in Table 2-39." (SC SWP Page 2-82 & 83)

SC SWP Table 2-39: Reference Waterbodies Achieving All Ecological Endpoints

Subwatershed	SWP PWL Number	Residence Time (days)	Unit Nitrogen Load (mg/L/day)	Unit Nitrogen Load * Residence Time (mg/L)
Coecles Harbor	1701-0163	39.6	0.002	0.089
Cold Spring Pond and Tribs	1701-0127	11.4	0.022	0.249
Gardiner's Bay	1701-0164	5.3	0.001	0.005
Goose Creek	1701-0236	10.8	0.028	0.305
Hallock/Long Beach Bay and Tidal Tribs	1701-0227	39.3	0.010	0.379
Lake Montauk	1701-0031	13.8	0.005	0.073
Little Peconic Bay	1701-0126+0172	80.8	0.002	0.122
Little Sebonac Creek	1701-0253	7.5	0.012	0.089
Long Island Sound, Suffolk County, East	1702-0266	45.5	0.000	0.002
Long Island Sound, Suffolk County, West	1702-0098+0232	45.8	0.000	0.016
Mill Creek and Tidal Tribs	1701-0238+	9.3	0.028	0.259
Mt Sinai Harbor and Tidal Tribs	1702-0019	4.5	0.027	0.122
Napeague Harbor and Tidal Tribs	1701-0166	19.1	0.004	0.084
North Sea Harbor and Tribs	1701-0037	5.7	0.019	0.106
Northwest Creek and Tidal Tribs	1701-0046	7.1	0.032	0.225
Northwest Harbor	1701-0368+0275+0276	8.0	0.003	0.027
Noyack Bay	1701-0167-rev	28.3	0.001	0.022
Sag Harbor	1701-0035-SH+0239	6.5	0.009	0.057
Sebonac Creek/Bullhead Bay and Tidal Tribs	1701-0051	5.0	0.028	0.104

Shelter Island Sound, North and Tribs	1701-0170	35.9	0.001	0.049
Shelter Island Sound, South and Tribs	1701-0365-rev+0240	41.0	0.001	0.058
Shinnecock Bay – Bennet Cove (Cormorant Cove)	1701-0033-BC+0252+0296	17.3	0.014	0.248
Shinnecock Bay East	1701-0033-E	18.6	0.004	0.070
Southold Bay	1701-0044	1.2	0.015	0.005
Stirling Creek and Basin	1701-0049	14.9	0.027	0.219
Town/Jockey Creeks and Tidal Tribs	1701-0235	12.3	0.004	0.336
West Neck Harbor	1701-0132-rev	8.9	0.046	0.038
Wooley Pond	1701-0048+	4.7	0.046	0.212
Average				**0.128**

SC SWP Figure 2-36: Reference Waterbodies



"The average unit nitrogen load * residence time of the reference water bodies is 0.128 mg/L. As described in more detail in Section 2.1.9.4, the 25th percentile of marine water bodies' unit nitrogen load * residence time was calculated based upon USEPA's **National Strategy for the Development of Regional Nutrient Criteria** (USEPA 1998) identifying the 25th percentile of Total Nitrogen data as representative of the acceptable water quality threshold where a sufficient range of existing water quality data exists in an ecoregion. The 25th percentile unit nitrogen load * residence time for marine water bodies in Suffolk County is 0.122 mg/L which is consistent with the 0.128 mg/L target developed based on the reference water bodies.

The average unit nitrogen load * residence time of 0.128 mg/L was then compared to the unit nitrogen load * residence time for all marine subwatersheds within the County. Some water bodies already achieve a unit nitrogen load * residence time of

0.128 mg/L or below and therefore were assigned a nitrogen load reduction goal of zero. All other water bodies were assigned a nitrogen load reduction goal which represents the percent reduction in nitrogen load required to achieve overall good water quality." (SC SWP Page 2-84)

A waterbody's unit nitrogen load multiplied by its residence time is considered it's "nitrogen residence time". The calculation used to determine the percent load reduction goal for an individual waterbody is the subject waterbody's nitrogen residence time minus the reference waterbody's average nitrogen residence time (0.128 mg/l) divided by that same subject waterbody's nitrogen residence time. "Since the residence time of a subwatershed is fixed, the resulting percentage indicates the necessary total nitrogen load reduction to the subwatershed. The required load reduction is calculated as follows: "

$$\frac{\text{Subject Waterbody's Nitrogen Residence Time} - \text{Average Reference Waterbody Nitrogen Residence Time (0.128 mg/l)}}{\text{Subject Waterbody's Nitrogen Residence Time}} = \text{\% Load Reduction Goal}$$

(SC SWP Page 2-84)

Because this approach considers only waterbodies that are consistently achieving all the desired ecological responses as "reference waterbodies", it represents a conservative approach to identifying load reduction goals (SC SWP Page 2-85).

Fresh Waterbodies and Coastal Ponds

Another evaluation was conducted for fresh waterbodies separate from marine waterbodies because "…both because of their physical differences to the tidally-flushed marine water bodies and because their responses to nitrogen loads are often different. The principles applied to marine water bodies to establish nitrogen-ecological endpoints (and nitrogen load reduction goals) could not be duplicated for fresh water bodies because there are fewer fresh water bodies than marine water bodies addressed in the SWP, a smaller range of water quality types (good versus poor), and insufficient water quality data to characterize Suffolk County fresh water bodies to establish responses to nitrogen loading. Although data on cyanobacteria HABs found in Suffolk County fresh water bodies is available, insufficient HAB data characterizing fresh water systems was available to determine a HAB reference threshold for fresh water bodies. In addition, fresh water bodies in the analysis include both flowing streams and rivers as well as closed systems like ponds and lakes; these also required distinct load reduction goal methods. The nineteen fresh water bodies included in the SWP were previously identified in **Table 2-37**. [Table 2-37 can be found on page 2-79 of the SC SWP.]

Coastal ponds are enclosed, fresh water bodies that are near the shoreline and inlets are sometimes created, both naturally and artificially, to allow tidal water to flush into the pond. These water bodies respond differently than marine and fresh water bodies to nitrogen loading. The thirteen coastal ponds included in the SWP were previously identified in **Table 2-38**. [Table 2-38 can be found on page 2-80 of the SC SWP.]

Nitrogen endpoints considered for fresh water bodies and coastal ponds include the following:

- Published guidance values of in-water total nitrogen concentrations resulting in good water quality (for both ponds and flowing streams);
- 25th percentile of in-water total nitrogen concentration of the freshwater and coastal ponds included in the SWP as local reference values for ponded and flowing systems." (SC SWP Page 2-102)

"Nitrogen endpoints were identified for those fresh water bodies that had at least ten in-water total nitrogen samples within the last ten years based on a comparison to published guidance values and local water quality data.

Because of the data limitations described above for fresh water bodies, no 25th percentile of in-water total nitrogen concentrations for Suffolk County waters could be calculated. Therefore, based on the strong correlation between the calculated Suffolk County-specific reference water unit nitrogen load * residence time to the USEPA's recommended 25th percentile, the Ambient Water Quality Criteria Recommendations for Lakes and Reservoirs in Nutrient Ecoregion XIV, the 25th percentile of all nitrogen data within Ecoregion XIV (including Suffolk County), 0.32 mg/L, was identified as a reference threshold for undrained fresh water bodies in Suffolk County. Load reduction goals were established based on the nitrogen reduction required to achieve the USEPA 25th percentile threshold of 0.32 mg/L for lakes and ponds for Agawam Lake, Georgica Pond, Big/Little Fresh Ponds and Lake Ronkonkoma.

USEPA's Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV identify a total nitrogen concentration of 0.71 mg/L as the 25th percentile of all nitrogen data within Ecoregion XIV (including Suffolk County). Load reduction goals based on the nitrogen load reduction required to achieve the US EPA 25th percentile threshold of 0.71 mg/L for rivers and streams were established for Carmans River Upper and Tribs, Connetquot River Upper and Tribs, Ligonee Brook and Tribs and Nissequogue River Upper and Tribs.

Insufficient total nitrogen data existed to use the reference value method for the remaining fresh water bodies and coastal ponds. Instead, the nitrogen load reduction goal assigned to the downstream marine water body or the nitrogen load reduction goal assigned to the subwatershed within which the unconnected pond is located was assigned. In general, the land uses within the contributing areas of the

downgradient marine water body and the upgradient fresh water body are similar." (SC SWP Page 2-103)

Additional Endpoint Reduction Calculations

Additional evaluations were completed on each individual endpoint (dissolved oxygen, HABs, water clarity/secchi depth, chlorophyll-a) to determine the relationship between the nitrogen loading and the desired ecological endpoints for each subwatershed. These evaluations followed a similar methodology as the reference waterbody approach to meet all endpoints. *Details on these individual endpoint evaluations can be found in the SC SWP Sections 2.1.9.3.4 and 2.1.9.2.1 through 2.1.9.2.5.*

Final Load Reduction Goals for Priority Waterbodies

The final nitrogen load reduction goals for the waterbodies noted in Table 1 are listed below in Table 3. Although five of these priority waterbodies note a zero percent load reduction goal, the waterbodies will still be part of the implementation activities to ensure their water quality is maintained or improved to meet their designated use. *Table 2-48 of the SC SWP outlines all the nitrogen load reductions per waterbody for each alternative approach and can be reviewed for more details.*

Table 3: Water Quality Improvement Load Reduction Goals for Priority Waterbodies

Assessment Unit ID	Waterbody Name	Load Reduction Goal
NY1701-0035	Sag Harbor and Sag Harbor Cove	81%
NY1702-0015	Port Jefferson Harbor, North, and tribs	0%
NY1702-0019	Mt Sinai Harbor and tidal tribs	0%
NY1702-0047	Stony Brook Harbor and West Meadow Creek	60%
NY1702-0091	Conscience Bay and tidal tribs	58%
NY1702-0227	Lloyd Harbor	0%
NY1702-0228	Huntington Harbor	72%
NY1702-0229	Centerport Harbor	0%
NY1702-0230	Northport Harbor	72%
NY1702-0242	Setauket Harbor	61%
NY1702-0023	Smithtown Bay	0%

(Adapted from Table 2-48 of the SC SWP.)

Subwatershed Characterization and Ranking

Suffolk County developed a system to characterize and rank the waterbodies to determine priority areas to focus non-point source reduction measures. This methodology is described below. *More detail in Section 2.1.7 of the SC SWP.*

"In collaboration with SCDHS and the Ranking/Priority Area Focus Area Work Group that SCDHS established for the SWP, an approach was developed and implemented

to characterize the subwatersheds and rank the priority of each subwatershed. Establishing priority ranks for individual water bodies accomplishes the following:

- Ranks and groups water bodies scientifically with respect to current ecological condition and vulnerability to nitrogen loads from wastewater (nitrogen load vs flushing time and existing water quality) to assist in funding resource allocation;
- Supports the analysis of cost-benefit;
- Supports the identification of areas that may benefit from alternate wastewater management strategies such as sewering and clustering; and,
- Ultimately, helps guide the recommendations of a Countywide phased wastewater upgrade program with the understanding that program resources are limited and need to be allocated in the most efficient means possible." (SC SWP Page 2-61)

EVAMIX

"The subwatersheds were ranked with respect to priority for nitrogen load reduction based upon a variety of criteria. In order to consider a range of subwatershed characteristics simultaneously in an organized and objective process, EVAMIX, a mathematically sophisticated decision support tool, was used to help guide the process of comparing each subwatershed to the others in the County to establish priorities for nitrogen reduction. EVAMIX was originally developed in the 1980s at Delft in the Netherlands by Dr. Henk Voogd and Dr. Mark Maimone. EVAMIX is a matrix based, multi-criteria evaluation program that allows use of both quantitative (cardinal) and qualitative (ordinal) criteria. The algorithm behind EVAMIX maintains the essential characteristics of quantitative and qualitative criteria yet is designed to eventually combine the results into a single appraisal score for each alternative. This unique feature of the program provides the ability to make use of all available data, whether it is quantitative or qualitative. EVAMIX has been successfully applied both in the United States and internationally. EVAMIX has been successfully used to support a variety of projects in New York State, and the results have been upheld in the courts, because the evaluation was completed in a rigorous, open and technically sound process." (SC SWP Page 2-61 & 2-62) *More information on EVAMIX can be found in Section 2.1.7.1 of the SC SWP.*

In the decision support tool, waterbodies were divided into three main categories to reflect the differences in the types of waterbodies in the County. The categories include marine, fresh, and mixed waterbodies. The evaluation criteria for determining the priority of the waterbodies was slightly altered for the different categories and is presented in the table below. *Detailed information on each category can be found in Section 2.1.7.3 of the SC SWP.*

SC SWP Table 2-28: Evaluation Criteria

Marine	Fresh	Criteria Characterization Approach
Estimated Unit Nitrogen Load * Residence Time		25/50 Year Onsite WW N-Load - (Aggregated lbs.-N/aggregated-m3/year)1 (load selection based on sensitivity variation)
Residence Time		10% flushing time

Total Nitrogen Concentration		90th Percentile of subwatershed specific TN (mg/L)
Total Phosphorus Concentration		90th Percentile of subwatershed specific TP (mg/L)
Dissolved Oxygen		0th Percentile of subwatershed specific D.O. (mg/L)
HAB – Human Health		Count of years in which Human Health HAB occurred from 2007-2017
HAB - Environmental		Count of years in which Environmental HAB occurred from 2007-2017
Total Chlorophyll-A		90th Percentile of subwatershed specific T-Chl-a (µg/L)
Clarity		Average of subwatershed specific Secchi Depth (ft)
n/a	Plant and/or Macroalgae Overgrowth	The presence of aquatic invasive species and algal/plant growth was identified from the NYSDEC PWL assessment fact sheets
Eelgrass (coastal resiliency)	n/a	Insufficient historical coverage information to establish subwatershed-specific eelgrass losses; however, water clarity and chlorophyll 'a' criterion are used as surrogates since these parameters directly impact the conditions for eelgrass growth
Pathogens		To be evaluated under separate GIS-based analysis. Recommendations for pathogen-related wastewater upgrades will be provided separately.
Submerged Aquatic Vegetation	n/a	Insufficient historical coverage information to establish subwatershed-specific SAV losses. In addition, the presence of SAV is influenced by other factors including water depth, substrate, turbidity, and presence of sulfates or pesticides.

"Watersheds were ranked, and then grouped into quartiles, as follows:

- Priority Rank 1 – generally moderate to severe water quality impacts, highest nitrogen loads and/or poorly flushed;
- Priority Rank 2 – generally minor to moderate water quality impacts, may have moderate to high nitrogen loads and/or be poorly flushed;
- Priority Rank 3 – generally minor water quality impacts, small to moderate nitrogen loads and/or be poorly flushed, and
- Priority Rank 4 – generally no known or minor water quality impacts, low nitrogen loads and/or well flushed." (SC SWP Page 2-69)

"One matrix was used to evaluate the marine/mixed subwatersheds and one to evaluate the fresh/mixed subwatersheds. The mixed subwatersheds were ranked using both the marine criteria and criteria weights and the fresh criteria and criteria weights. The combined ranking of all subwatersheds utilized the ranking resulting in the greatest required nitrogen load reduction for the mixed subwatersheds that were ranked in both the marine and the fresh matrices. Watersheds were ranked, and then grouped into four quartiles. The ranking for the mixed subwatersheds was based on the lower of the marine/mixed and fresh/mixed ranking matrices." (SC SWP Page 2-70)

Table 4 below shows the priority rankings for the nitrogen waterbodies listed in Table 1. *The final criteria weights used in the ranking of the marine and fresh waterbodies can be found in Table 2-31 (Page 2-70) of the SC SWP. Final priority rankings for all waterbodies can be found in Table 2-34 of the SC SWP.*

Table 4: Subwatershed Priority Ranking

Assessment Unit ID	Waterbody Name	Priority Rank
NY1701-0035	Sag Harbor and Sag Harbor Cove	3
NY1702-0015	Port Jefferson Harbor, North, and tribs	4
NY1702-0019	Mt Sinai Harbor and tidal tribs	4
NY1702-0047	Stony Brook Harbor and West Meadow Creek	3
NY1702-0091	Conscience Bay and tidal tribs	3
NY1702-0227	Lloyd Harbor	3
NY1702-0228	Huntington Harbor	2
NY1702-0229	Centerport Harbor	2
NY1702-0230	Northport Harbor	1
NY1702-0242	Setauket Harbor	3
NY1702-0023	Smithtown Bay	3

(Adapted from Table 2-34 of the SC SWP.)

Implementation

Human wastewater was determined to be the highest source of nitrogen loads to the waters of Suffolk County – with wastewater from on-site treatment systems being the highest source. As such, a county-wide implementation plan was developed to address wastewater from on-site treatment systems. This includes a variety of actions such as code changes, approving nitrogen removal systems, creating a management district and recurring revenue source (funding), and determining areas that would be better served by public sewer systems. The implementation plan also uses the priority areas to determine where and how implementation should occur. The implementation plan is described below. *More details on the recommendations can be found in Section 8 of the SC SWP.*

The overall goal of the implementation plan is to replace or upgrade all septic systems or cesspools to innovative/alternative on-site wastewater treatment systems (I/A OWTS)

which treat the effluent to under 19 mg/l. The implementation plan is broken down into four phases, described below. The implementation plan is a long-term approach, with the first three phases being completed within a 50-year timeframe. The schedule anticipates that milestones described in each phase will get the water quality improvements necessary to get closer to ultimately meeting the ecological endpoints and the State's nutrient criteria for the waterbodies. There are also discussions on other nitrogen sources and how to decrease the load for those waterbodies where wastewater management alone would not meet the reduction target. *More detail on the four phases can be found in Section 8.1.6 of the SC SWP.*

Phases of Implementation

As noted, Suffolk County has determined a four-phase approach for the implementation of their wastewater nitrogen reduction strategy. "The phases are intended to build upon each other through an aggressive, but achievable, timeline that allows for:

- Establishment of critical administrative elements such as a Countywide Water Quality Management District (WQMD) and stable recurring revenue source before initiating required wastewater upgrades;
- A steady, but controlled, annual update target rate that can accommodate industry and RME (Responsible Management Entity) readiness; and
- The program timeline goals for the protection of human health and the environment." (SC SWP Page 8-2)

Each phase of implementation is described below.

Phase I – Program Ramp Up

"The primary objectives of Phase I are to establish the basic programmatic infrastructure necessary to implement a countywide wastewater upgrade program, to require the installation of I/A OWTS for all new construction in Suffolk County, and to revise Appendix A of the Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single Family Residences to make the use of Appendix A STPs more flexible in Suffolk County." (SC SWP Page 8-33) Additionally, this phase will include the continuation of the volunteer upgrades of septic or cesspools to I/A OWTS systems through the County's Septic Improvement Program. This includes the use of the existing grant programs to incentivize property owners to upgrade or to assist those with failing systems. It is expected that through volunteer upgrades in this phase a net reduction of up to 252,000 pounds would be achieved via up to 5,000 on-site wastewater upgrades. (SC SWP Page 8-33)

The following implementation sub-tasks are slated to occur during Phase I:

1) "Completion of a Countywide Water Quality Management District Feasibility Study (WQMD FS) to establish recommendations for the administrative structure of the Countywide Water Quality Management District and provide recommendations for the establishment of a stable recurring revenue source;
2) Establishment of the WQMD using the data and recommendations obtained from the WQMD FS;

3) Establishment of the stable and recurring revenue source using the findings of the WQMD FS;
4) Amendment of Article 6 of the Suffolk County Sanitary Code to require the installations of I/A OWTS for all new construction;
5) Amendment of Appendix A of the Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single Family Residences to permit reduced setbacks and increase in allowable design flow to 30,000 gpd for Appendix A STPs including revising the language to require sound attenuation – such that a maximum noise level of 50 dbA must be met at the most conservative (minimum) setback for the project and revising the commercial standards to include the STP guidance memorandum as an appendix so that all future Appendix A systems located within environmentally sensitive areas will result in a new nitrogen reduction benefit;
6) Continue to reduce nitrogen from wastewater sources in Suffolk County through the implementation of existing voluntary incentive programs for the installations of I/A OWTS and Town/Village required upgrades to I/A OWTS. Modify existing New York State and County SIP guidelines to align with the priority needs and recommendations provided within this SWP;
7) Continue industry and RME ramp up, including hiring approximately 18 staff, to accommodate the up to 3,000 upgrades per year estimated under Phase IIA;
8) Complete buildout nitrogen load travel time analysis and work with County and Town/Village planners and the Article 6 Workgroup to develop policy recommendations for upzoning;
9) Preparation of a SWP Adaptative Management and Monitoring Plan(s); and,
10) Completion of a SWP Addendum including revaluation of parcel-specific recommended upgrade methodology (e.g. advanced onsite treatment versus sewering/clustered)." (SC SWP Page 8-33 and 34)

Detailed information on each sub-task is available in Sections 8.1.1 through 8. 8.1.6 of the SC SWP.

As of November 2020, Suffolk County has made progress in implementing the tasks outlined in Phase I. This includes:

- Starting the WQMD FS, with a completed report released on February 23, 2021,
- Passing the amendment to Article 6 of the Suffolk County Sanitary Code that requires installations of I/A OWTS for all new construction,
- Working with the Article 6 Workgroup on additional measures to update the Suffolk County Sanitary Code,
- Hiring staff to accommodate the increasing work, and
- Forming a workgroup to begin the development of the SWP Adaptative Management and Monitoring Plan(s).

