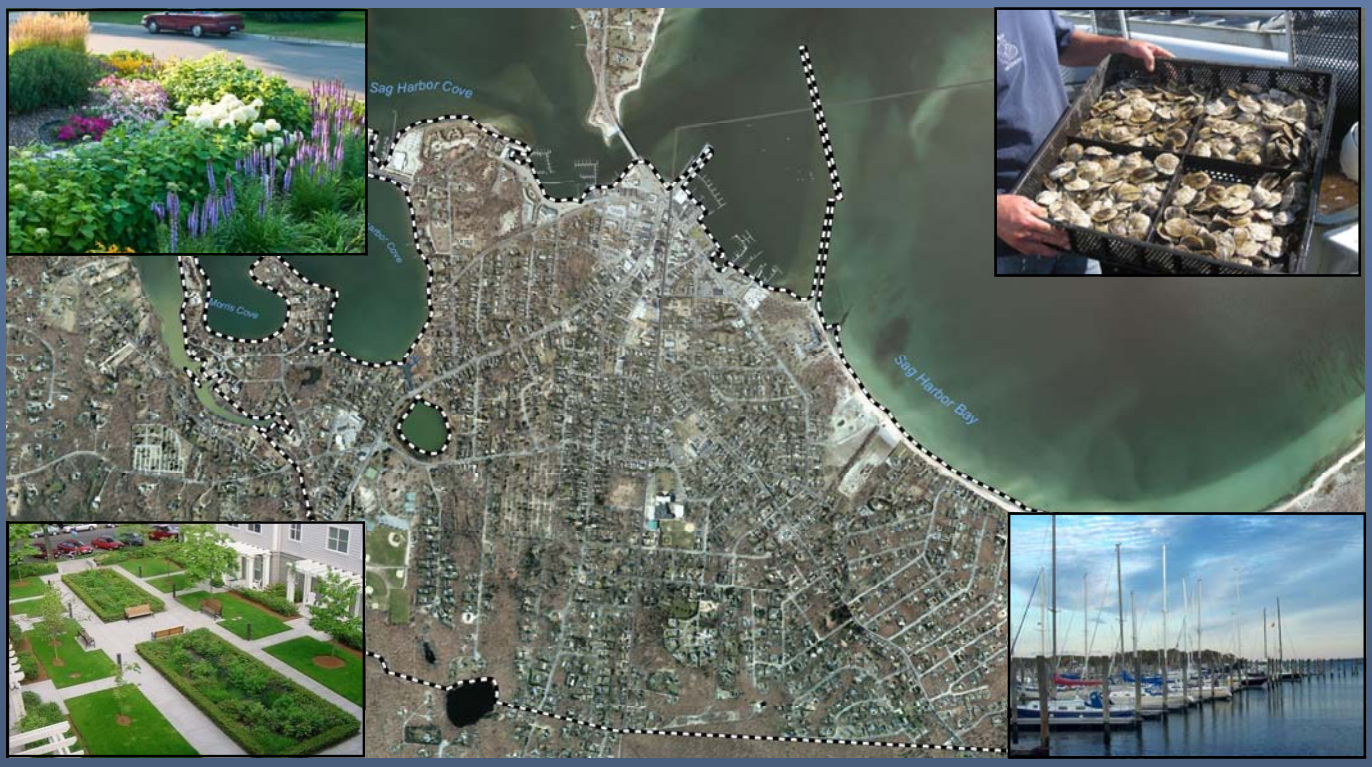
Water Quality Improvement Project Plan

Village of Sag Harbor

Town of Southampton
Community Preservation Fund
Grant Application



Prepared for:
Village of Sag Harbor, Board of Trustees
and
Town of Southampton Town Board

Prepared By: Nelson, Pope & Voorhis, LLC, 572 Walt Whitman Road, Melville, NY 11747
Phone: (631) 427-5665

July 13th, 2018

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

COMMUNITY PRESERVATION FUND (CPF)
WATER QUALITY IMPROVEMENT PROGRAM
CHECKLIST/APPLICATION INSTRUCTIONS

The CPF Water Quality Improvement Project Plan (WQIPP) Fund follows the objectives in the adopted Water Quality Improvement Project Plan (see http://www.southamptontownny.gov/DocumentCenter/View/7318)

To apply for funding, an application must be **COMPLETED** and submitted along with detailed narratives and supporting information as described below. The Water Quality Advisory Committee will rank and score projects based on the Scoring Criteria contained in the application materials. Parcel acquisitions will be considered on an ongoing basis, independent of this application process.

A Public Hearing and Town Board Resolution will be required for individual or multiple projects in excess of $50,000.