Phase II – Upgrades in Near Shore and All Priority Rank I Areas

"The primary objective of Phase II is to upgrade all unsewered parcels to advanced wastewater treatment in the highest priority areas of Suffolk County. This includes upgrades in all near shore areas within the 0 to 2-year groundwater contributing area

to surface waters, all surface water Priority Rank 1 areas, and all groundwater/drinking water Priority Rank 1 areas." (SC SWP Page 8-37)

"As discussed previously in this SWP, these areas were established as the highest priority areas for wastewater upgrades in Suffolk County due [to] a variety of factors as described below:

- Installation of I/A OWTS in the 0 to 2-year contributing area results in the most immediate benefit in terms of reducing nitrogen loads to Suffolk County water bodies including 708 pounds per day from the Long Island Sound subwatersheds, 788 pounds per day from the Peconic Estuary subwatersheds and 1,236 pounds of nitrogen per day from the South Shore Estuary Reserve subwatersheds;
- Installation of I/A OWTS in the 0 to 2-year contributing area provides the most cost-effective removal of nitrogen loading as shown by Figure 8-5 [can be found on Page 8-39 of the SC SWP];
- Reducing nitrogen concentrations to below NYSDEC groundwater criteria and New York State Department of Health (NYSDOH) drinking water standards within supply wells where concentrations in untreated groundwater currently exceed 10 mg/l and the predominant source of nitrogen is from sanitary wastewater;
- May reduce concentrations of CECs [Contaminants of Emerging Concern] (e.g. some of which can be degraded biologically through existing wastewater technologies); and
- Provides additional nitrogen removal for the protection of surface water bodies in eastern Suffolk groundwater/drinking water priority areas that overlap surface water contributing areas." (SC SWP Page 8-38)

"Phase II consists of four sub-phases to accommodate industry and RME growth. The sub-phases include the phasing-in of specific geographic target areas and policy triggers to achieve manageable incremental increases in the annual number of WWT upgrades per year. A summary of each sub-phase, their respective policy recommendations, and expected outcomes is provided below in Table 8-15." (SC SWP Page 8-39)

The four sub-phases that are detailed in Table 8-15 Phase II Policy Recommendations and Expected Outcomes is summarized below. *More details on the sub-phases can be found in the SWP in Sections 8.1.6.2.1 through 8.1.6.2.4.*

Phase IIA: Years 2024 – 2025

- Policy Recommendations
    - Continue voluntary upgrade incentive programs
    - Continue requirement for upgrades on all New Constructions
    - Upgrade at system failure in all 0-2-year surface water contributing areas
    - Upgrades at system failure in all groundwater/drinking water Priority Rank 1 areas
- Expected Outcomes

    - 3,188 upgrades/year*
    - 11,873 cumulative upgrades**
- Total funding need
    - Between $65 and $71 million per year

Phase IIB: Years 2026 – 2036

- Policy Recommendations
    - Continue upgrades from Phase IIA
    - Upgrades at property transfer in all 0-2-year surface water contributing areas
    - Upgrades at property transfer in all groundwater/drinking water Priority Rank 1 areas
- Expected Outcomes
    - 6,082 upgrades/year*
    - 78,778 cumulative upgrades**
- Total funding need
    - Between $65 and $137 million per year

Phase IIC: Years 2037 – 2038

- Policy Recommendations
    - Continue upgrades from Phase IIB
    - Upgrades at system failure in all Priority Rank 1 surface water contributing areas
- Expected Outcomes
    - 4,409 upgrades/year*
    - 87,595 cumulative upgrades**
- Total funding need
    - Between $66 and $96 million per year

Phase IID: Years 2039 – 2053

- Policy Recommendations
    - Continue upgrades from Phase IIC
    - Upgrades at property transfer in all Priority Rank 1 surface water contributing areas
- Expected Outcomes
    - 6,431 upgrades/year*
    - 177,634 cumulative upgrades**
- Total funding need
    - Between $66 and $140 million per year

*Retrofits of existing on-site systems.
**Includes upgrades from previous phase(s).
(SC SWP Page 8-39 to 40)

Phase III – Upgrades in All Remaining Surface Water Priority Areas and Groundwater/Drinking Water Priority Rank 2 Areas

Phase III "…will be initiated approximately 30 years after the start of Phase II, or sooner, if the annual revenue stream can accommodate the additional upgrades targeted for Phase III. The primary objective of Phase III is to upgrade all remaining surface water priority areas Countywide as well as parcels within groundwater/drinking water Priority Rank 2 areas." (SC SWP Page 8-41)

A summary of Phase III policy recommendations is below (adapted from SC SWP Table 8-16: Summary of Phase III Policy Recommendations and Expected Outcomes on page 8-43).

Phase III: Years 2054 – 2068

Policy Recommendations

- Continue voluntary upgrade incentive programs
- Continue requirement for upgrades on all New Construction
- Upgrades at system failure in all 0-2-year surface water contributing areas, if necessary
- Upgrades at system failure in all groundwater/drinking water Priority Rank 1 areas, if necessary
- Mandatory upgrades at system failure and property transfer in the 2 to 25/50-year surface water contributing area for Priority Ranks 2 through 4
- Mandatory upgrades at system failure and property transfer in groundwater/drinking water Priority Rank 2

Expected Outcomes

- 5,500 upgrades/year*
- 252,500 cumulative upgrades**

Total funding need

- Between $67 and $141 million per year

*Retrofits of existing on-site systems.
**Includes upgrades from previous phase(s).

Phase IV – Upgrades in All Remaining Groundwater/Drinking Water (Priority Rank III)

"[Phase IV] will be initiated approximately 15 years after the start of Phase III, or sooner, if the annual revenue stream can accommodate the additional upgrades targeted for Phase IV. The primary objective of Phase IV is to upgrade all remaining groundwater/drinking water parcels in Suffolk County (e.g., groundwater/drinking water Priority Rank 3). Because of the significant parcel pool estimated within groundwater/drinking water Priority Rank 3 (approximately 430,000 parcels), it is anticipated that the Article 6 upgrade triggers utilized in Phase IV would need to be

phased in, similar to the process used in Phase II, to accommodate an upgrade rate consistent with the industry, RME, and annual funding spending capacity.

Because of the uncertainty in making recommendations for a program phase that will begin an estimated 45 years after establishment of a stable and recurring revenue source (Phase I), specific recommendations for how to phase individual parcels within Phase IV are not provided within this SWP. Policy recommendations for Phase IV should be made through a future SWP Addendum or Annual Report pursuant to the Adaptive Management Plan [described in Section 8.4.11]. It should be noted that many of the parcels located within Phase IV are in areas with very long travel times (e.g., hundreds of years)." (SC SWP Page 8-44)

Implementation Considerations

Suffolk County took many considerations into account when detailing the implementation plan. These considerations include:

- Estimating upgrade rates for wastewater treatment systems
- Industry and market readiness
- Responsible Management Entity (RME) readiness

More on these considerations can be found in Section 8.2 of the SC SWP.

Also included in the implementation discussion was determining which wastewater management method is best for a particular area, as well as recommendations for ensuring a holistic approach to ensure all parcels in Suffolk County have some sort of plan to reduce nitrogen. It is expected that the 8 water bodies included in this 5-Alt Plan will have the recommended implementation actions completed within Phase 2 of the SC SWP. *More information on these can be found in SC SWP Sections 8.3 and 8.4, respectively.*

Adaptive Management Plan

"The Program defined within the SWP is intended [to] be a guide that builds upon the best information available at the time of plan development. As with any extended program, the implementation of an adaptive management strategy is a critical element to ensure the overall success of the program. Adaptive management is a process of information gathering, review and analysis, and response that promotes flexible decision-making as shown by Figure 8-16. It is particularly appropriate for complex programs, for programs where the effects of an organization's decisions and actions play out over an extended period of time, and where an organization must meet multiple objectives – as in the case of the SWP.

If impacts from implementation of the SC SWP are identified during the review process, mitigation measures can be identified and implemented into the program as part of adaptive management. The County's adaptive management program includes the following five critical components:

1. Establishment of a program lead;
2. Establishment of clearly defined goals and objectives (performance measures);
3. Establishment of clearly defined program review intervals;
4. Establishment of a monitoring plan to track program progress; and
5. A reporting mechanism that will:
    a. Document progress;
    b. Identify new data sources;
    c. Identify corrective actions; and,
    d. Identify recommendations to the Program.

In addition, the Adaptive Management Plan will provide the mechanisms to ensure that critical program elements are in-place prior to moving forward with individual program elements (e.g., industry readiness, design professional readiness, scavenger plant capacity). Finally, the Adaptive Management Plan will provide an additional location to publish defined SEQRA thresholds that would prompt requirements for supplemental Environmental Impact Statement (EIS) or project-specific EIS, essentially building on the list of thresholds identified in the Draft/Final Generic Environmental Impact Statement (GEIS)." (SC SWP Page 8-88 & 8-89)

SC SWP Figure 8-16: Example Adaptative Management Process as Utilized in the California EcoRestore Initiative

Source: http://resources.ca.gov/ecorestore/what-is-california-ecorestore/

As described above, Suffolk County is working through the Adaptative Management Plan process to ensure they are doing the correct implementation activities to get the

results needed. *More information on the steps of the Adaptative Management Plan can be found in Sections 8.4.11.1 through 8.4.11.6 of the SC SWP.*

Funding/Revenue Source

> "Identification and procurement of a stable recurring revenue source is paramount for implementation of the recommendations provided within this Plan. The recommendations provided in the SWP will not be advanced unless a stable, recurring revenue source is established that makes the cost of wastewater upgrades affordable to the residents of Suffolk County. While there are numerous successful models of revenue programs focused on funding wastewater management infrastructure nationally and locally, two example models were evaluated as part of this SWP to identify a range of potential annual revenue streams that could be used to offset the cost of wastewater infrastructure upgrades. The two example models evaluated include: 1) an Aquifer Protection Fee applied as a surcharge on individual public water supply bills; and 2) a Bay Restoration Fee model applied to each parcel's property tax bill and modeled on the Chesapeake Bay Restoration Fund which has been successful in the State of Maryland." (SC SWP Page 8-22) *More details on the two approaches can be found in Sections 8.1.4.1 and 8.1.4.2 in the SC SWP.*

The final revenue source for the implementation of SC SWP will be determined by the results of the Countywide Management District Feasibility Study that is expected to be released in Spring of 2021. This study analyzes the different possible revenue sources, as mentioned above, to determine the best way to fund the implementation activities into the future, including operation and maintenance of those projects. *More on this study can be found in the description of Phase I of implementation of this document.*

Additional funding sources that were taken into consideration include the County's ¼% Fund, which is a sales tax that funds various projects in Suffolk County, and the Town's Community Preservation Funds, which is a fund established by five towns in the eastern portion of the County that could be used on water quality improvement projects. *More details can be found in Section 8.1.4.3 of the SC SWP.*

Suffolk County has and will continue to use New York State funds for their Septic Improvement Program. In 2018 NYS provided $10.025 million to Suffolk County for septic and cesspool replacement with IA systems. Additionally. Suffolk County can apply for funding through both the NYSDEC's Water Quality Improvement Project (WQIP) grant program and the Clean Water Revolving Loan program to upgrade wastewater treatment facilities.

Other Implementation

Additionally, the SC SWP is an early action item in the Long Island Nitrogen Action Plan (LINAP) Scope. Through LINAP, implementation of reductions to sources of nitrogen are being address through partner initiatives as well as State-led initiative such as

nitrogen fertilizer management, water reuse, and bioextraction. Suffolk County is partnering with LINAP on many initiatives.

To address nitrogen from fertilizers, LINAP has a Fertilizer Management Workgroup to work through a variety of fertilizer management topics. Through Workgroup discussions, a set of recommendations was developed for turf grass fertilizer management to reduce the potential of nitrogen to leech or runoff into surface and ground water. The recommendations would reduce nitrogen in fertilizer to still meet the needs of the plant, while protecting the quality of the surface and ground water on Long Island. Suffolk County was, and continues to be, involved in the Fertilizer Management Workgroup efforts.

LINAP is also leading the Nutrient Bioextraction Initiative to focus on how to remove legacy nitrogen sources within the waterbody to improve the water quality. Currently, the initiative is working on pilot studies to determine how much nitrogen can be removed, the potential uses for the pilot studies species after harvest, and best techniques for installation of sites. Additionally, LINAP is working to determine how to establish an industry to allow for nutrient bioextraction to become a standard practice that would have benefits beyond water quality. Suffolk County is part of the two workgroups that help move this initiative forward and pilots are currently being executed within the County.

To reduce point sources of nitrogen from wastewater treatment facilities, LINAP has been working on a Water Reuse Initiative. This initiative focuses on how effluent from facilities can be reused in a way that would reduce the nitrogen in its effluent below permit limits. One way to do this is to use the effluent for irrigation purposes. This practice takes the nitrogen that would be discharged and reuses it to fertilizer plants, therefore lowering the nitrogen entering the system. Suffolk County's Department of Health Services has been instrumental in determining the pathways facilities would need to undertake in order to permit this type of activity in the County. Currently, one facility in Suffolk County practices water reuse and another is in the feasibility study stage.

The SC SWP will work in conjunction with the LINAP efforts to continue to reduce nitrogen from all sources. Suffolk County staff engages in LINAP efforts by participating in meetings, routinely contributing to projects, and doing groundwork to support LINAP's projects.

Monitoring Effectiveness of Alternative Approach

The SC SWP describes a plan for the long-term monitoring and recommendations for further evaluations. The County recognizes that:

"The focus of the SWP was to use readily available existing data and information to:

- Provide a range of recommended wastewater management policy options to policymakers that considered the established priority areas, load reduction goals,

code and standard changes, and potential funding needs to facilitate implementation of an integrated Countywide strategy; and,

- Identify data gaps where additional information was needed before policy recommendations could be set forth and to provide a recommended road map of to close each of the identified data gaps.

The SWP is one aspect of a Countywide program to reduce the total nitrogen mass load to groundwater and surface water within the County. Suffolk County remains dedicated to tracking the implementation of the program and to working with local jurisdictions and continuing coordination with related programs (e.g., estuary programs, LINAP, LICAP, Towns/Village) to ensure the Countywide implementation strategy addressing nitrogen sources is advanced. The following section summarizes the identified data gaps, uncertainties, and opportunities to refine the results of the SWP." (SC SWP Page 9-1)

Integrated into the Adaptative Management Plan will be a Long-Term Monitoring Plan. The plan will include the continuation of existing monitoring, as well as new monitoring as recommended. The County currently has a robust monitoring program that was able to supply data for the creation of the models for this analysis. Going forward, the monitoring efforts will be assessed and increased where necessary to ensure implementation can be tracked to show improvement to the water quality. Success of this alternative restoration plan will be assessed by the annual monitoring reports supplied by Suffolk County during the implementation of their SWP. *More detail on how long-term monitoring will occur and descriptions for further evaluations of specific considerations can be found in Section 9 of the SC SWP.*

Local actions slated to occur via the implementation plan will improve and maintain water quality in the waterbodies that are listed in Table 1. The waterbodies included in this plan will be address in all phases of implementation, as well as through the various LINAP initiatives. DEC anticipates these waterbodies to continue to achieve the state's water quality standards, which will be confirmed by ambient water quality monitoring, and cease being in jeopardy of nitrogen impairment as the implementation of the SC SWP progresses and is completed.

Public Participation

Stakeholder participation was included in all aspects of the SC SWP. The plan development included feedback from stakeholders though multiple workgroups. In addition, decisions made during plan development were vetted through the work group to gain public confidence in the outcome of the plan. Additionally, the plan was part of a Generic Environmental Impact Statement that was voted on and passed by the Suffolk County legislature on March of 2020. Part of that process was a 30-day comment period that was extended to 60-days due to public interest in the plan. All public comments received were address and where appropriate, were incorporated into the plan. More information on stakeholder input is described below. *Additional details can be found in Section 1.3 of the SC SWP.*

"Suffolk County has endeavored to develop the SWP in an open and transparent process, and has incorporated the information, experiences, perspectives and feedback provided by a wide variety of stakeholders engaged throughout the SWP development. Stakeholder participation included:

- Focus Area Work Groups convened by SCDHS to provide technical oversight and guidance on specific technical issues;
- A Wastewater Plan Advisory Committee (WPAC) comprised of representatives with diverse backgrounds and perspectives to provide input, feedback and guidance on SWP development, and
- Stakeholders representing a range of perspectives and interests." (SC SWP Page 1-86)

"In addition, SCDHS held bi-weekly project progress calls to update project partners including representatives from the Long Island Regional Planning Council, New York State Department of Environmental Conservation (NYSDEC), New York State Department of State (NYSDOS), State University of New York School of Marine and Atmospheric Sciences (SUNY SoMAS), Suffolk County Department of Economic Development and Planning (SCDEDP), the Suffolk County Executive's Office, the United States Environmental Protection Agency (USEPA) and the United States Geological Survey (USGS).

Finally, SCDHS presented interim work products and solicited feedback at meetings with individual stakeholders including the Long Island Farm Bureau, NYSDEC, the Peconic Estuary Program (PEP), the Nature Conservancy (TNC), and USEPA." (SC SWP Page 1-86 & 1-87)

"SCDHS convened five Focus Area Work Groups to provide technical expertise, share data and information and guide technical direction. The original Focus Area Work Group subject areas and members are listed on Table 1-23. As the project progressed, additional experts and stakeholders contributed to Focus Area Work Group technical meetings and discussions.

Proposed approaches and interim work-products were presented to the Focus Area Work Groups and feedback was obtained at in-person meetings, net-meetings, conference calls and via email." (SC SWP Page 1-87)

SC SWP Table 1-23: Focus Area Work Groups Memberships

Nitrogen Load Model	Groundwater Model	Surface Water Model	Priority Areas/ Endpoints
Dr. Chris Gobler, SUNY SoMAS	Chris Schubert, USGS	Dr. Chris Gobler, SUNY SoMAS	Dr. Chris Gobler, SUNY SoMAS
Chris Schubert, USGS	Dr. Chris Gobler, SUNY SoMAS	Dr. Robert Wilson, SUNY SoMAS	Cameron Ross, NYSDEC
Cameron Ross, NYSDEC	Cameron Ross, NYSDEC	Dr. Charles Flagg, SUNY SoMAS	Ken Kosinski, NYSDEC

Ken Kosinski, NYSDEC	Ken Kosinski, NYSDEC	Chris Schubert, USGS	Alison Branco, PEP/TNC
Alison Branco, PEP/TNC	Alison Branco, PEP/TNC	Cameron Ross, NYSDEC	Mike Jensen, SCDHS
Ken Zegel, SCDHS	Ken Zegel, SCDHS	Ken Kosinski, NYSDEC	Ken Zegel, SCDHS
Stephen Lloyd, TNC	Ron Paulsen, SCDHS	Alison Branco, PEP/TNC	Jason Hime, SCDHS
Jamie Vaudrey, UCONN	Steve Colabufo, SCWA	Ken Zegel, SCDHS	Brian Howes, UMASS
Steve Pacenka, Cornell	Ruth Izraeli, EPA	Jim Ammerman, LIS	Tim Kelly, Nassau County
Nora Catlin, Cornell	Kristin Heinemann, EPA	Myra Fedyniak/Nancy Rucks, SSER	Marci Bortman, TNC
Myra Fedyniak/Nancy Rucks, SSER	Dr. Henry Bokeniewicz, SUNY SoMAS	Kristin Heinemann, EPA	Myra Fedyniak/Nancy Rucks, SSER
Kristina Heinemann, EPA	Jim Ammerman, LIS	Tim Kelly, Nassau County	Mark Tedesco, LIS
Jim Ammerman, LIS	Tim Kelly, Nassau County	Stephen Lloyd, TNC	Marci Bortman, TNC
Tim Kelly, Nassau County	Stephen Lloyd, TNC	Awarded Consultant Experts	Kristina Heinemann, EPA
Awarded Consultant Experts	Awarded Consultant Experts		Soren Dahl, NYSDEC
			Awarded Consultant Experts

Acronyms:
CCWT – Center for Clean Water Technology
LIFB – Long Island Farm Bureau
LIS – Long Island Sound
NYSDEC – New York State Department of Environmental Conservation
PEP – Peconic Estuary Program
SCDEDP – Suffolk County Department of Economic Development and Planning
SCDHS – Suffolk County Department of Health Services
SSER – South Shore Estuary Reserve
SCWA – Suffolk County Water Authority
SUNY SoMAS – State University of Stony Brook School of Marine and Atmospheric Sciences
TNC – The Nature Conservancy
UCONN – University of Connecticut
UMASS – University of Massachusetts
USEPA – United States Environmental Protection Agency
USGS – United States Geological Survey

In addition to the Focus Area Work Groups, a Wastewater Plan Advisory Committee (WPAC) was assembled. "The WPAC included representatives from academia, environmental organizations, local and state government, regulatory agencies and the Suffolk County Water Authority (SCWA); a complete list of WPAC members (in alphabetical order) is provided in Table 1-24. In total, more than 140 participants were invited to participate in the WPAC meetings." (SC SWP Page 1-88) Thirty-nine groups were represented on the WPAC.

SC SWP Table 1-24: Subwatershed Wastewater Plan Advisory Committee

WPAC Membership	
Citizens Campaign for the Environment	Cornell Cooperative Extension
Long Island Builders institute	Long Island Commission on Aquifer Protection (LICAP)
Long Island Farm Bureau	Long Island Nitrogen Action Plan – Executive Council and Project Management Team
Long Island Pine Barrens Society	Long Island Sound Study
New York State Department of Environmental Conservation	New York State Department of Health
New York State Department of State – South Shore Estuary Reserve	New York State Legislators
Peconic Baykeeper	Peconic Estuary Program
Sea Grant	Seatuck Environmental Association
State University of New York – Center for Clean Water Technology	Stony Brook University School of Marine and Atmospheric Sciences
Subwatershed Wastewater Plan Consultant Team	Suffolk County Board of Health
Suffolk County Department of Economic Development and Planning	Suffolk County Department of Health Services
Suffolk County Department of Public Works	Suffolk County Executive Office
Suffolk County Legislators	Suffolk County Water Authority
The Nature Conservancy	Town of Babylon Planning Department
Town of Brookhaven Planning Department	Town of East Hampton Planning Department
Town of Huntington Planning Department	Town of Islip Planning Department
Town of Riverhead Planning Department	Town of Shelter Island Planning Department
Town of Smithtown Planning Department	Town of Southold Planning Department
Town of Southampton Planning Department	United States Environmental Protection Agency
United States Geological Survey	

Suffolk County convened the WPAC to gather input and guidance on specifics of the plan at four separate meetings. Each meeting including the presentation of

information/progress on the elements of the planning effort as well as a request for assistance or input from the group members. The first meeting focused on the development of the SWP, including input and feedback from the group on the project scope, list of subwatersheds, and available data. The second meeting, held about six months later, included presentations on the subwatershed mapping and nitrogen load calculation, and requesting assistance from the group with filling in data gaps and identifying pilot locations. About a year and a half later, the group met to review the subwatersehd residence time modeling, subwatershed ranking approach, and proposed nitrogen load reduction approach. The final meeting of the WPAC occurred about six months later where they were presented with the priority areas and aggregated wastewater management areas, final nitrogen load reduction goals, and proposed implementation framework. (SC SWP Page 1-90, adapted from Table 1-25: WPAC Meeting Overview)

> "In addition to the formal input and guidance provided by the technical experts who participated in the Focus Area Work Groups and the WPAC, SCDHS organized two stakeholder meetings to present the SWP to an even broader spectrum of interested stakeholders. The stakeholder invitation list included more than 300 individuals from academia, environmental organizations, local and state government, regulatory agencies, and the wastewater management industry, and various interest groups. These meetings provided an opportunity both for the County to introduce the SWP to stakeholders and for stakeholders to identify questions and concerns. During the first meeting, held on May 16, 2016, Suffolk County introduced the County's Reclaim Our Waters initiative and NYSDEC provided an overview of the Long Island Nitrogen Action Plan (LINAP). Proposed changes to the County's Sanitary Code and the scope of the SWP were outlined and NYSDEC, the County and their consultant team responded to stakeholder questions." (SC SWP Page 1-30)

The SWP is an appendix to the Subwatersheds Wastewater Plan Generic Environmental Impact Statement (GEIS) that was presented to the Suffolk County legislator. Two public meetings were held, and Suffolk County accepted both verbal and written comments on the GEIS and the SWP during a 60-day comment period. Comments received were addressed and responses posted on the Suffolk County SWP webpage. (SC SWP Page 1-91)

Appendix A: Land Use and Predicted Loadings to Subwatersheds

SC SWP Table D-2

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Table D-2
Predicted Nitrogen Loads for the Nine Element Subwatersheds [1]

Waterbody [7]	Nitrogen Load Sources																						
	Onsite Wastewater [2]				Fertilizer [3]				Atmospheric Deposition [4]					Point Sources (STPs) [5]				Pet Waste [6]				TOTALS [11]		
	Load (lbs/day)	Load Percent of Total	Acres	Applied Load (lbs/day/acre)	Load (lbs/day)	Load Percent of Total	Acres	Applied Load (lbs/day/acre)	Load to Groundwater (lbs/day) [8]	Direct Load to Surface Water (lbs/day) [9]	Load Percent of Total	Acres	Applied Load (lbs/day/acre) [10]	Load (lbs/day)	Load Percent of Total	Acres	Applied Load (lbs/day/acre)	Load (lbs/day)	Load Percent of Total	Acres	Applied Load (lbs/day/acre)	Load (lbs/day)	Acres	Applied Load (lbs/day/acre)
Bellport Bay	1036	64%	7741	0.13	361	22%	6371	0.057	74	35	7%	18583	0.0040	70	4%	N/A	N/A	46	3%	5444	0.0085	1622	18583	0.085
Brown Creek	444	80%	2307	0.19	67	12%	1745	0.039	13	1.9	3%	3101	0.0040	9.1	2%	N/A	N/A	17	3%	1728	0.0101	552	3101	0.18
Carlls River	497	76%	2987	0.17	85	13%	2528	0.034	18	2.1	3%	3879	0.0045	2.6	0%	N/A	N/A	46	7%	2528	0.0181	651	3879	0.17
Carmans River Lower, and Tribs	766	64%	5654	0.14	300	25%	4848	0.062	59	3.6	5%	14984	0.0039	40	3%	N/A	N/A	34	3%	3984	0.0086	1203	14984	0.08
Centerport Harbor	308	77%	2138	0.14	62	16%	2032	0.031	11	5.3	4%	2627	0.0041	0.0	0%	N/A	N/A	15	4%	1948	0.0075	401	2627	0.15
Connetquot River, Lower, and Tribs	1331	73%	6455	0.21	304	17%	4742	0.064	56	8.6	4%	12365	0.0045	48	3%	N/A	N/A	64	4%	4681	0.0136	1812	12365	0.15
Cutchogue Harbor	83	45%	1152	0.07	75	41%	1506	0.050	8.4	14	12%	1791	0.0047	0.0	0%	N/A	N/A	4.1	2%	1069	0.0039	185	1791	0.10
Deep Hole Creek	22	44%	281	0.08	24	49%	387	0.062	2.0	0.6	5%	453	0.0044	0.0	0%	N/A	N/A	1.2	2%	274	0.0042	49	453	0.11
Flanders Bay, East/Center, and Tribs	400	37%	4856	0.08	445	41%	4964	0.090	84	42	12%	17020	0.0049	96	9%	N/A	N/A	21	2%	3228	0.0064	1086	17020	0.06
Flanders Bay, West/Lower Sawmill Creek	202	32%	3127	0.06	262	41%	2472	0.106	55	10	10%	10872	0.0051	96	15%	N/A	N/A	12	2%	1693	0.0070	636	10872	0.06
Forge River Cove and Tidal Tribs	842	75%	5272	0.16	182	16%	5172	0.035	39	16	5%	7912	0.0049	6.7	1%	N/A	N/A	38	3%	4575	0.0083	1123	7912	0.14
Fort Pond Bay	25	50%	340	0.07	7.5	15%	274	0.027	3.3	12	30%	999	0.0033	1.2	2%	N/A	N/A	1.6	3%	269	0.0059	51	999	0.04
Gardiners Bay and minor Tidal Tribs	2167	39%	16128	0.13	1629	29%	16846	0.097	262	1260	27%	31121	0.0084	108	2%	N/A	N/A	112	2%	15220	0.0074	5537	31121	0.14
Great Cove	624	53%	8337	0.07	348	29%	7076	0.049	61	53	10%	13045	0.0047	0.0	0%	N/A	N/A	93	8%	7013	0.0133	1179	13045	0.09
Great Peconic Bay and minor coves	710	35%	9042	0.08	778	38%	10391	0.075	118	289	20%	24939	0.0047	96	5%	N/A	N/A	35	2%	7109	0.0049	2026	24939	0.07
Great South Bay, East	5066	69%	29947	0.17	1177	16%	23843	0.049	221	415	9%	53624	0.0041	250	3%	N/A	N/A	238	3%	22505	0.0106	7367	53624	0.13
Great South Bay, Middle	650	45%	8615	0.08	375	26%	7331	0.051	66	254	22%	15317	0.0043	10	1%	N/A	N/A	99	7%	7258	0.0136	1454	15317	0.08
Great South Bay, West	751	51%	11369	0.07	322	22%	9070	0.036	71	148	15%	14697	0.0048	2.6	0%	N/A	N/A	180	12%	9038	0.0199	1475	14697	0.09
Huntington Bay	1274	71%	10028	0.13	266	15%	9133	0.029	50	66	6%	11893	0.0042	83	5%	N/A	N/A	66	4%	9017	0.0073	1805	11893	0.15
James Creek	37	71%	350	0.11	11	22%	332	0.034	1.8	0.3	4%	552	0.0033	0.0	0%	N/A	N/A	1.4	3%	274	0.0051	52	552	0.09
Little Peconic Bay	1038	37%	13792	0.08	1024	36%	16131	0.063	153	469	22%	33089	0.0046	96	3%	N/A	N/A	52	2%	11683	0.0045	2833	33089	0.07
Long Island Sound, Suffolk Co, Central	1969	35%	14932	0.13	990	18%	18798	0.053	145	2261	43%	29593	0.0049	94	2%	N/A	N/A	115	2%	12987	0.0089	5574	29593	0.11
Long Island Sound, Suffolk County, East	185	11%	3062	0.06	217	13%	5738	0.038	28	1239	73%	7665	0.0037	46	3%	N/A	N/A	10	1%	2804	0.0035	1725	7665	0.06
Long Island Sound, Suffolk County, West	3201	59%	27355	0.12	884	16%	23752	0.037	164	900	20%	37107	0.0044	111	2%	N/A	N/A	171	3%	23012	0.0074	5430	37107	0.12
Mecox Bay and Tribs	151	35%	2957	0.05	233	53%	5299	0.044	28	17	10%	6111	0.0047	0.0	0%	N/A	N/A	7.4	2%	2765	0.0027	437	6111	0.07
Moriches Bay East	236	62%	3267	0.07	87	23%	2700	0.032	19	28	12%	4874	0.0040	1.1	0%	N/A	N/A	11	3%	2602	0.0041	382	4874	0.07
Moriches Bay West	1596	69%	9922	0.16	455	20%	10719	0.042	86	93	8%	19689	0.0044	8.9	0%	N/A	N/A	75	3%	8666	0.0086	2314	19689	0.11
Napeague Bay	1154	37%	2083	0.55	845	27%	2009	0.421	149	890	33%	6226	0.0239	55	2%	N/A	N/A	60	2%	1963	0.0304	3153	6226	0.36
Narrow Bay	402	80%	1075	0.37	59	12%	1045	0.056	9.3	14	5%	2666	0.0035	0.0	0%	N/A	N/A	19	4%	1023	0.0187	504	2666	0.18
Nicoll Bay	1489	73%	7472	0.20	334	17%	5379	0.062	62	22	4%	13758	0.0045	50	2%	N/A	N/A	68	3%	5305	0.0129	2026	13758	0.15
Nissequogue River Lower/Sunken Meadow Creek	1029	69%	8941	0.12	315	21%	7466	0.042	55	5.1	4%	13119	0.0042	21	1%	N/A	N/A	56	4%	7246	0.0077	1480	13119	0.11
North Sea Harbor and Tribs	92	59%	1284	0.07	45	29%	1238	0.037	10	4.1	9%	2300	0.0042	0.3	0%	N/A	N/A	4.9	3%	1226	0.0040	156	2300	0.07
Northport Bay	783	74%	5837	0.13	154	15%	5407	0.029	28	36	6%	6893	0.0040	11	1%	N/A	N/A	39	4%	5308	0.0073	1051	6893	0.15
Northwest Harbor	80	50%	1331	0.06	42	26%	1335	0.032	15	19	21%	3841	0.0039	0.0	0%	N/A	N/A	3.9	2%	1327	0.0030	160	3841	0.04
Noyack Bay	66	40%	903	0.07	43	26%	994	0.043	7.2	45	32%	1311	0.0055	0.0	0%	N/A	N/A	3.7	2%	890	0.0042	164	1311	0.09
Orient Harbor and minor Tidal Tribs	261	44%	3826	0.07	197	33%	4460	0.044	26	97	21%	7811	0.0034	1.6	0%	N/A	N/A	16	3%	3326	0.0048	599	7811	0.06
Patchogue Bay	1593	73%	9250	0.17	298	14%	7720	0.039	54	33	4%	12528	0.0043	116	5%	N/A	N/A	82	4%	7508	0.0109	2176	12528	0.17
Peconic River Middle, and Tribs	26	19%	574	0.05	77	58%	917	0.084	21	4.3	19%	4477	0.0048	3.0	2%	N/A	N/A	1.5	1%	280	0.0053	133	4477	0.03
Peconic River, Lower, and Tidal Tribs	167	34%	2759	0.06	247	51%	2192	0.112	52	7.9	12%	10002	0.0052	3.0	1%	N/A	N/A	10	2%	1454	0.0066	486	10002	0.05
Pipes Cove	19	55%	269	0.07	7.1	21%	186	0.038	2.3	4.8	21%	883	0.0026	0.0	0%	N/A	N/A	1.2	4%	173	0.0071	34	883	0.03
Port Jefferson Harbor, North, and Tribs	476	64%	3993	0.12	130	17%	3467	0.037	24	18	6%	5159	0.0047	67	9%	N/A	N/A	26	4%	3379	0.0077	741	5159	0.14
Quantuck Bay	155	64%	1726	0.09	62	25%	1458	0.042	13	7.1	8%	3672	0.0036	0.0	0%	N/A	N/A	6.5	3%	1458	0.0044	244	3672	0.06
Quogue Canal	179	64%	2039	0.09	72	25%	1759	0.041	15	7.5	8%	4026	0.0037	0.0	0%	N/A	N/A	7.8	3%	1759	0.0044	281	4026	0.07
Sag Harbor	189	56%	2230	0.08	95	28%	2206	0.043	16	19	10%	3968	0.0040	6.9	2%	N/A	N/A	11	3%	2101	0.0050	337	3968	0.08
Sag Harbor Cove and Tribs	120	63%	1359	0.09	48	25%	1378	0.035	8.5	7.2	8%	2151	0.0039	0.0	0%	N/A	N/A	6.7	4%	1290	0.0052	190	2151	0.08
Shelter Island Sound, North, and Tribs	838	40%	5096	0.16	714	34%	5212	0.137	111	343	22%	9834	0.0112	59	3%	N/A	N/A	44	2%	4623	0.0096	2109	9834	0.18
Shelter Island Sound, South, and Tribs	836	41%	7541	0.11	638	31%	7731	0.083	112	351	23%	14909	0.0075	45	2%	N/A	N/A	44	2%	7303	0.0060	2026	14909	0.11
Shinnecock Bay Central	226	66%	1495	0.15	68	20%	1348	0.050	9.2	31	12%	2242	0.0041	0.1	0%	N/A	N/A	10	3%	1348	0.0077	345	2242	0.14
Shinnecock Bay East	320	63%	3331	0.10	93	18%	2343	0.040	16	63	16%	4190	0.0039	0.4	0%	N/A	N/A	15	3%	2269	0.0064	507	4190	0.11
Shinnecock Bay West	350	61%	4028	0.09	155	27%	3749	0.041	30	25	9%	7335	0.0041	0.2	0%	N/A	N/A	16	3%	3667	0.0045	576	7335	0.08
Smithtown Bay	1881	63%	16332	0.12	575	19%	13637	0.042	106	284	13%	23508	0.0045	27	1%	N/A	N/A	103	3%	13014	0.0079	2977	23508	0.11
Southold Bay	106	65%	1131	0.09	36	22%	1191	0.030	5.5	11	10%	1599	0.0034	0.0	0%	N/A	N/A	5.1	3%	1000	0.0051	163	1599	0.10
Wading River	90	67%	896	0.10	28	21%	762	0.036	11	0.8	9%	2987	0.0037	0.0	0%	N/A	N/A	4.1	3%	730	0.0056	133	2987	0.04
West Neck Harbor	50	57%	993	0.05	23	26%	985	0.023	5.0	8.0	15%	1428	0.0035	0.0	0%	N/A	N/A	2.7	3%	905	0.0030	88	1428	0.06
Lake Ronkonkoma	18	68%	94	0.19	4.1	16%	90	0.046	0.6	2.8	13%	163	0.0038	0.0	0%	N/A	N/A	0.9	3%	90	0.0099	26	163	0.14
Agawam Lake	76	87%	316	0.24	7.5	9%	220	0.034	1.6	0.8	3%	356	0.0046	0.0	0%	N/A	N/A	1.5	2%	220	0.0069	88	356	0.24
Lake Montauk	67	57%	617	0.11	30	25%	587	0.051	4.9	13	16%	1320	0.0037	0.0	0%	N/A	N/A	2.7	2%	534	0.0050	117	1320	0.08
Georgica Pond	82	52%	1440	0.06	59	37%	1299	0.045	11	3.1	9%	2292	0.0048	0.0	0%	N/A	N/A	4.1	3%	1231	0.0033	159	2292	0.07
Cold Spring Harbor	460	66%	2883	0.16	150	22%	2547	0.059	32	29	9%	4064	0.0079	0.0	0%	N/A	N/A	24	3%	2444	0.0097	695	4064	0.16

Notes:

1) Loads to groundwater include nitrogen loads from the 200 year groundwater contributing area for the respective waterbody.

2) Nitrogen from onsite wastewater is generated from Land Use Categories: Low Density Residential, Medium Density Residential, High Density Residential, Commercial, Industrial, Institutional, and Recreation and Open Space when an existing building is located on the parcel and when the parcel is not connected to a sewage treatment plant. See Section 2.1.5.1.1 of the SWP for additional description of nitrogen loading and land uses for onsite wastewater sources. Note that because most tax lots identified as Recreation and Open Space do not have sanitary wastewater as a source, the acreage from Recreation and Open Space land uses was not included in the calculation of acres or applied load.

3) Nitrogen from fertilizer is generated from Land Use Categories: Low Density Residential, Medium Density Residential, High Density Residential, Recreation and Open Space, and Agriculture and includes fertilizer from residential application, golf courses, parks, and agricultural sources. See Section 2.1.5.1.2 of the SWP for additional description of nitrogen loading and land uses for fertilizer. Note that because most tax lots identified as Recreation and Open Space do not have fertilizer as a source, the acreage from Recreation and Open Space land uses was not included in the calculation of acres or applied load, with the exception of golf courses.

4) Nitrogen from atmospheric deposition was applied to all parcels in Suffolk County and Land Use Categories: Low Density Residential, High Density Residential, Commercial, Institutional, Recreation and Open Space, Agriculture, Vacant, Transportation, Utilities, Industrial, Waste Handling and Management, and Surface Water (including Wetlands). See Section 2.1.5.1.4 of the SWP for additional description of nitrogen loading from atmospheric deposition.

5) Nitrogen from point sources was applied to parcels in Suffolk County with a Sewage Treatment Plant located on the parcel. See Figure 4-14 of the SWP for the location of Sewage Treatment Plants in Suffolk County and Section 2.1.5.1.1 for additional description of nitrogen loading from Sewage Treatment Plants.

6) Nitrogen from pet waste is generated from dogs and cats in Land Use Categories: Low Density Residential, Medium Density Residential and High Density Residential. See Section 2.1.5.1.3 of the SWP for additional description of nitrogen loading and land uses from pet waste sources.

7) Nitrogen loads shown represent the aggregated waterbodies/subwatersheds, as described in Section 2.1.5.2.2 of the SWP, from the 200 year groundwater contributing area.

8) Includes the atmospheric deposition load that is contributed direct to land and ultimately groundwater.

9) Includes the atmospheric deposition load that is contributed directly to the surface water body itself.

10) Calculation is based on the atmospheric deposition load to groundwater. The applied loading rate per unit surface water area is provided in Section 2.1.5.1.4 of the SWP.

11) Total load includes all sources. However total acres exclude surface water, and loading rate is based on loading from land only (see note no. 9).