WATER QUALITY IMPROVEMENT PROJECT MEANS:

[1] DEFINITIONS:

1. **Wastewater Treatment Improvement Project** means the planning, design, construction, acquisition, enlargement, extension, or alteration of a wastewater treatment facility, including alternative systems to a sewage treatment plant or traditional septic system, to treat, neutralize, stabilize, eliminate or partially eliminate sewage or reduce pollutants in treatment facility effluent, including permanent or pilot demonstration wastewater treatment projects, or equipment or furnishings thereof. Stormwater collecting systems and vessel pumpout stations shall also be included within the definition of a wastewater improvement project.

1. **Nonpoint source abatement and control program projects** developed pursuant to section eleven-b of the soil and water conservation districts law, title 14 of article 17 of the environmental conservation law, section 1455b of the federal coastal zone management act, or article forty-two of the executive law;

2. **Aquatic Habitat Restoration Project** means the planning, design, construction, management, maintenance, reconstruction, revitalization, or rejuvenation activities intended to improve waters of the state of ecological significance or any part thereof, including, but not limited to ponds, bogs, wetlands, bays, sounds, streams, rivers, or lakes and shorelines thereof, to support a spawning, nursery, wintering, migratory, nesting, breeding, feeding, or foraging environment for fish and wildlife and other biota.

3. **Pollution Prevention Project** means the planning, design, construction, improvement, maintenance or acquisition of facilities, production processes, equipment or buildings owned or operated by municipalities for the reduction, avoidance, or elimination of the use of toxic or hazardous substances or the generation of such substances or pollutants so as to reduce risks to public health or the environment, including changes in production processes or raw materials; such projects shall not include incineration, transfer from one medium of release or discharge to another medium, off-site or out-of-production recycling, end-of-pipe treatment or pollution control.

4. **The Operation of the Peconic Bay National Estuary Program**, as designated by the United States Environmental Protection Agency. Such projects shall have as their purpose the improvement of existing water quality to meet existing specific water quality standards. Projects which have as a purpose to permit or accommodate new growth shall not be included within this definition.

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

COMMUNITY PRESERVATION FUND (CPF)
WATER QUALITY IMPROVEMENT PROGRAM
PROPOSAL SUMMARY

Project Proposal: Green Infrastructure for Village of Sag Harbor
Project Applicant: Village of Sag Harbor
Project Title: Sag Harbor Green Infrastructure Projects

Project Contact Information
Project Manager Name: Beth Kamper
Project Manager Title: Village Clerk
Project Manager Affiliation: Village of Sag Harbor
Project Manager Address: 55 Main Street, P.O. Box 660, Sag Harbor NY 11963
Project Manager Phone: 631-725-0222
Project Manager Email: clerk@sagharborny.gov

Property Owner Name: Village of Sag Harbor
Property Owner Affiliation: Village
Property Owner Mailing Address
Property Owner Phone
Property Owner Email

Project Location: Multiple locations in Town of Southampton areas of the Village of Sag Harbor.
Project Location SCTM #(S)

Type of Project
Reduction: Rain gardens, bioretention basins, road-end filtration systems, stormwater wetland, tree trenches and pervious pavement
Remediation
Restoration
Project Summary (2-3 sentences): Design, construct and install numerous green infrastructure practices within Village right-of-ways and on Village properties to reduce direct discharges of stormwater to Sag Harbor Bay and other Sag Harbor surface waters. These projects are designed and located to provide the largest positive impact to surface waters by capturing the heaviest direct discharges using an array of green infrastructure practices. The proposed projects are ranked according to their cost-effectiveness in removing nitrogen.

Submittal date

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

1. PROJECT TYPE (check all that apply)

Meets at least one of the definitions of "Water Quality Improvement Project" per State Law Chapter 551 cited above

- ☐ **Wastewater Treatment Improvement Project**
- ☑ **Non-point source abatement and control**
- ☐ **Aquatic habitat restoration**
- ☑ **Pollution prevention**
- ☑ **Stormwater collecting system**
- ☐ **Vessel Pump out station**
- ☐ **Operation of Peconic Bay National Estuary Program (Grant Match)**

2. PRIORITY AREA(S) (check all that apply)

- ☑ **High**
- ☑ **303(d) Impaired**
- ☑ **Medium**
- ☐ **Outside High and Medium priority areas***

*Narrative must explain how project is relevant to Water Quality Improvement Project Plan (WQIPP) goals

The proposed projects address the Town of Southampton WQIPP goals by implementing water quality treatment systems that will help abate nitrogen and bacteria discharges to Sag Harbor surface waterbodies. The proposed practices are designed to reduce discharges of pollutants from stormwater conveyance system outfalls. Practices in proximity to the Harbor will be comprised of native plant material and will be consistent with marine habitat restoration efforts.