Appendix B: Watershed/Land Use Maps

SC SWP Land Use Maps

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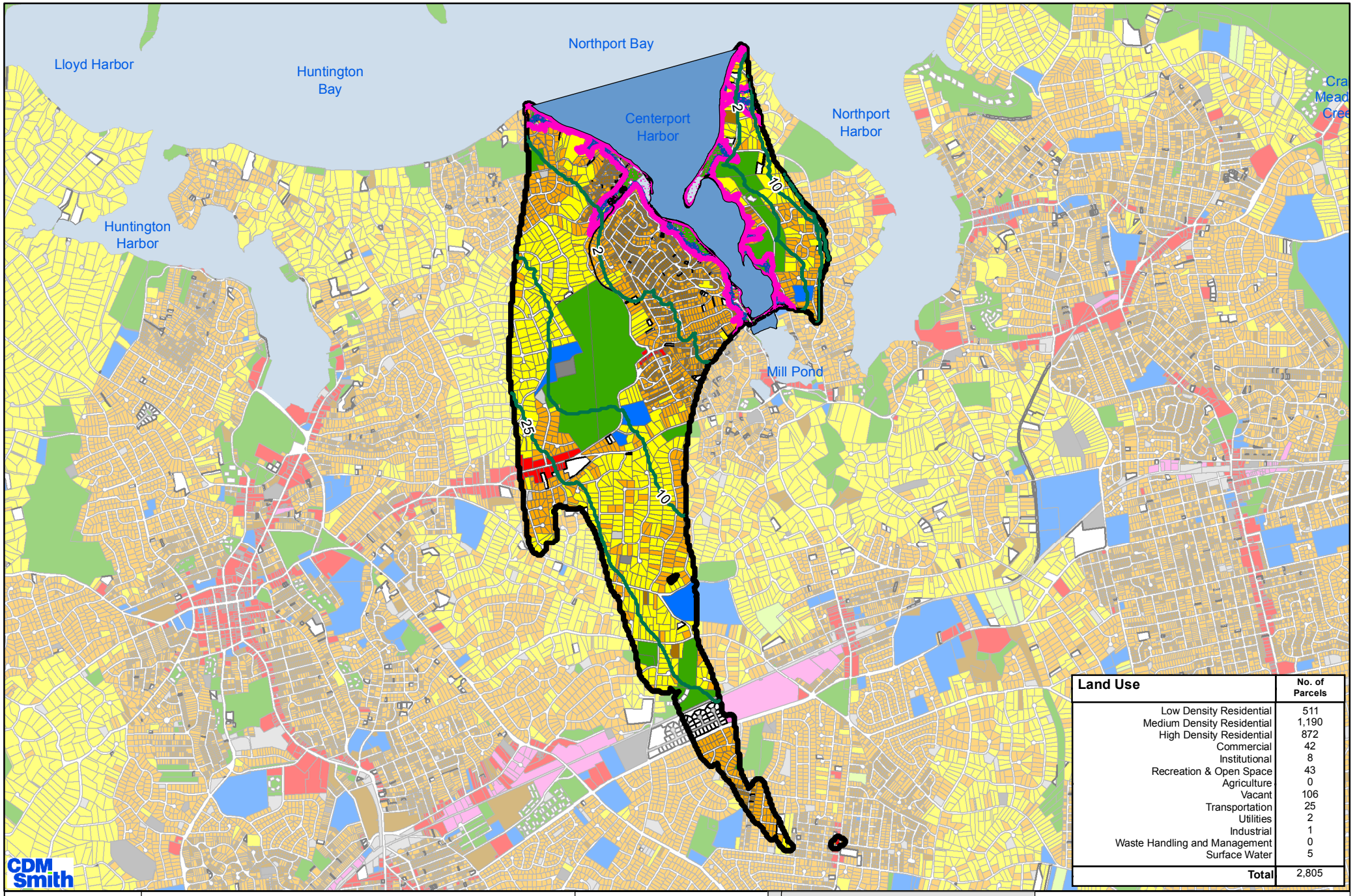


Land Use	No. of Parcels
Low Density Residential	511
Medium Density Residential	1,190
High Density Residential	872
Commercial	42
Institutional	8
Recreation & Open Space	43
Agriculture	0
Vacant	106
Transportation	25
Utilities	2
Industrial	1
Waste Handling and Management	0
Surface Water	5
Total	2,805

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

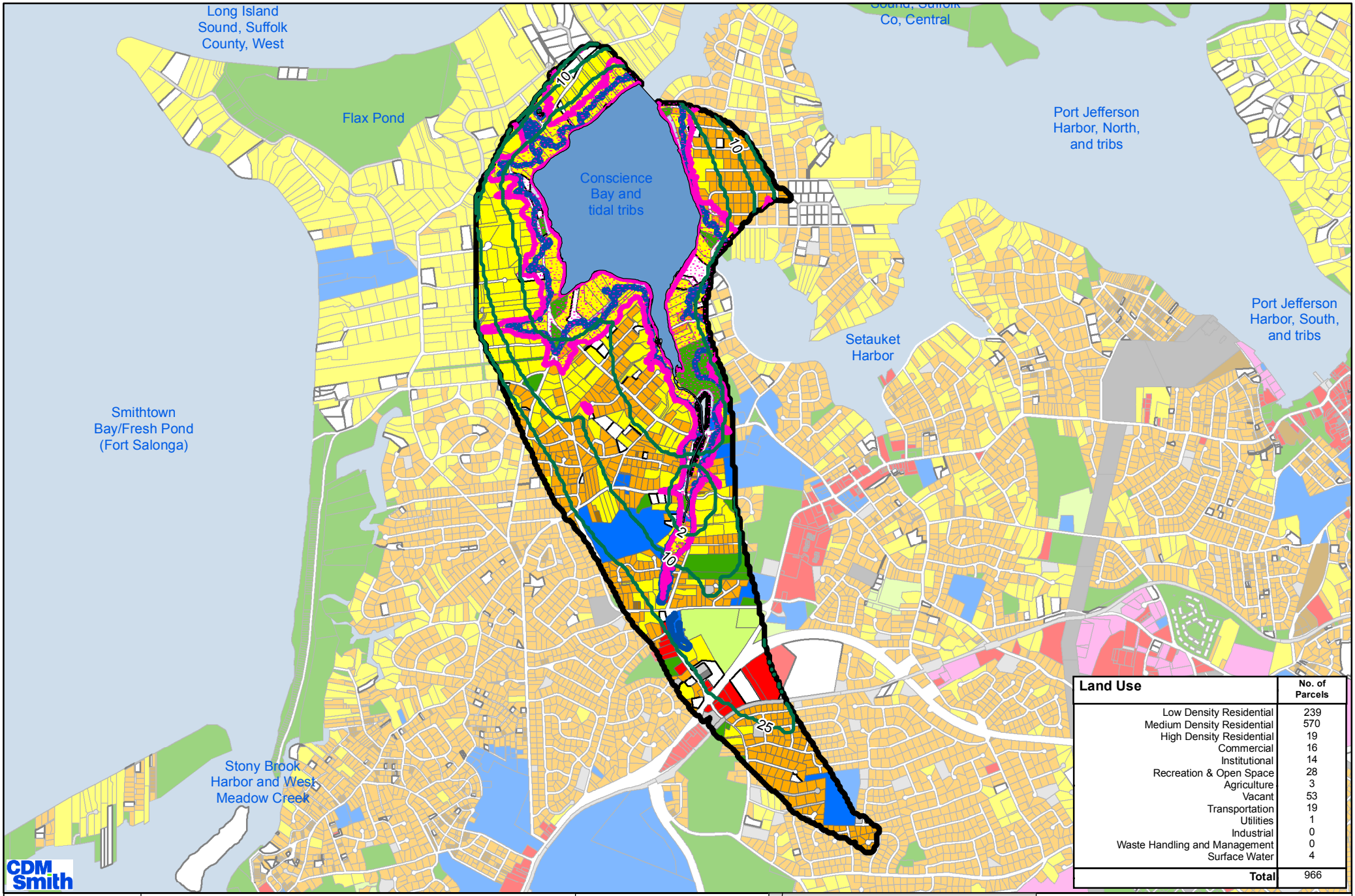
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 1,700 3,400 Ft

Subwatershed Planning Criteria
1702-0229
Centerport Harbor

September 2018



Land Use	No. of Parcels
Low Density Residential	239
Medium Density Residential	570
High Density Residential	19
Commercial	16
Institutional	14
Recreation & Open Space	28
Agriculture	3
Vacant	53
Transportation	19
Utilities	1
Industrial	0
Waste Handling and Management	0
Surface Water	4
Total	966

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet

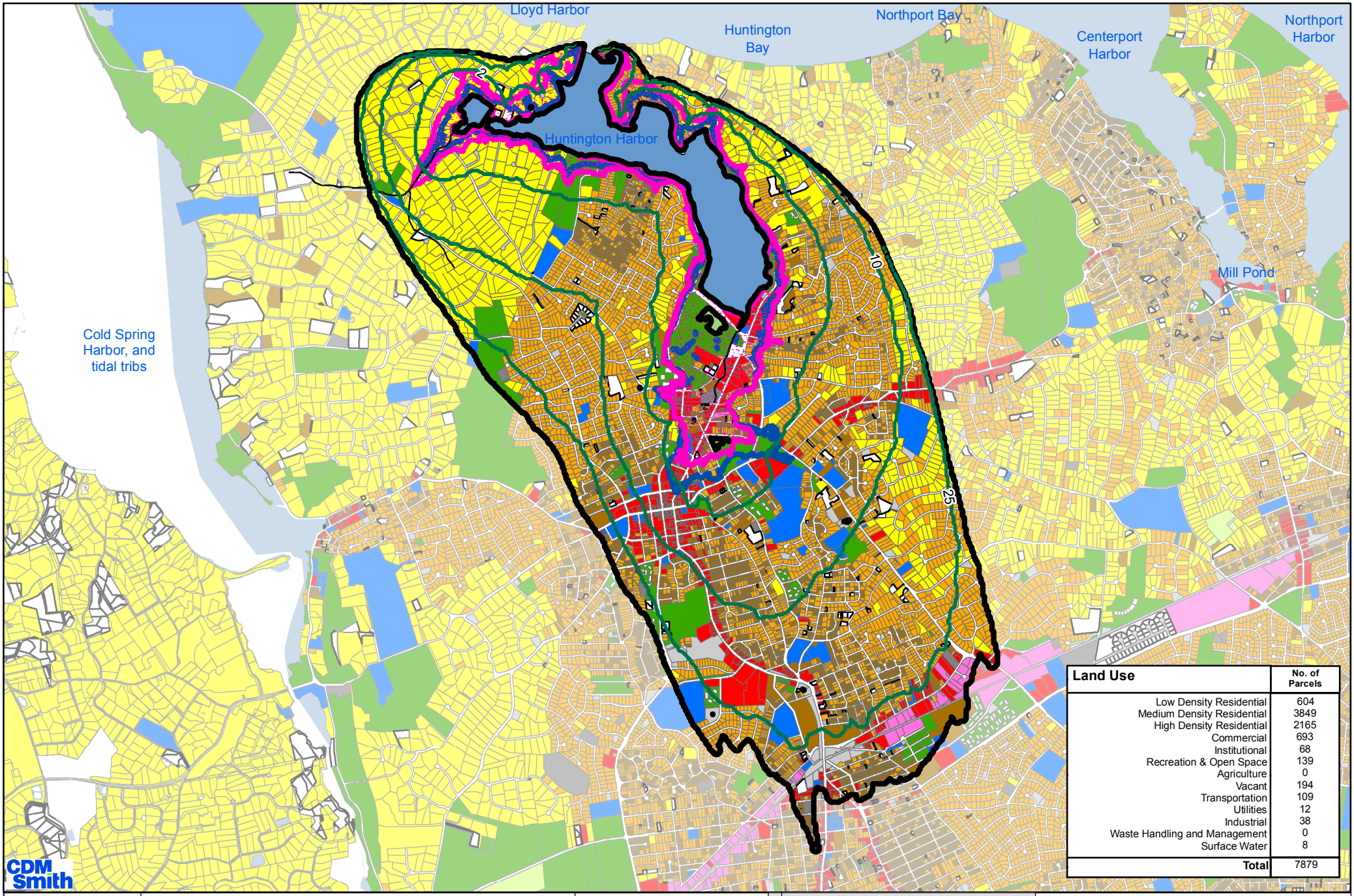
- SLOSH Zones

N

0 1,250 2,500 Ft

Subwatershed Planning Criteria 1702-0091 Conscience Bay and Tidal Tribs

September 2018



Land Use	No. of Parcels
Low Density Residential	604
Medium Density Residential	3849
High Density Residential	2165
Commercial	693
Institutional	68
Recreation & Open Space	139
Agriculture	0
Vacant	194
Transportation	109
Utilities	12
Industrial	38
Waste Handling and Management	0
Surface Water	8
Total	7879

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

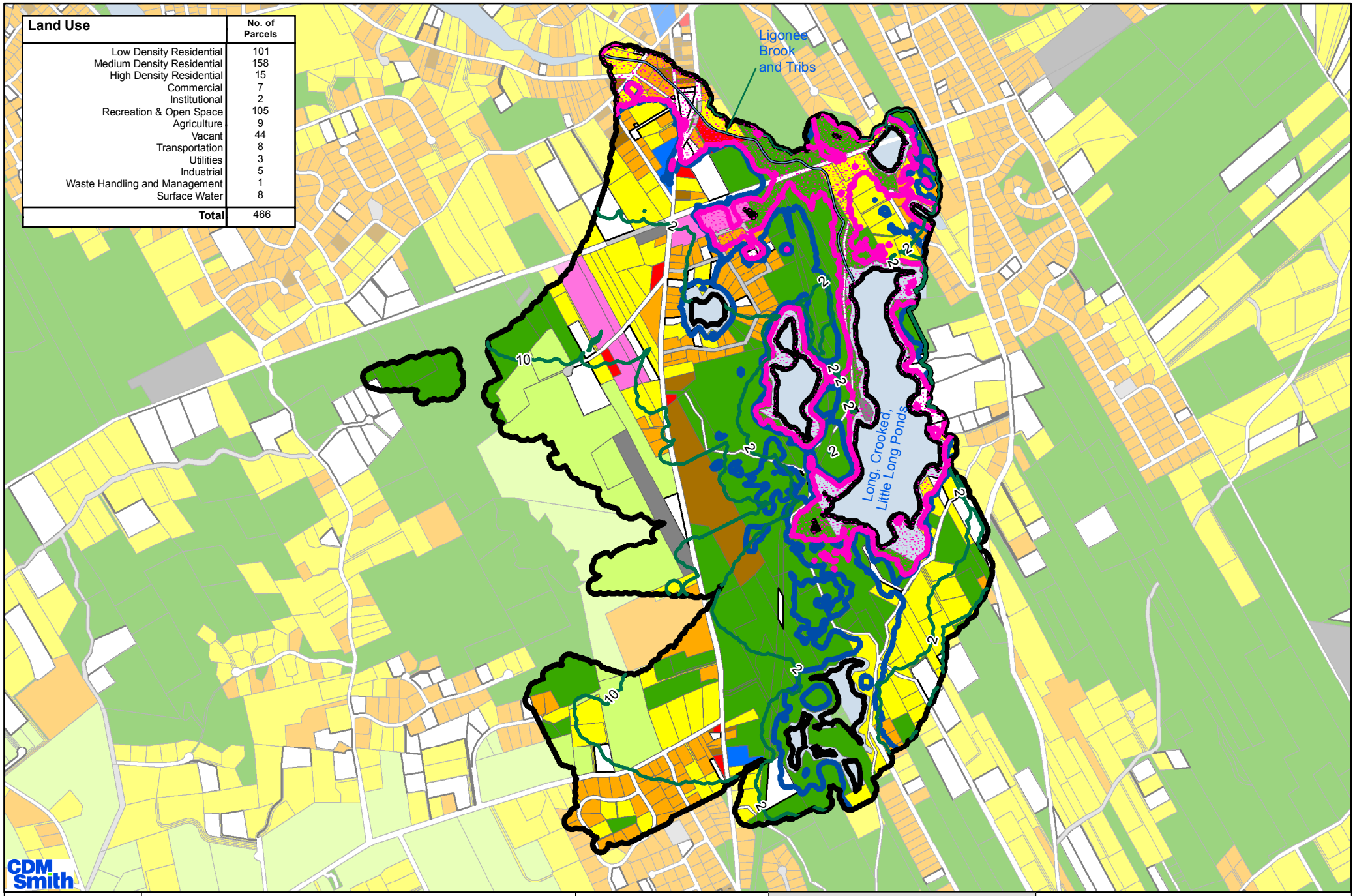
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 1,650 3,300 Ft

Subwatershed Planning Criteria
1702-0228+0231
Huntington Harbor

September 2018



Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 25 year Groundwater Contributing Area
- 2 /10 year Groundwater Contributing Area

Depth to Water (ft)

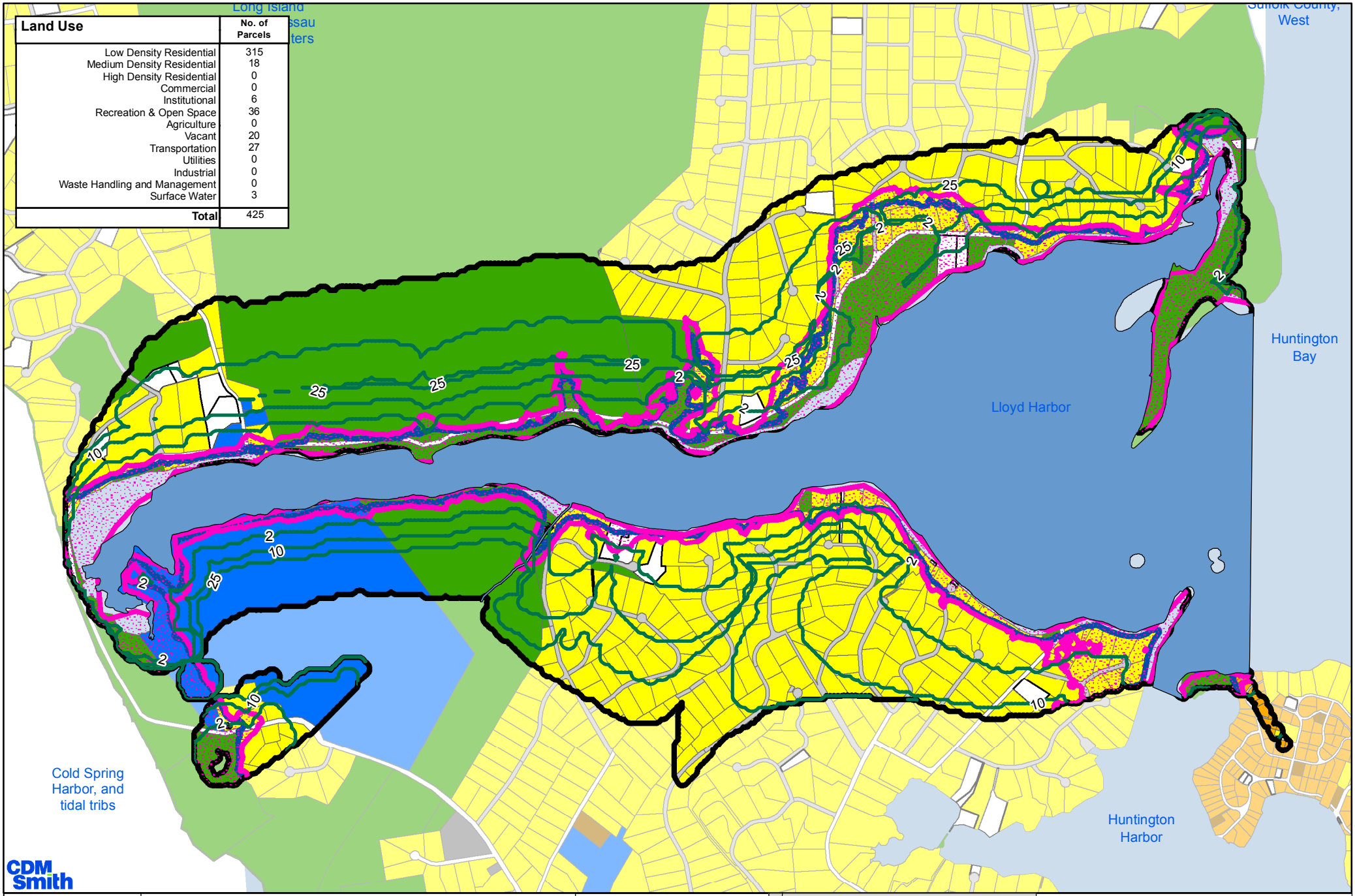
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 750 1,500 Ft

Subwatershed Planning Criteria
1701-0352+0353
Ligonee Brook and Tribs

September 2018



CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet

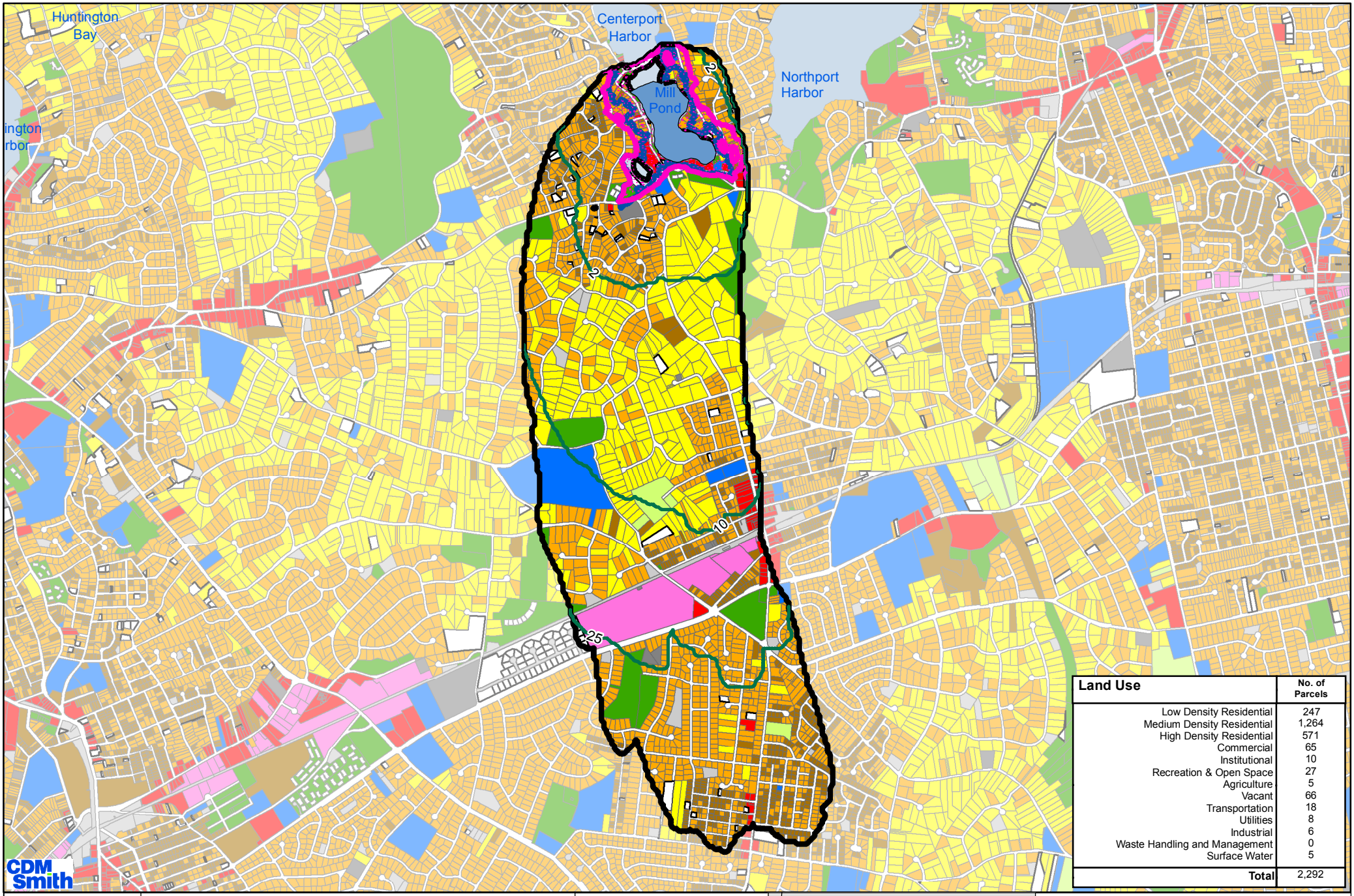
- SLOSH Zones

N

0 750 1,500 Ft

Subwatershed Planning Criteria
1702-0227
Lloyd Harbor

September 2018



Land Use	No. of Parcels
Low Density Residential	247
Medium Density Residential	1,264
High Density Residential	571
Commercial	65
Institutional	10
Recreation & Open Space	27
Agriculture	5
Vacant	66
Transportation	18
Utilities	8
Industrial	6
Waste Handling and Management	0
Surface Water	5
Total	2,292

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet

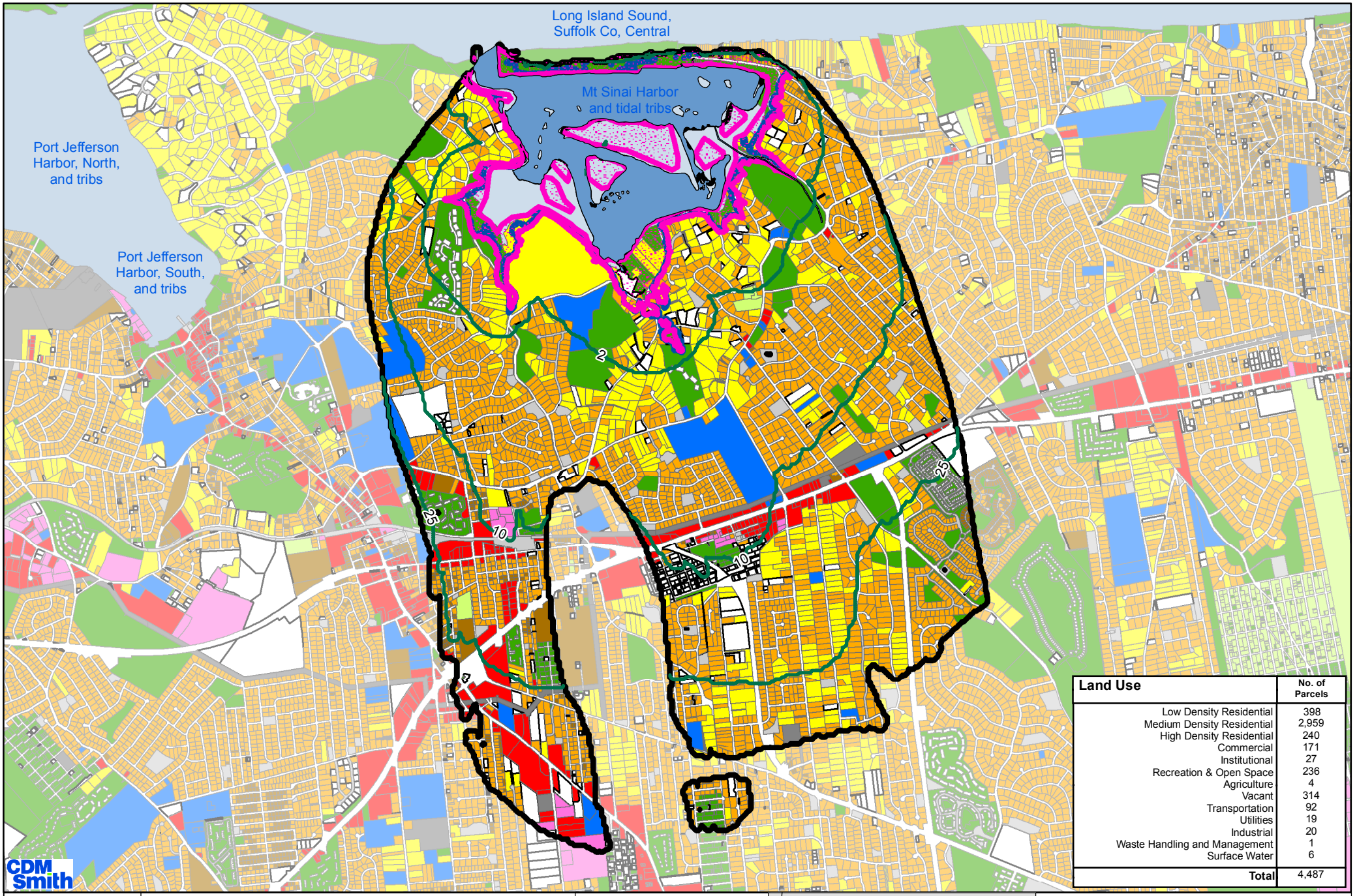
- SLOSH Zones

N

0 1,150 2,300 Ft

Subwatershed Planning Criteria
1702-0261
Mill Pond

September 2018



Land Use	No. of Parcels
Low Density Residential	398
Medium Density Residential	2,959
High Density Residential	240
Commercial	171
Institutional	27
Recreation & Open Space	236
Agriculture	4
Vacant	314
Transportation	92
Utilities	19
Industrial	20
Waste Handling and Management	1
Surface Water	6
Total	4,487

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

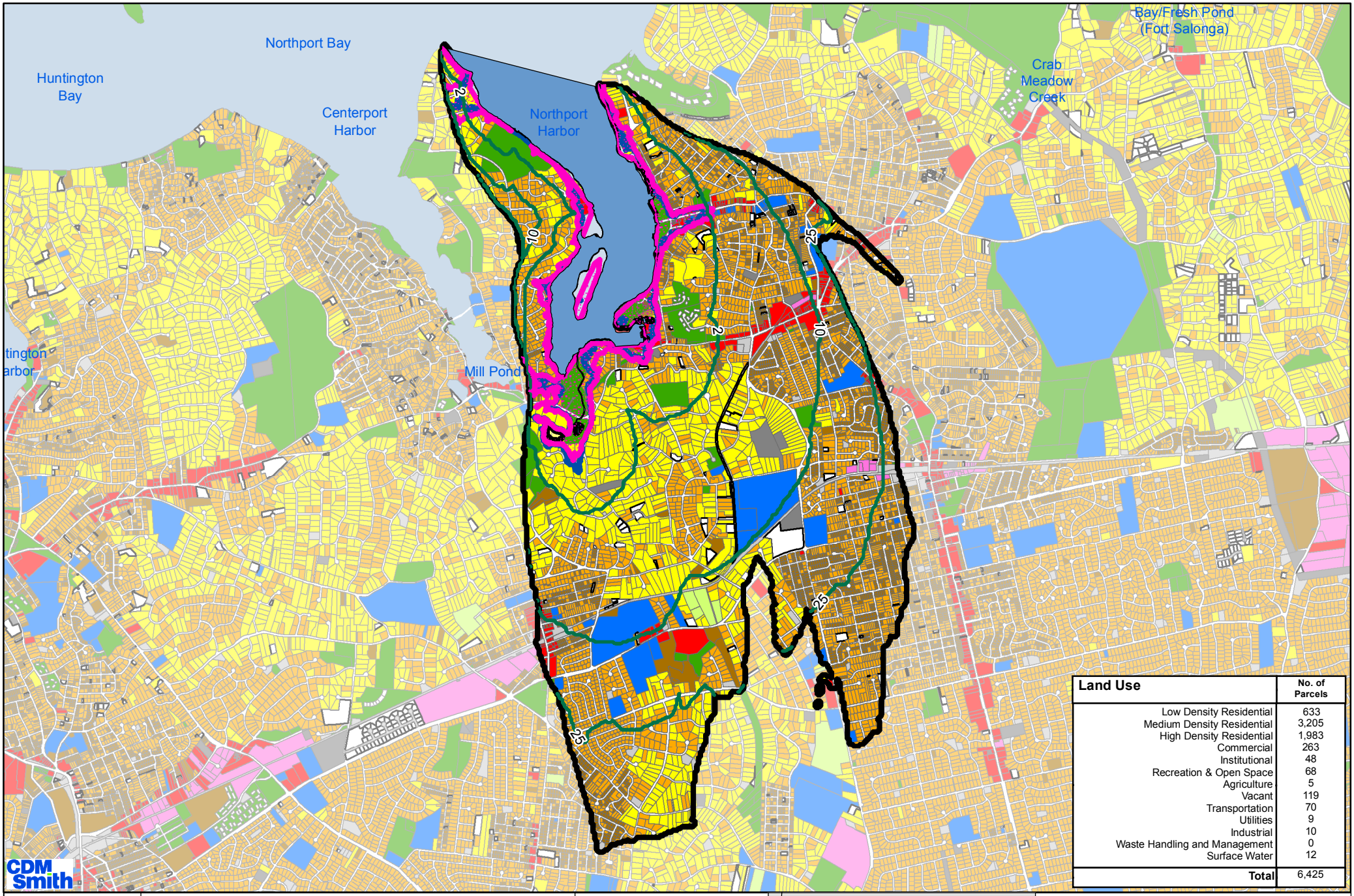
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 1,400 2,800 Ft

Subwatershed Planning Criteria
1702-0019
Mt Sinai Harbor and Tidal Tribs

September 2018



Land Use	No. of Parcels
Low Density Residential	633
Medium Density Residential	3,205
High Density Residential	1,983
Commercial	263
Institutional	48
Recreation & Open Space	68
Agriculture	5
Vacant	119
Transportation	70
Utilities	9
Industrial	10
Waste Handling and Management	0
Surface Water	12
Total	6,425

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet

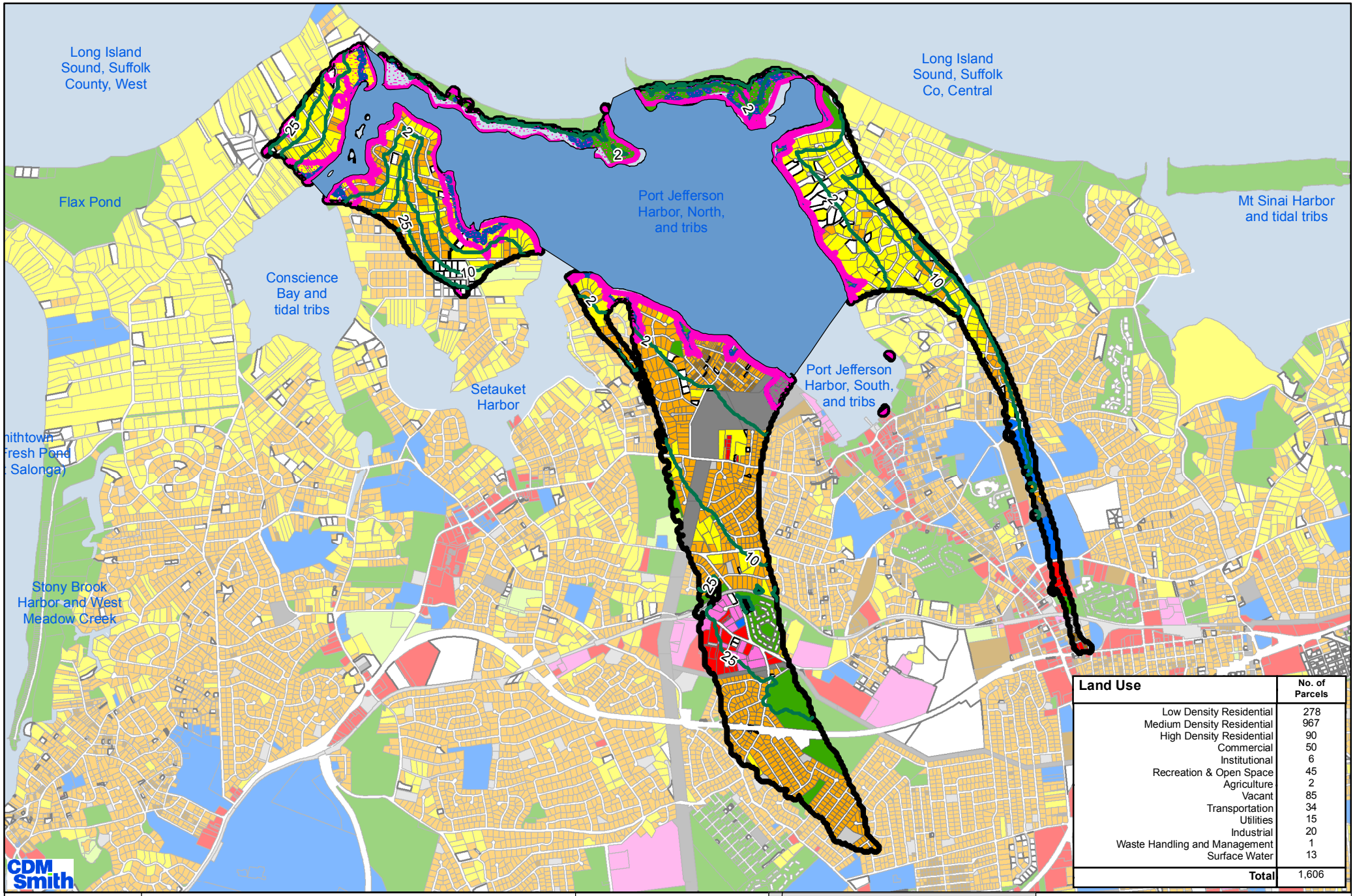
- SLOSH Zones

N

0 1,700 3,400 Ft

Subwatershed Planning Criteria
1702-0230
Northport Harbor

September 2018



Land Use	No. of Parcels
Low Density Residential	278
Medium Density Residential	967
High Density Residential	90
Commercial	50
Institutional	6
Recreation & Open Space	45
Agriculture	2
Vacant	85
Transportation	34
Utilities	15
Industrial	20
Waste Handling and Management	1
Surface Water	13
Total	1,606

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

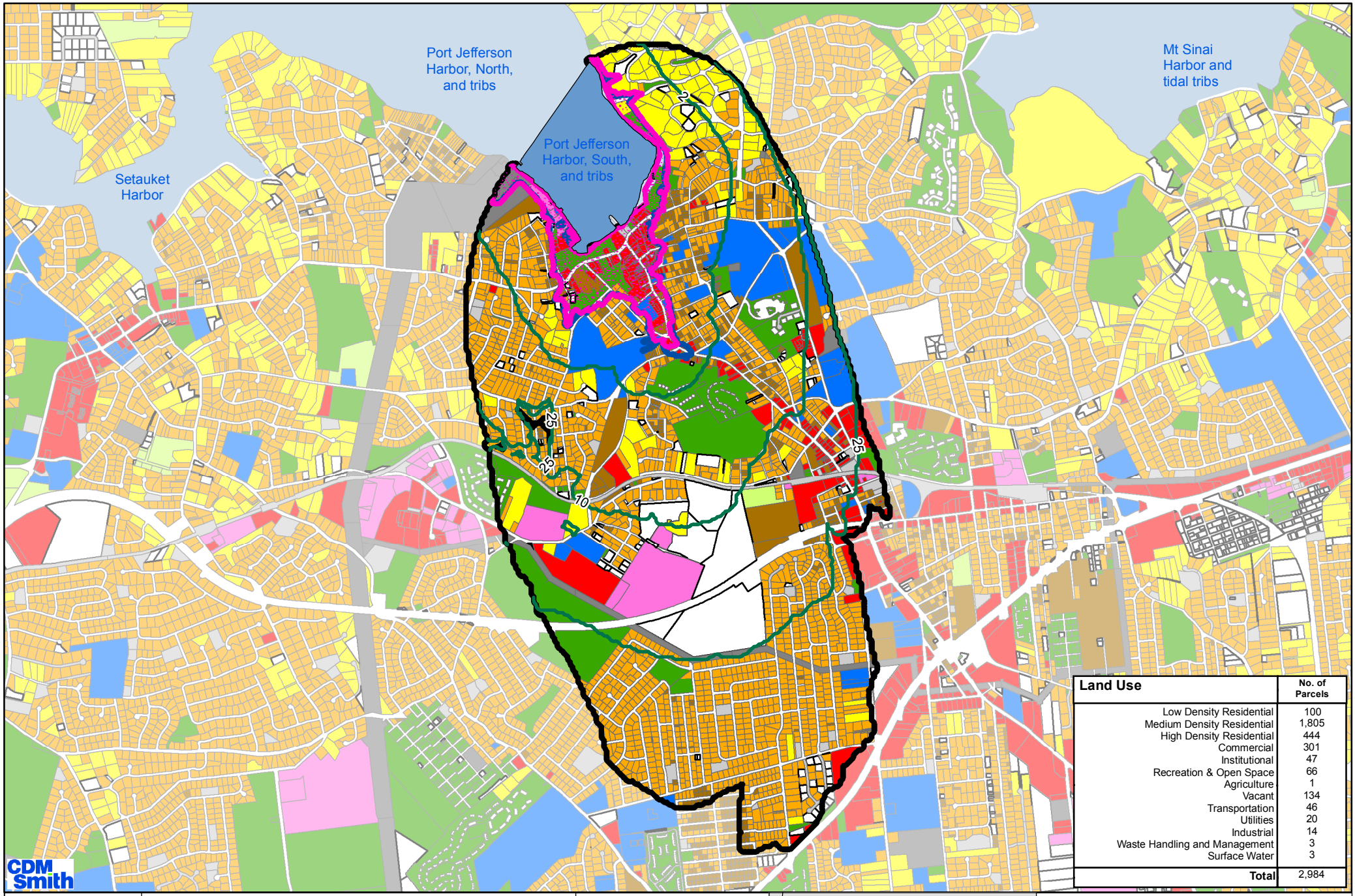
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 1,500 3,000 Ft

Subwatershed Planning Criteria 1702-0015 Port Jefferson Harbor, North, and Tribs

September 2018



Land Use	No. of Parcels
Low Density Residential	100
Medium Density Residential	1,805
High Density Residential	444
Commercial	301
Institutional	47
Recreation & Open Space	66
Agriculture	1
Vacant	134
Transportation	46
Utilities	20
Industrial	14
Waste Handling and Management	3
Surface Water	3
Total	2,984

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

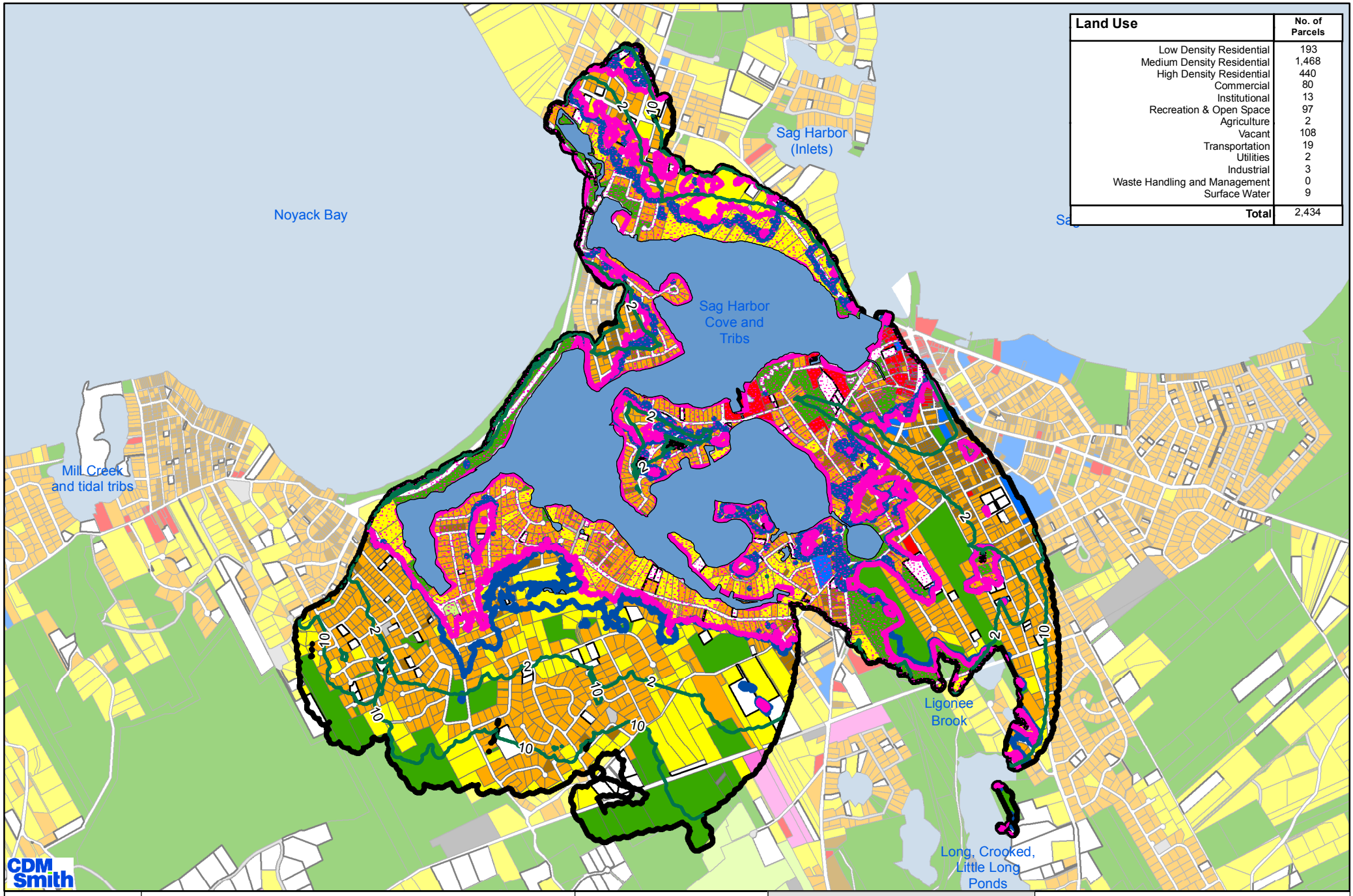
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 1,150 2,300 Ft

Subwatershed Planning Criteria
1702-0241
Port Jefferson Harbor, South, and Tribs

September 2018



Land Use	No. of Parcels
Low Density Residential	193
Medium Density Residential	1,468
High Density Residential	440
Commercial	80
Institutional	13
Recreation & Open Space	97
Agriculture	2
Vacant	108
Transportation	19
Utilities	2
Industrial	3
Waste Handling and Management	0
Surface Water	9
Total	2,434

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 25 year Groundwater Contributing Area
- 2 /10 year Groundwater Contributing Area

Depth to Water (ft)

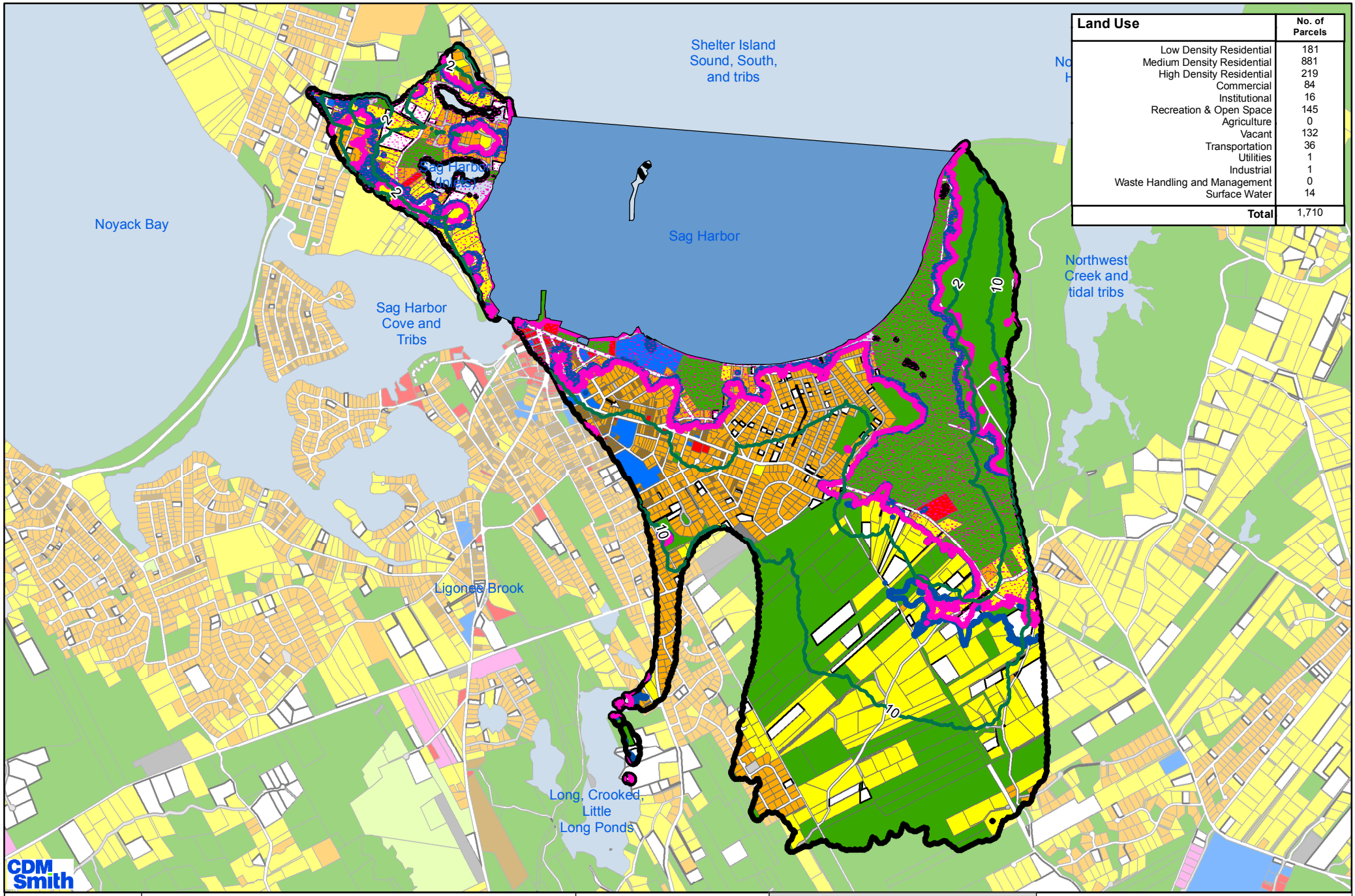
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 1,050 2,100 Ft

Subwatershed Planning Criteria
1701-0035-SHC
Sag Harbor Cove and Tribs

September 2018



Land Use	No. of Parcels
Low Density Residential	181
Medium Density Residential	881
High Density Residential	219
Commercial	84
Institutional	16
Recreation & Open Space	145
Agriculture	0
Vacant	132
Transportation	36
Utilities	1
Industrial	1
Waste Handling and Management	0
Surface Water	14
Total	1,710

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

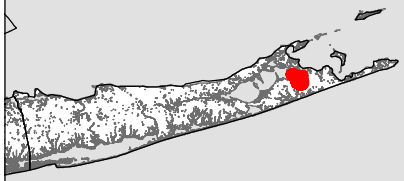
- 25 year Groundwater Contributing Area
- 2 /10 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet
- SLOSH Zones

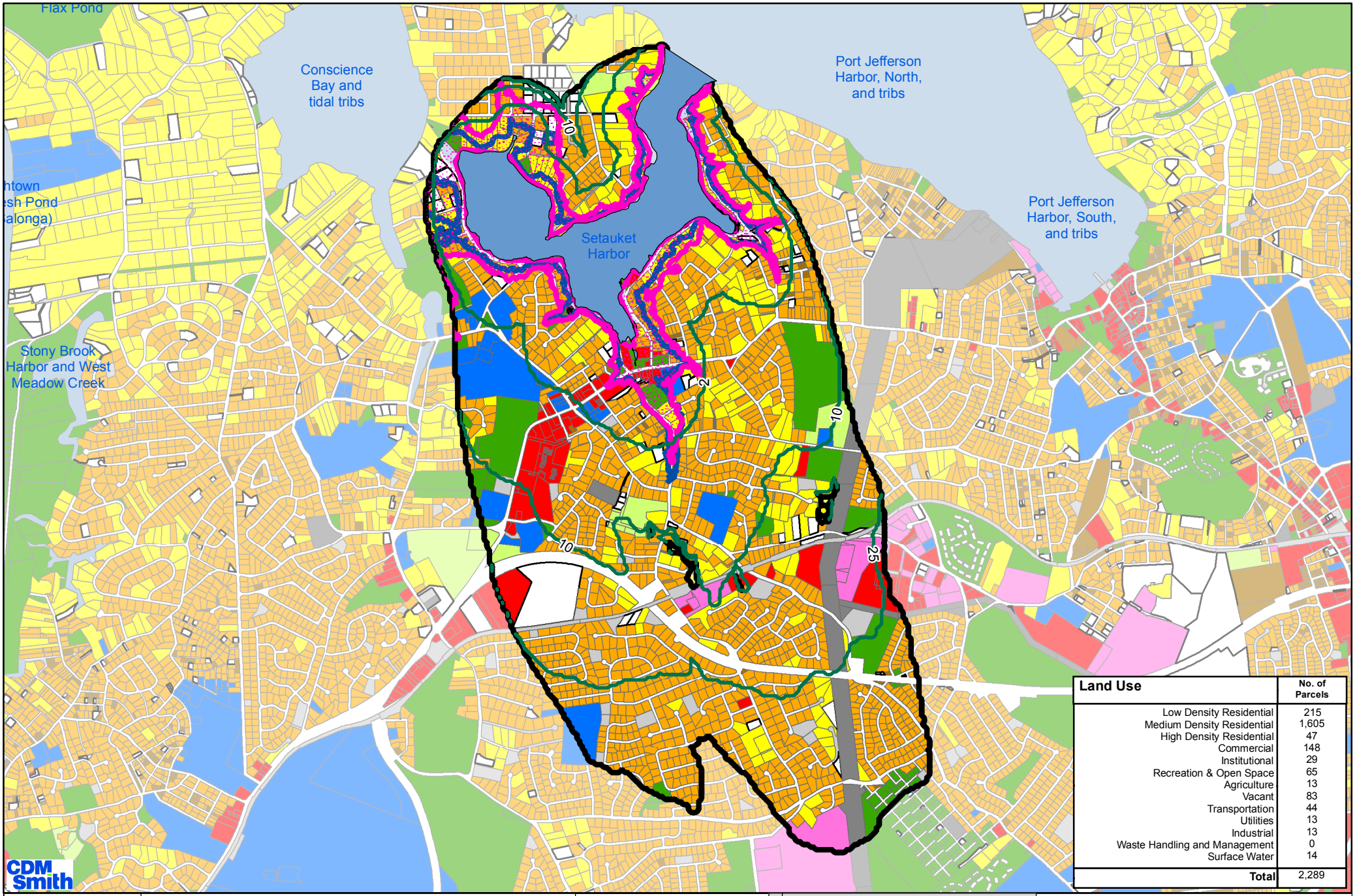
N

0 1,250 2,500 Ft



Subwatershed Planning Criteria
1701-0035-SH+0239
Sag Harbor

September 2018



Land Use	No. of Parcels
Low Density Residential	215
Medium Density Residential	1,605
High Density Residential	47
Commercial	148
Institutional	29
Recreation & Open Space	65
Agriculture	13
Vacant	83
Transportation	44
Utilities	13
Industrial	13
Waste Handling and Management	0
Surface Water	14
Total	2,289

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet

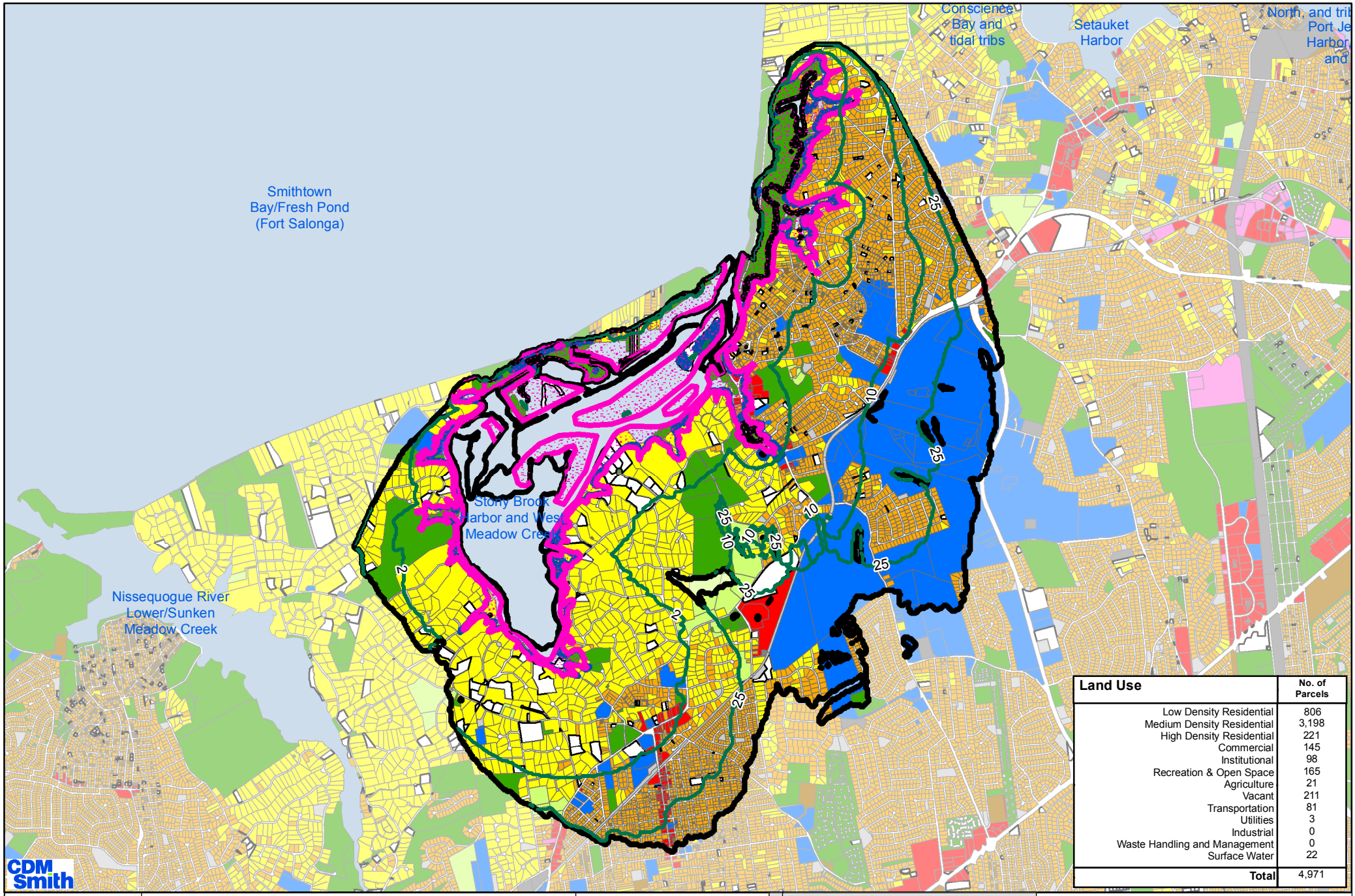
- SLOSH Zones

N

0 1,150 2,300 Ft

Subwatershed Planning Criteria
1702-0242
Setauket Harbor

September 2018



Land Use	No. of Parcels
Low Density Residential	806
Medium Density Residential	3,198
High Density Residential	221
Commercial	145
Institutional	98
Recreation & Open Space	165
Agriculture	21
Vacant	211
Transportation	81
Utilities	3
Industrial	0
Waste Handling and Management	0
Surface Water	22
Total	4,971

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet

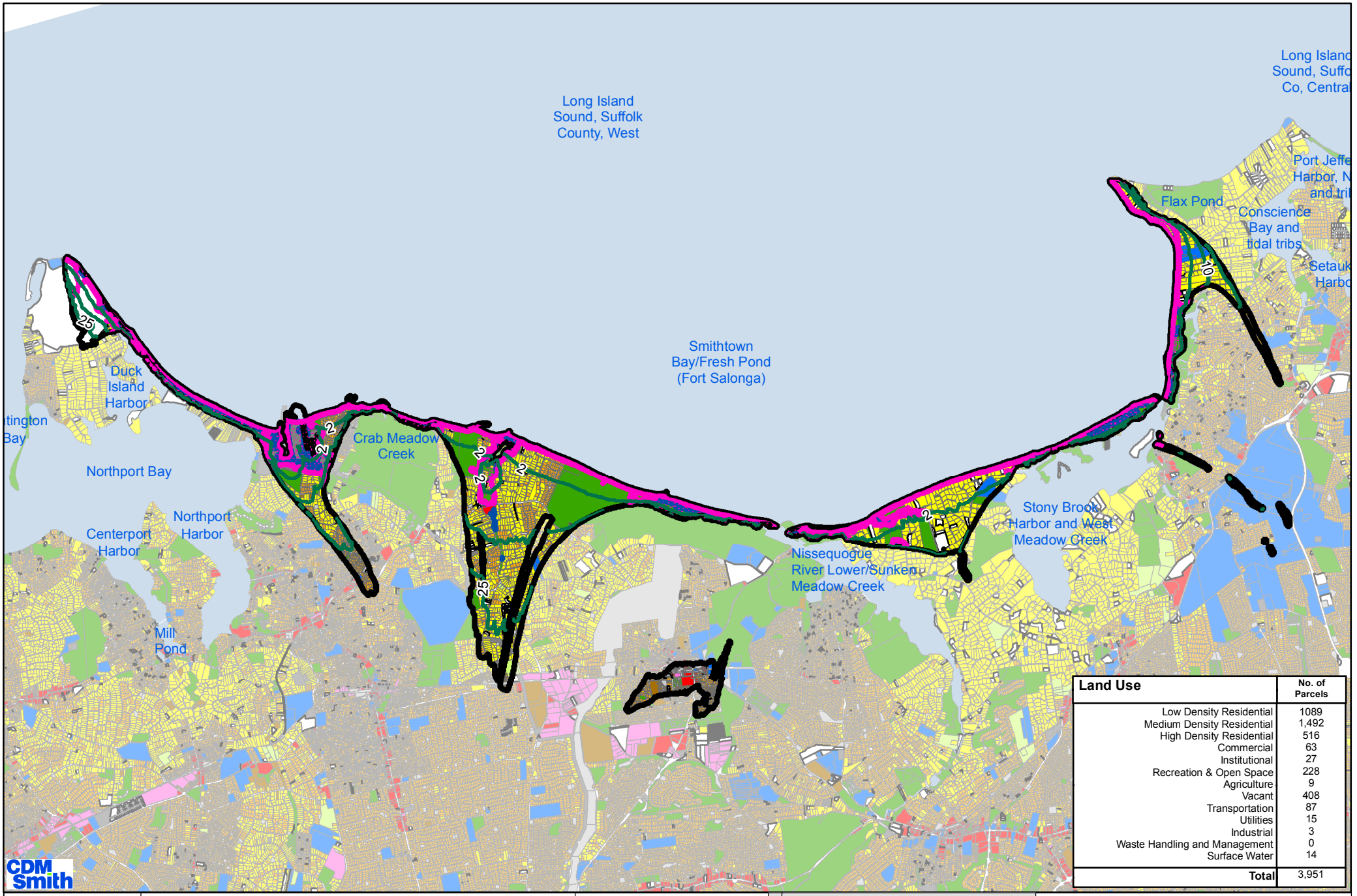
- SLOSH Zones

N

0 2,000 4,000 Ft

Subwatershed Planning Criteria
1702-0047+0239
Stony Brook Harbor

September 2018



Land Use	No. of Parcels
Low Density Residential	1089
Medium Density Residential	1,492
High Density Residential	516
Commercial	63
Institutional	27
Recreation & Open Space	228
Agriculture	9
Vacant	408
Transportation	87
Utilities	15
Industrial	3
Waste Handling and Management	0
Surface Water	14
Total	3,951

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

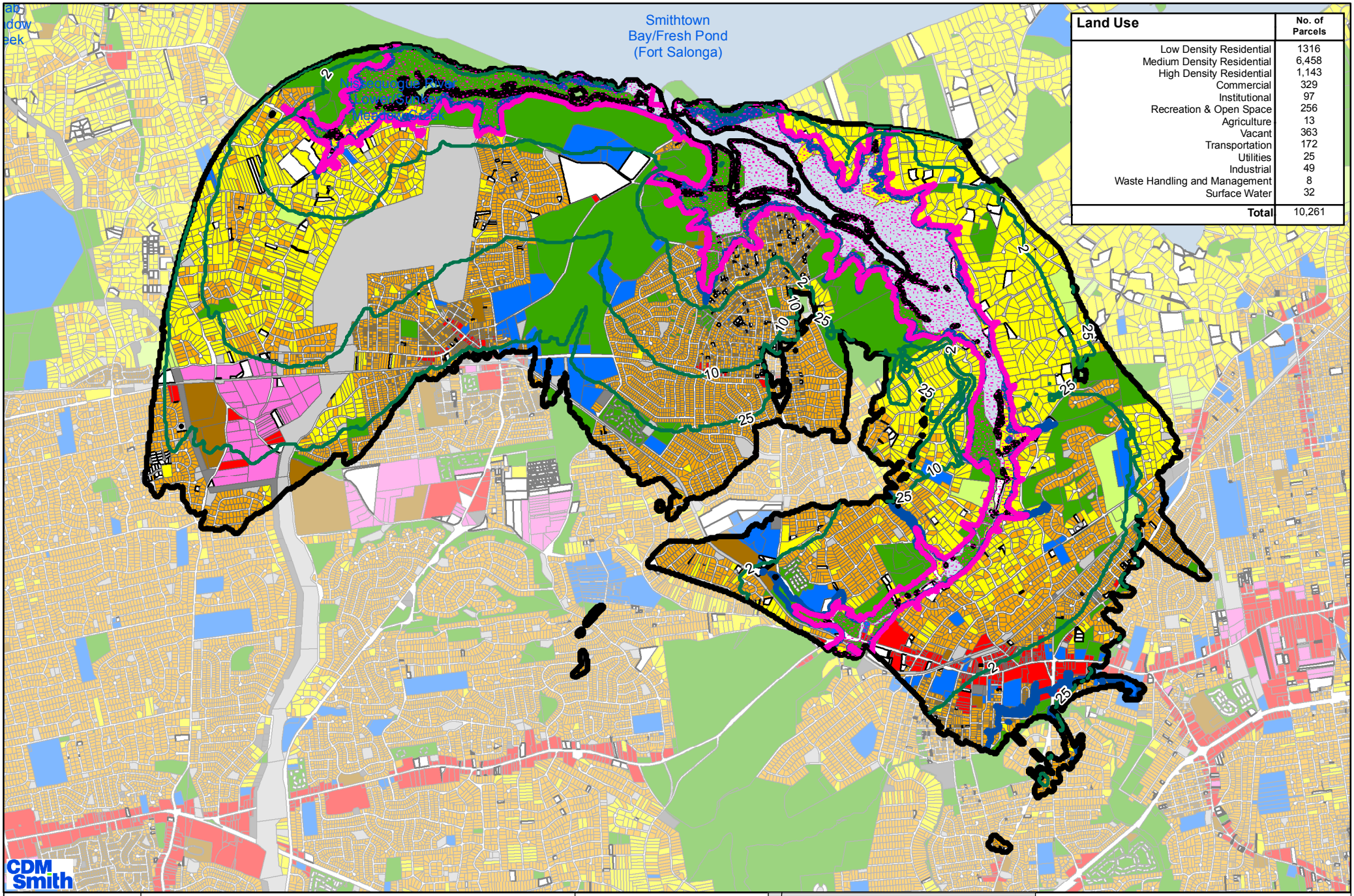
- Less than or Equal to 10 feet
- SLOSH Zones

N

0 3,800 7,600 Ft

Subwatershed Planning Criteria
1702-0023+0233+0234
Smithtown Bay

September 2018



Land Use	No. of Parcels
Low Density Residential	1316
Medium Density Residential	6,458
High Density Residential	1,143
Commercial	329
Institutional	97
Recreation & Open Space	256
Agriculture	13
Vacant	363
Transportation	172
Utilities	25
Industrial	49
Waste Handling and Management	8
Surface Water	32
Total	10,261

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

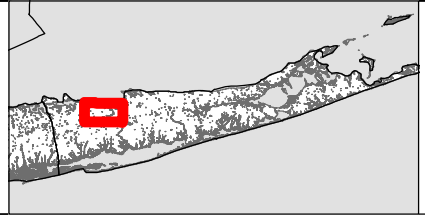
Depth to Water (ft)

- Less than or Equal to 10 feet

- SLOSH Zones

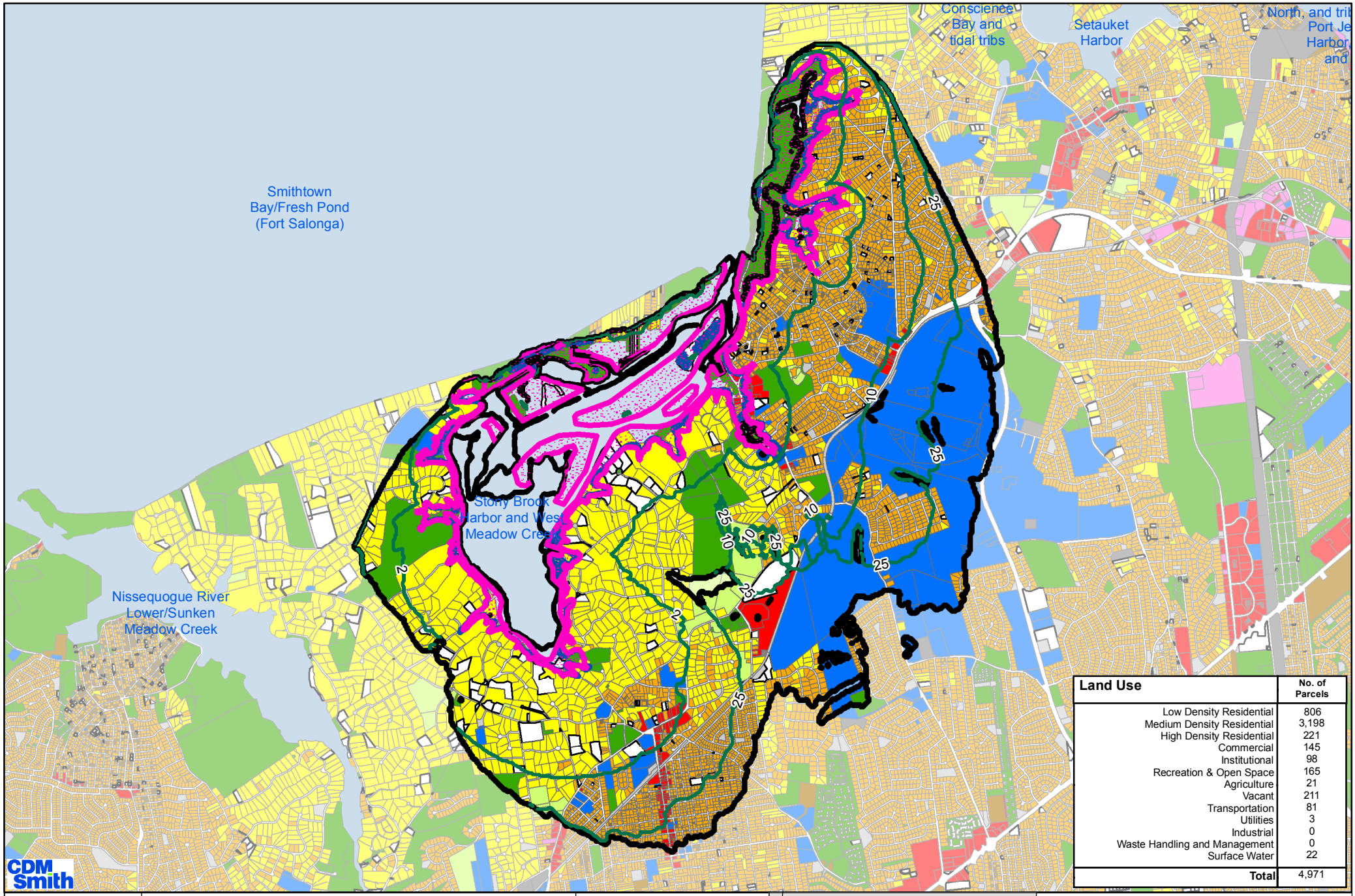
N

0 2,000 4,000 Ft



Subwatershed Planning Criteria
1702-0025+0234+0232
Nissequogue River Lower

September 2018



Land Use	No. of Parcels
Low Density Residential	806
Medium Density Residential	3,198
High Density Residential	221
Commercial	145
Institutional	98
Recreation & Open Space	165
Agriculture	21
Vacant	211
Transportation	81
Utilities	3
Industrial	0
Waste Handling and Management	0
Surface Water	22
Total	4,971

CDM Smith

Land Use (Suffolk County Department of Planning and Economic Development Land Use, 2016)

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Recreation and Open Space
- Agricultural
- Vacant
- Transportation
- Utilities
- Waste Handling and Management

- 50 year Groundwater Contributing Area
- 2 /10/25 year Groundwater Contributing Area

Depth to Water (ft)

- Less than or Equal to 10 feet

- SLOSH Zones

N

0 2,000 4,000 Ft

Subwatershed Planning Criteria
1702-0047+0239
Stony Brook Harbor

September 2018

Appendix C: List of Wastewater Facilities

Adapted from SC SWP Table D-3

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Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
1	**Bellport Bay**	Bellport Bay	NY0076988	Woodside	Groundwater	29.1
		Beaverdam Creek	NY0211826	BELLHAVEN NURSING CENTER	Groundwater	1.1
		Carmans River Lower, and Tribs	NY0085693	Yaphank County Center	Groundwater	16.8
		Carmans River Upper, and Tribs	NY0180548	LAKE POINTE	Groundwater	0.0
			NY0253065	STRATHMORE ON THE GREEN	Groundwater	2.0
			NY0066559	WHISPERING PINES	Groundwater	5.0
			NY0079502	ARTIST LAKE	Groundwater	2.8
			NY0277827	Brookhaven Sewer District 2	Groundwater	13.3
2	**Brown Creek**	Brown Creek	NY0253529	SADDLE BROOK APARTMENTS	Groundwater	0.5
			NY0255386	LAKEVIEW WOODS AT BAYPORT	Groundwater	0.2
			NY0253235	SAYVILLE COMMONS	Groundwater	3.8
			NY0065331	VALLEY FORGE	Groundwater	2.3
			NY0254495	BROADWAY KNOLLS	Groundwater	1.5
			NY0195758	SUNRISE VILLAGE	Groundwater	0.6
		Sans Souci Lakes	NY0220990	PEITE FLEUR	Groundwater	0.2
3	**Carlls River**	Carlls River	NY0074250	SOMERSET WOODS	Groundwater	2.6
		Belmont Lake		--	--	--
4	**Carmans River Lower, and Tribs**	Carmans River Lower, and Tribs	NY0085693	Yaphank County Center	Groundwater	16.8
		Carmans River Upper, and Tribs	NY0180548	LAKE POINTE	Groundwater	0.0
			NY0253065	STRATHMORE ON THE GREEN	Groundwater	2.0
			NY0066559	WHISPERING PINES	Groundwater	5.0
			NY0079502	ARTIST LAKE	Groundwater	2.8
			NY0277827	Brookhaven Sewer District 2	Groundwater	13.3
5	**Centerport Harbor**	Centerport Harbor		--	--	--
		Mill Pond		--	--	--
		Connetquot River, Lower, and Tribs		--	--	--
		Grand Canal	NY0077356	DOWLING COLLEGE	Groundwater	0.0
			NY0253227	GREENVIEW COMMONS	Groundwater	0.7
			NY0254479	THE PRESERVE AT CONNETQUOT	Groundwater	0.2
			NY0253219	HILTON GARDENS	Groundwater	0.7

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
6	**Connetquot River, Lower, and Tribs**	Connetquot River, Upper, and Tribs	NY0220493	ISLANDA CENTER	Groundwater	1.3
			NY0077241	TOWNE HOUSE VILLAGE SOUTH	Groundwater	2.9
			NY0077330	Nob Hill	Groundwater	2.4
			NY0077321	HEATHERWOOD AT LAKELAND	Groundwater	0.4
			NY0077411	WINDBROOKE HOMES	Groundwater	26.4
			NY0077429	Wind Watch	Groundwater	13.5
		Lake Ronkonkoma		--	--	--
7	**Cutchogue Harbor**	Cutchogue Harbor		--	--	--
		Cutchogue Harbor - East Creek		--	--	--
		Cutchogue Harbor - Mud Creek		--	--	--
		Cutchogue Harbor - Wickham Creek		--	--	--
8	**Deep Hole Creek**	Deep Hole Creek		--	--	--
		Mattituck (Marratooka) Pond		--	--	--
9	**Flanders Bay, East/Center, and Tribs**	Flanders Bay, East/Center, and Tribs		--	--	--
		Meetinghouse Creek and Tribs	NY0005304	CRESCENT DUCK FARM	Groundwater	0.0
		Terry's Creek and Tribs		--	--	--
		Goose Neck Creek		--	--	--
		Reeves Bay and Tidal Tribs		--	--	--
		Flanders Bay, West/Lower Sawmill Creek	NY0020061	Riverhead	Surface Water	92.5
		Peconic River, Lower, and Tidal Tribs		--	--	--
		Peconic River Middle, and Tribs	NY0080616	CALVERTON HILLS	Groundwater	3.0
		Peconic River Upper, and Tribs		--	--	--
		Wildwood Lake (Great Pond)		--	--	--
10	**Flanders Bay, West/Lower Sawmill Creek**	Flanders Bay, West/Lower Sawmill Creek	NY0020061	Riverhead	Surface Water	92.5
		Peconic River, Lower, and Tidal Tribs		--	--	--
		Peconic River Middle, and Tribs	NY0080616	CALVERTON HILLS	Groundwater	3.0
		Peconic River Upper, and Tribs		--	--	--
		Wildwood Lake (Great Pond)		--	--	--
	Forge River Cove	Forge River Cove and Tidal Tribs		--	--	--
		Forge River and Tidal Tribs	NY0253308	MIRROR PONDS	Groundwater	0.6
			NY0079405	PINE HILLS	Groundwater	3.7

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
11	**Forge River Cove and Tidal Tribs**	Forge River and Tidal Tribs	NY0198480	WATERWAYS AT BAY POINT	Groundwater	1.3
			NY0273490	FAIRFIELD MASTIC	Groundwater	0.6
		Mud and Senix Creeks	NY0254819	VINEYARDS AT MORICHES	Groundwater	0.4
		Orchard Neck Creek		--	--	--
12	**Fort Pond Bay**	Fort Pond Bay	NY0195995	ROUGH RIDERS LANDING	Groundwater	1.2
		Fort Pond		--	--	--
13	**Gardiners Bay and minor Tidal Tribs**	Gardiners Bay and minor Tidal Tribs		--	--	--
		Acabonack Harbor		--	--	--
		Hog Creek and Tidal Tribs		--	--	--
		Three Mile Harbor	NY0199079	East Hampton Scavenger	Groundwater	3.2
		Coecles Harbor		--	--	--
		Orient Harbor and minor Tidal Tribs		--	--	--
		Hallock/Long Beach Bay and Tidal Tribs		--	--	--
		Dam Pond		--	--	--
		Marion Lake		--	--	--
		Spring Pond		--	--	--
		Shelter Island Sound, North, and Tribs	NY0021814	SHELTER ISLAND HEIGHTS	Surface Water	1.6
		Southold Bay		--	--	--
		Town/Jockey Creeks and Tidal Tribs		--	--	--
		Goose Creek		--	--	--
		Hashamomuck Pond/Long Creek and Budd's Pond		--	--	--
		Pipes Cove		--	--	--
		SI Sound Trib/Moores Drain, Lower, Tribs		--	--	--
		Stirling Creek and Basin		--	--	--
		Gull Pond		--	--	--
		Dering Harbor		--	--	--
		Shelter Island Sound, South, and Tribs		--	--	--
		Little Peconic Bay		--	--	--
		Noyack Bay		--	--	--
		Mill Creek and Tidal Tribs		--	--	--
		Noyack Creek and Tidal Tribs		--	--	--
		Sag Harbor	NY0028908	Village of Sag Harbor	Surface Water	6.9
		Sag Harbor Cove and Tribs		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
		Ligonee Brook and Tribs		--	--	--
		Northwest Harbor		--	--	--
		Northwest Creek and Tidal Tribs		--	--	--
		West Neck Harbor		--	--	--
		Dickerson Creek		--	--	--
		Menantic Creek		--	--	--
		West Neck Bay and Creek		--	--	--
14	**Great Cove**	Great Cove		--	--	--
		Champlin Creek		--	--	--
		Pardees, Orowoc Lakes, Creek, and Tidal Tribs		--	--	--
		Awixa Creek		--	--	--
		Penataquit Creek		--	--	--
		Lawrence Creek, O-co-nee and Lawrence Lakes		--	--	--
		Brightwaters Canal, Nosreka, Mirror, and Cascade Lakes		--	--	--
15	**Great Peconic Bay and minor coves**	Great Peconic Bay and minor coves		--	--	--
		Brushes Creek		--	--	--
		Laurel Pond		--	--	--
		James Creek		--	--	--
		Deep Hole Creek		--	--	--
		Mattituck (Marratooka) Pond		--	--	--
		West Creek and Tidal Tribs		--	--	--
		Sebonac Cr/Bullhead Bay and Tidal Tribs		--	--	--
		Little Sebonac Creek		--	--	--
		Scallop Pond		--	--	--
		Cold Spring Pond and Tribs		--	--	--
		Red Creek Pond and Tidal Tribs		--	--	--
		Flanders Bay, East/Center, and Tribs		--	--	--
		Meetinghouse Creek and Tribs	NY0005304	CRESCENT DUCK FARM	Groundwater	0.0
		Terry's Creek and Tribs		--	--	--
		Goose Neck Creek		--	--	--
		Reeves Bay and Tidal Tribs		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
		Flanders Bay, West/Lower Sawmill Creek	NY0020061	Riverhead	Surface Water	92.5
		Peconic River, Lower, and Tidal Tribs		--	--	--
		Peconic River Middle, and Tribs	NY0080616	CALVERTON HILLS	Groundwater	3.0
		Peconic River Upper, and Tribs		--	--	--
		Wildwood Lake (Great Pond)		--	--	--
		Great South Bay, East	NY0253120	OAKWOOD CARE CENTER	Groundwater	0.9
			NY0077372	HEATHERWOOD AT HOLBROOK	Groundwater	2.7
			NY0077453	EMERALD GREEN APARTMENTS	Groundwater	0.8
			NY0210382	GREENWOOD AT OAKDALE	Groundwater	0.6
		Bellport Bay	NY0076988	Woodside	Groundwater	29.1
		Beaverdam Creek	NY0211826	BELLHAVEN NURSING CENTER	Groundwater	1.1
		Carmans River Lower, and Tribs	NY0085693	Yaphank County Center	Groundwater	16.8
		Carmans River Upper, and Tribs	NY0180548	LAKE POINTE	Groundwater	0.0
			NY0253065	STRATHMORE ON THE GREEN	Groundwater	2.0
			NY0066559	WHISPERING PINES	Groundwater	5.0
			NY0079502	ARTIST LAKE	Groundwater	2.8
			NY0277827	Brookhaven Sewer District 2	Groundwater	13.3
		Howell's Creek		--	--	--
		Dunton Lake, Upper, and Tribs and Hedges Creek		--	--	--
		Abets Creek	NY0253316	PATCHOGUE SENIOR APARTMENTS	Groundwater	0.9
			NY0080683	12 Pines	Groundwater	10.2
		Mud Creek, Robinson Pond, and Tidal Tribs	NY0074730	BROOKHAVEN HOSPITAL	Groundwater	3.5
		Swan River, Swan Lake, and Tidal Tribs	NY0136930	AVERY VILLAGE	Groundwater	0.3
			NY0080454	PATCHOGUE NURSING HOME	Groundwater	3.4
		Patchogue River	NY0023922	Patchogue Village	Surface Water	31.9
			NY0065463	BIRCHWOOD GLEN	Groundwater	0.7
			NY0253511	MEDFORD HAMLET ASSISTED LIVING	Groundwater	0.5
			NY0080730	FAIRFIELD ON THE BAY	Groundwater	0.0
			NY0253154	EXIT 63 DEVELOPMENT	Groundwater	1.7
			NY0079341	WOODHULL GARDEN APARTMENTS	Groundwater	0.9
			NY0209597	RADISSON HOTEL	Groundwater	1.2
			NY0079413	IRS Service Center	Groundwater	5.6
16	**Great South Bay, East**	Patchogue Bay	NY0065358	Parkland	Groundwater	49.9
			NY0238406	FAIRWAY MANOR	Groundwater	1.4

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
		Tuthills Creek	NY0252972	SPRUCE PONDS GARDEN APARTMENTS	Groundwater	1.8
			NY0227226	SUNRISE AT HOLBROOK	Groundwater	0.3
		Corey Lake and Creek, and Tribs	NY0226963	SPRINGHORN AT BLUE POINT	Groundwater	0.2
		Stillman Creek	NY0077364	SOUTHERN MEADOWS	Groundwater	1.3
		Brown Creek	NY0253529	SADDLE BROOK APARTMENTS	Groundwater	0.5
			NY0255386	LAKEVIEW WOODS AT BAYPORT	Groundwater	0.2
			NY0253235	SAYVILLE COMMONS	Groundwater	3.8
			NY0065331	VALLEY FORGE	Groundwater	2.3
			NY0254495	BROADWAY KNOLLS	Groundwater	1.5
			NY0195758	SUNRISE VILLAGE	Groundwater	0.6
		Sans Souci Lakes	NY0220990	PEITE FLEUR	Groundwater	0.2
		Green Creek, Upper, and Tribs	NY0254525	PINEWOOD GARDENS	Groundwater	0.1
		Nicoll Bay	NY0077283	BIRCHWOOD ON THE GREEN	Groundwater	0.8
			NY0226254	GREENVIEW COURT	Groundwater	0.5
			NY0272990	OAK CREEK COMMONS	Groundwater	0.1
		Connetquot River, Lower, and Tribs		--	--	--
		Grand Canal	NY0077356	DOWLING COLLEGE	Groundwater	0.0
			NY0253227	GREENVIEW COMMONS	Groundwater	0.7
		Connetquot River, Upper, and Tribs	NY0254479	THE PRESERVE AT CONNETQUOT	Groundwater	0.2
			NY0253219	HILTON GARDENS	Groundwater	0.7
			NY0220493	ISLANDA CENTER	Groundwater	1.3
			NY0077241	TOWNE HOUSE VILLAGE SOUTH	Groundwater	2.9
			NY0077330	Nob Hill	Groundwater	2.4
			NY0077321	HEATHERWOOD AT LAKELAND	Groundwater	0.4
			NY0077411	WINDBROOKE HOMES	Groundwater	26.4
			NY0077429	Wind Watch	Groundwater	13.5
		Lake Ronkonkoma		--	--	--
		Great South Bay, Middle	NY0020168	Ocean Beach	Surface Water	9.9
		Great Cove		--	--	--
		Champlin Creek		--	--	--
		Pardees, Orowoc Lakes, Creek, and Tidal Tribs		--	--	--
17	**Great South Bay, Middle**	Awixa Creek		--	--	--
		Penataquit Creek		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
		Lawrence Creek, O-co-nee and Lawrence Lakes		--	--	--
		Brightwaters Canal, Nosreka, Mirror, and Cascade Lakes		--	--	--
18	**Great South Bay, West**	Great South Bay, West		--	--	--
		Willets Creek		--	--	--
		Sampawams Creek		--	--	--
		Carlls River	NY0074250	SOMERSET WOODS	Groundwater	2.6
		Belmont Lake		--	--	--
		Santapogue Creek		--	--	--
		Neguntatogue Creek		--	--	--
		Amityville Creek		--	--	--
19	**Huntington Bay**	Huntington Bay		--	--	--
		Lloyd Harbor		--	--	--
		Huntington Harbor	NY0021342	Huntington Town	Surface Water	72.2
		Centerport Harbor		--	--	--
		Mill Pond		--	--	--
		Northport Harbor	NY0024881	Northport Village	Surface Water	10.1
			NY0137065	PAUMANACK VILLAGE	Groundwater	1.1
		Northport Bay		--	--	--
		Duck Island Harbor		--	--	--
20	**James Creek**	James Creek		--	--	--
		Mattituck (Marratooka) Pond		--	--	--
		Little Peconic Bay		--	--	--
		Cutchogue Harbor		--	--	--
		Cutchogue Harbor - East Creek		--	--	--
		Cutchogue Harbor - Mud Creek		--	--	--
		Cutchogue Harbor - Wickham Creek		--	--	--
		Richmond Creek and Tidal Tribs		--	--	--
		Corey Creek and Tidal Tribs		--	--	--
		Cedar Beach Creek and Tidal Tribs		--	--	--
		Wooley Pond		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
21	**Little Peconic Bay**	North Sea Harbor and Tribs	NY0254941	COURTYARDS AT SOUTHAMPTON	Groundwater	0.3
		Fish Cove		--	--	--
		Big/Little Fresh Ponds		--	--	--
		Great Peconic Bay and minor coves		--	--	--
		Brushes Creek		--	--	--
		Laurel Pond		--	--	--
		James Creek		--	--	--
		Deep Hole Creek		--	--	--
		Mattituck (Marratooka) Pond		--	--	--
		West Creek and Tidal Tribs		--	--	--
		Sebonac Cr/Bullhead Bay and Tidal Tribs		--	--	--
		Little Sebonac Creek		--	--	--
		Scallop Pond		--	--	--
		Cold Spring Pond and Tribs		--	--	--
		Red Creek Pond and Tidal Tribs		--	--	--
		Flanders Bay, East/Center, and Tribs		--	--	--
		Meetinghouse Creek and Tribs	NY0005304	CRESCENT DUCK FARM	Groundwater	0.0
		Terry's Creek and Tribs		--	--	--
		Goose Neck Creek		--	--	--
		Reeves Bay and Tidal Tribs		--	--	--
		Flanders Bay, West/Lower Sawmill Creek	NY0020061	Riverhead	Surface Water	92.5
		Peconic River, Lower, and Tidal Tribs		--	--	--
		Peconic River Middle, and Tribs	NY0080616	CALVERTON HILLS	Groundwater	3.0
		Peconic River Upper, and Tribs		--	--	--
		Wildwood Lake (Great Pond)		--	--	--
22	**Long Island Sound,**	Long Island Sound, Suffolk Co, Central	NY0238848	COUNTRY VIEW ESTATES	Groundwater	0.3
			NY0253421	THE INN AT EASTWINDS	Groundwater	0.5
			NY0253197	WILLOW PONDS	Groundwater	0.4
			NY0065382	ROCKY POINT APARTMENTS	Groundwater	1.7
			NY0226688	Ridge Haven	Groundwater	1.8
			NY0079359	Leisure Village	Groundwater	8.3
			NY0221678	Tallmadge Woods	Groundwater	11.3
		Wading River		--	--	--
		Lake Panamoka (Long Pond)		--	--	--
		Fresh Pond Creek and Tribs		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
22	**Suffolk Co, Central**	Deep Pond		--	--	--
		Mt Sinai Harbor and Tidal Tribs	NY0065455	SAGAMORE HILLS	Groundwater	2.2
			NY0068144	WOODHAVEN MANOR	Groundwater	0.6
		Port Jefferson Harbor, North, and Tribs	NY0254517	SETAUKET MEADOWS	Groundwater	0.6
			NY0079529	STONY HOLLOW	Groundwater	2.3
			NY0210161	STONINGTON AT PORT JEFFERSON	Groundwater	0.7
		Port Jefferson Harbor, South, and Tribs	NY0021750	Port Jefferson	Surface Water	62
			NY0196339	FOX MEADOWS	Groundwater	0.8
		Setauket Harbor	NY0266442	SUNRISE AT EAST SETAUKET	Groundwater	0.3
		Conscience Bay and Tidal Tribs		--	--	--
23	**Long Island Sound, Suffolk County, East**	Long Island Sound, Suffolk County, East	NY0020079	Village of Greenport	Surface Water	46.1
		Goldsmith Inlet		--	--	--
		Mattituck Inlet/Cr, Low, and Tidal Tribs		--	--	--
24	**Long Island Sound, Suffolk County, West**	Long Island Sound, Suffolk County, West		--	--	--
		Flax Pond		--	--	--
		Smithtown Bay	NY0254720	VILLAGES AT LAKE GROVE	Groundwater	1.1
		Stony Brook Harbor and West Meadow Creek	NY0109291	SUNY Stony Brook	Surface Water	0
			NY0074292	ST. JAMES NURSING HOME	Groundwater	2.3
			NY0091081	Fairfield	Groundwater	2.7
		Nissequogue River Lower/ Sunken Meadow Creek	NY0023311	Kings Park	Surface Water	6.2
			NY0272906	COUNTRY VIEW ESTATES SMITHTOWN	Groundwater	0.1
			NY0196282	HIDDEN PONDS AT SMITHTOWN	Groundwater	3.1
			NY0226998	SUNRISE ASSISTED LIVING AT SMITHTOWN	Groundwater	0.3
		Nissequogue River Upper, and Tribs	NY0066028	Hauppauge	Groundwater	11.3
		Crab Meadow Creek		--	--	--
		Huntington Bay		--	--	--
		Lloyd Harbor		--	--	--
		Huntington Harbor	NY0021342	Huntington Town	Surface Water	72.2
		Centerport Harbor		--	--	--
		Mill Pond		--	--	--
		Northport Harbor	NY0024881	Northport Village	Surface Water	10.1
			NY0137065	PAUMANACK VILLAGE	Groundwater	1.1
		Northport Bay		--	--	--
		Duck Island Harbor		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
25	**Mecox Bay and Tribs**	Mecox Bay and Tribs		--	--	--
		Little Long, Long, and Shorts Pond		--	--	--
		Kellis Pond		--	--	--
		Mill Pond and Sevens Ponds		--	--	--
26	**Moriches Bay East**	Moriches Bay East	NY0254550	WESTHAMPTON PINES	Groundwater	0.6
			NY0210901	WESTHAMPTON NURSING HOME	Groundwater	0.5
		Beaverdam Pond		--	--	--
		Speonk River		--	--	--
27	**Moriches Bay West**	Moriches Bay West		--	--	--
		Seatuck Cove and Tidal Tribs	NY0253537	ENCORE ATLANTIC SHORES	Groundwater	1.0
			NY0278289	EASTPORT MEADOWS	Groundwater	0.5
		Harts Cove		--	--	--
		Tuthill Cove		--	--	--
		Terrell River	NY0080586	CEDAR LODGE	Groundwater	0.6
		Forge River Cove and Tidal Tribs		--	--	--
		Forge River and Tidal Tribs	NY0253308	MIRROR PONDS	Groundwater	0.6
			NY0079405	PINE HILLS	Groundwater	3.7
			NY0198480	WATERWAYS AT BAY POINT	Groundwater	1.3
			NY0273490	FAIRFIELD MASTIC	Groundwater	0.6
		Mud and Senix Creeks	NY0254819	VINEYARDS AT MORICHES	Groundwater	0.4
		Orchard Neck Creek		--	--	--
		Narrow Bay		--	--	--
		Pattersquash Creek		--	--	--
		Sheepen Creek		--	--	--
		Unchachogue/Johns Neck Creeks		--	--	--
28	**Napeague Bay**	Napeague Bay		--	--	--
		Napeague Harbor and Tidal Tribs		--	--	--
		Fresh Pond		--	--	--
		Fort Pond		--	--	--
		Fort Pond Bay	NY0195995	ROUGH RIDERS LANDING	Groundwater	1.2
		Gardiners Bay and minor Tidal Tribs		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
29	**Narrow Bay**	Narrow Bay		--	--	--
		Pattersquash Creek		--	--	--
		Sheepen Creek		--	--	--
		Unchachogue/Johns Neck Creeks		--	--	--
30	**Nicoll Bay**	Nicoll Bay	NY0077283	BIRCHWOOD ON THE GREEN	Groundwater	0.8
			NY0226254	GREENVIEW COURT	Groundwater	0.5
			NY0272990	OAK CREEK COMMONS	Groundwater	0.1
		Connetquot River, Lower, and Tribs		--	--	--
		Grand Canal	NY0077356	DOWLING COLLEGE	Groundwater	0.0
			NY0253227	GREENVIEW COMMONS	Groundwater	0.7
		Connetquot River, Upper, and Tribs	NY0254479	THE PRESERVE AT CONNETQUOT	Groundwater	0.2
			NY0253219	HILTON GARDENS	Groundwater	0.7
			NY0220493	ISLANDA CENTER	Groundwater	1.3
			NY0077241	TOWNE HOUSE VILLAGE SOUTH	Groundwater	2.9
			NY0077330	Nob Hill	Groundwater	2.4
			NY0077321	HEATHERWOOD AT LAKELAND	Groundwater	0.4
			NY0077411	WINDBROOKE HOMES	Groundwater	26.4
			NY0077429	Wind Watch	Groundwater	13.5
		Lake Ronkonkoma		--	--	--
31	**Nissequogue River Lower/Sunken Meadow Creek**	Nissequogue River Lower/ Sunken Meadow Creek	NY0023311	Kings Park	Surface Water	6.2
			NY0272906	COUNTRY VIEW ESTATES SMITHTOWN	Groundwater	0.1
			NY0196282	HIDDEN PONDS AT SMITHTOWN	Groundwater	3.1
			NY0226998	SUNRISE ASSISTED LIVING AT SMITHTOWN	Groundwater	0.3
		Nissequogue River Upper, and Tribs	NY0066028	Hauppauge	Groundwater	11.3
32	**North Sea Harbor and Tribs**	North Sea Harbor and Tribs	NY0254941	COURTYARDS AT SOUTHAMPTON	Groundwater	0.3
		Fish Cove		--	--	--
		Big/Little Fresh Ponds		--	--	--
33	**Northport Bay**	Northport Bay		--	--	--
		Northport Harbor	NY0024881	Northport Village	Surface Water	10.1
			NY0137065	PAUMANACK VILLAGE	Groundwater	1.1
		Centerport Harbor		--	--	--
		Mill Pond		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
		Duck Island Harbor		--	--	--
34	**Northwest Harbor**	Northwest Harbor		--	--	--
		Northwest Creek and Tidal Tribs		--	--	--
35	**Noyack Bay**	Noyack Bay		--	--	--
		Mill Creek and Tidal Tribs		--	--	--
		Noyack Creek and Tidal Tribs		--	--	--
36	**Orient Harbor and minor Tidal Tribs**	Orient Harbor and minor Tidal Tribs		--	--	--
		Hallock/Long Beach Bay and Tidal Tribs		--	--	--
		Dam Pond		--	--	--
		Marion Lake		--	--	--
		Spring Pond		--	--	--
		Shelter Island Sound, North, and Tribs	NY0021814	SHELTER ISLAND HEIGHTS	Surface Water	1.6
		Southold Bay		--	--	--
		Town/Jockey Creeks and Tidal Tribs		--	--	--
		Goose Creek		--	--	--
		Hashamomuck Pond/Long Creek and Budd's Pond		--	--	--
		Pipes Cove		--	--	--
		SI Sound Trib/Moores Drain, Lower, Tribs		--	--	--
		Stirling Creek and Basin		--	--	--
		Gull Pond		--	--	--
		Dering Harbor		--	--	--
		Patchogue Bay		Parkland	Groundwater	49.9
		Howell's Creek		--	--	--
		Dunton Lake, Upper, and Tribs and Hedges Creek		--	--	--
		Abets Creek	NY0253316	PATCHOGUE SENIOR APARTMENTS	Groundwater	0.9
			NY0080683	12 Pines	Groundwater	10.2
		Mud Creek, Robinson Pond, and Tidal Tribs	NY0074730	BROOKHAVEN HOSPITAL	Groundwater	3.5
		Swan River, Swan Lake, and Tidal Tribs	NY0136930	AVERY VILLAGE	Groundwater	0.3
			NY0080454	PATCHOGUE NURSING HOME	Groundwater	3.4
			NY0023922	Patchogue Village	Surface Water	31.9

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
37	**Patchogue Bay**	Patchogue River	NY0065463	BIRCHWOOD GLEN	Groundwater	0.7
			NY0253511	MEDFORD HAMLET ASSISTED LIVING	Groundwater	0.5
			NY0080730	FAIRFIELD ON THE BAY	Groundwater	0.0
			NY0253154	EXIT 63 DEVELOPMENT	Groundwater	1.7
		Patchogue River (cont.)	NY0079341	WOODHULL GARDEN APARTMENTS	Groundwater	0.9
			NY0209597	RADISSON HOTEL	Groundwater	1.2
			NY0079413	IRS Service Center	Groundwater	5.6
		Tuthills Creek	NY0238406	FAIRWAY MANOR	Groundwater	1.4
			NY0252972	SPRUCE PONDS GARDEN APARTMENTS	Groundwater	1.8
			NY0227226	SUNRISE AT HOLBROOK	Groundwater	0.3
		Corey Lake and Creek, and Tribs	NY0226963	SPRINGHORN AT BLUE POINT	Groundwater	0.2
		Stillman Creek	NY0077364	SOUTHERN MEADOWS	Groundwater	1.3
38	**Peconic River Middle, and Tribs**	Peconic River Middle, and Tribs	NY0080616	CALVERTON HILLS	Groundwater	3.0
		Peconic River Upper, and Tribs		--	--	--
39	**Peconic River, Lower, and Tidal Tribs**	Peconic River, Lower, and Tidal Tribs		--	--	--
		Peconic River Middle, and Tribs	NY0080616	CALVERTON HILLS	Groundwater	3.0
		Peconic River Upper, and Tribs		--	--	--
		Wildwood Lake (Great Pond)		--	--	--
40	**Pipes Cove**	Pipes Cove		--	--	--
		SI Sound Trib/Moores Drain, Lower, Tribs		--	--	--
41	**Port Jefferson Harbor, North, and Tribs**	Port Jefferson Harbor, North, and Tribs	NY0254517	SETAUKET MEADOWS	Groundwater	0.6
			NY0079529	STONY HOLLOW	Groundwater	2.3
			NY0210161	STONINGTON AT PORT JEFFERSON	Groundwater	0.7
		Port Jefferson Harbor, South, and Tribs	NY0021750	Port Jefferson	Surface Water	62
			NY0196339	FOX MEADOWS	Groundwater	0.8
		Setauket Harbor	NY0266442	SUNRISE AT EAST SETAUKET	Groundwater	0.3
		Conscience Bay and Tidal Tribs		--	--	--
42	**Quantuck Bay**	Quantuck Bay		--	--	--
		Quantuck Creek and Old Ice Pond		--	--	--
		Aspatuck Creek and River		--	--	--
		Quantuck Canal/Moneybogue Bay		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
43	**Quogue Canal**	Quogue Canal		--	--	--
		Quantuck Canal/Moneybogue Bay		--	--	--
		Quantuck Creek and Old Ice Pond		--	--	--
		Aspatuck Creek and River		--	--	--
		Quantuck Bay		--	--	--
		Ogden Pond		--	--	--
44	**Sag Harbor**	Sag Harbor	NY0028908	Village of Sag Harbor	Surface Water	6.9
		Sag Harbor Cove and Tribs		--	--	--
		Ligonee Brook and Tribs		--	--	--
45	**Sag Harbor Cove and Tribs**	Sag Harbor Cove and Tribs		--	--	--
		Ligonee Brook and Tribs		--	--	--
46	**Shelter Island Sound, North, and Tribs**	Shelter Island Sound, North, and Tribs	NY0021814	SHELTER ISLAND HEIGHTS	Surface Water	1.6
		Shelter Island Sound, South, and Tribs		--	--	--
		Little Peconic Bay		--	--	--
		Southold Bay		--	--	--
		Town/Jockey Creeks and Tidal Tribs		--	--	--
		Goose Creek		--	--	--
		Hashamomuck Pond/Long Creek and Budd's Pond		--	--	--
		Pipes Cove		--	--	--
		SI Sound Trib/Moores Drain, Lower, Tribs		--	--	--
		Stirling Creek and Basin		--	--	--
		Gull Pond		--	--	--
		Dering Harbor		--	--	--
47	**Shelter Island Sound, South, and**	Shelter Island Sound, South, and Tribs		--	--	--
		Little Peconic Bay		--	--	--
		Noyack Bay		--	--	--
		Mill Creek and Tidal Tribs		--	--	--
		Noyack Creek and Tidal Tribs		--	--	--
		Sag Harbor	NY0028908	Village of Sag Harbor	Surface Water	6.9
		Sag Harbor Cove and Tribs		--	--	--

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
47	Sound, South, and Tribs	Ligonee Brook and Tribs		--	--	--
		Northwest Harbor		--	--	--
		Northwest Creek and Tidal Tribs		--	--	--
		West Neck Harbor		--	--	--
		Dickerson Creek		--	--	--
		Menantic Creek		--	--	--
		West Neck Bay and Creek		--	--	--
48	**Shinnecock Bay Central**	Shinnecock Bay Central		--	--	--
		Penny Pond, Wells, Smith, and Gilbert Creeks		--	--	--
		Tiana Bay and Tidal Tribs	NY0226777	WOODBRIDGE AT HAMPTON BAYS	Groundwater	0.1
49	**Shinnecock Bay East**	Shinnecock Bay East		--	--	--
		Shinnecock Bay - Bennet Cove (Cormorant Cove)		--	--	--
		Old Fort Pond		--	--	--
		Middle Pond		--	--	--
		Far Pond		--	--	--
		Heady and Taylor Creeks and Tribs	NY0179213	SOUTHAMPTON COMMONS	Groundwater	0.4
50	**Shinnecock Bay West**	Shinnecock Bay West	NY0253286	EAGLE WALK	Groundwater	0.2
		Penniman Creek and Tidal Tribs		--	--	--
		Phillips Creek, Lower, and Tidal Tribs		--	--	--
		Weesuck Creek and Tidal Tribs		--	--	--
		Quogue Canal		--	--	--
		Quantuck Canal/Moneybogue Bay		--	--	--
		Ogden Pond		--	--	--
		Quantuck Bay		--	--	--
		Quantuck Creek and Old Ice Pond		--	--	--
		Aspatuck Creek and River		--	--	--
		Smithtown Bay	NY0254720	VILLAGES AT LAKE GROVE	Groundwater	1.1
		Stony Brook Harbor and West Meadow Creek	NY0109291	SUNY Stony Brook	Surface Water	0
			NY0074292	ST. JAMES NURSING HOME	Groundwater	2.3
			NY0091081	Fairfield	Groundwater	2.7

Table D-3
Nine Elements Subwatersheds STP Nitrogen Loads

Number	Nine Elements Subwatersheds 1	Individual Subwatersheds 2	SPDES	STP Name	Discharge Location	Nitrogen Load (lbs/day)
51	**Smithtown Bay**	Nissequogue River Lower/ Sunken Meadow Creek	NY0023311	Kings Park	Surface Water	6.2
			NY0272906	COUNTRY VIEW ESTATES SMITHTOWN	Groundwater	0.1
			NY0196282	HIDDEN PONDS AT SMITHTOWN	Groundwater	3.1
			NY0226998	SUNRISE ASSISTED LIVING AT SMITHTOWN	Groundwater	0.3
		Nissequogue River Upper, and Tribs	NY0066028	Hauppauge	Groundwater	11.3
		Crab Meadow Creek		--	--	--
52	**Southold Bay**	Southold Bay		--	--	--
		Town/Jockey Creeks and Tidal Tribs		--	--	--
		Goose Creek		--	--	--
53	**Wading River**	Wading River		--	--	--
		Lake Panamoka (Long Pond)		--	--	--
54	**West Neck Harbor**	West Neck Harbor		--	--	--
		Dickerson Creek		--	--	--
		Menantic Creek		--	--	--
		West Neck Bay and Creek		--	--	--
55	**Lake Ronkonkoma**	Lake Ronkonkoma		--	--	--
56	**Agawam Lake**	Agawam Lake		--	--	--
57	**Lake Montauk**	Lake Montauk		--	--	--
58	**Georgica Pond**	Georgica Pond		--	--	--
59	**Cold Spring Harbor**	Cold Spring Harbor		--	--	--

Notes:

--: No STPs are located within this individual subwatershed.

1: Nine elements subwatersheds include the SWP aggregated waterbodies, and any individual SWP subwatersheds that don't fall into an aggregated waterbody, but

2: Individual subwatersheds are the SWP subwatersheds that constitute the nine elements subwatersheds.