3. PROJECT DESCRIPTION

☑ **Narrative describes in detail existing conditions of applicable groundwater/sub-watershed/waterbody and includes most recent and relevant data available (provide sources)**

See Appendix A - Expanded Responses Attachment 3.1

☑ **Photos of exiting conditions are included** (Attach Photos) SEE APPENDIX F FOR EXISTING CONDITIONS PHOTOS

☑ **Location map is included** (Attach Map) SEE APPENDIX C FOR LOCATION MAP AND PROJECT FIGURES

☑ **Narrative describes in detail what the issue is and how the proposed solution addresses the issue in the context of Reduction, Remediation and/or Restoration as per the CPF Water Quality Project Plan**

Sag Harbor Bay is an impaired waterbody that is on the NYSDEC 303(d) list and it is within the Town of Southampton's high priority area for water quality improvement projects. The many inlets, tributaries and freshwater ponds and wetlands that are associated with the Bay are also within the high priority area. The proposed project will includes green infrastructure projects that will intercept the direct discharge of stormwater to the Bay by locating the projects on Village property within the Bay watershed and associated tributaries to capture the largest volume of stormwater possible and treat the water prior to entering the Bay. Using the 2013 NYSDEC Watershed Treatment Model, the proposed projects are ranked according to their cost-effectiveness in removing nitrogen as nitrogen is the primary pollutant of concern.

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

☑ **Narrative describes proposed technology in sufficient detail and includes information on its demonstrated efficacy in similar setting (may include published data)** (Attach pages as needed)

See Appendix A - Expanded Responses Attachment 3.2

☑ **Narrative indicates how the project supports Town of Southampton, Suffolk County, NYSDEC Long Island Nitrogen Action Plan (LINAP) or other adopted goals/policies (provide references with pages numbers, etc.)** (Attach pages as needed)

See Appendix A - Expanded Responses Attachment 3.3

☑ **A State Environmental Quality Review Act (SEQRA) Long or Short Environmental Assessment Form (EAF) is completed and included with application** https://www.dec.ny.gov/permits/6191.html SEE APPENDIX D FOR SEAF

OTHER REQUIRED INFORMATION

☑ If Stormwater system or Drainage is proposed, the narrative and design specifications indicate compliance with the New York State Stormwater Design Manual (2015 and as updated) SEE APPENDIX A - Attachment 3.

☐ If project is related to farmland, the narrative addresses any Agricultural Stewardship Plan or other long term strategy for Nitrogen abatement

☑ If the project is for a municipal facility or infrastructure, information pertaining to Town or Village budgetary allocations for ongoing maintenance is provided SEE APPENDIX A - Attachment 3.

☐ If the project is for habitat restoration, the narrative addresses how underlying causes are being ameliorated and expected outcomes for local species populations or other ecological considerations are given

☐ If project is a Sewage Treatment Plant (STP) or cluster treatment system, fund allocation request is based on cost for reduction of pre-existing conditions and not for purpose of accommodating new density (describe pre-existing density and associated flow (gallons per day) and total projected nitrogen reduction in narrative). Include detailed information on how many homes the system would treat as well as potential for formation of Sewer District, if required by Suffolk County Health Department or Town Law

☐ If the project is requesting grant match for the Peconic Estuary Program, include information related to funding program source and purpose of application and any relevant items on this checklist. Note: A Town Board resolution will be required in order to encumber matching funds for grant applications

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

4. WATER QUALITY BENEFIT

☑Yes	☐No	☐N/A	Nitrogen, Pathogen or Pollutant of Concern (POC) Existing Condition & Target Reduction is identified
☐Yes	☐No	☑N/A	Anticipated reduction by proposed technology is provided by utilizing EPA's Spreadsheet Tool for Evaluating Pollutant Load (STEPL) http://it.tetratech-ffx.com/steplweb/ or similar standardized methodology (provide) SEE APPENDIX A - Attachment 4.
☑Yes	☐No	☐N/A	Related to above, the narrative describes how data will be collected and reported over time
☑Yes	☐No	☐N/A	Narrative indicates how the useful life of the proposed technology will meet or exceed five (5) years
☑Yes	☐No	☐N/A	A total cost budget is included (see pages 6-7 for template) with a cost-benefit discussion and any details related to matching funds (e.g. in-kind services, pre-and post-monitoring, etc)

5. DURATION OF PROJECT

- ☑ Projected timeline is included (described any permits needed and time frame/status of required approvals)
- ☑ Narrative explains if project is multi-year or phased and includes budget/milestones for each year and Phase

6. PROJECT READINESS

- ☑ Narrative describes current stage of planning (e.g. conceptual, preliminary, full construction documents) and includes conceptual or sketch plans where applicable.
- ☑ Narrative describes community support for the project (attach letters of support, public hearing testimony, news coverage, community meeting minutes, other outreach as applicable) or addresses potential community opposition/educational needs.

SEE APPENDIX E FOR LOI AND RESOLUTION #6

7. MANAGEMENT, EXPERIENCE, ABILITY

- ☑ Narrative describes experience in completing similar projects
- ☑ Narrative describes project staffing, oversight and administration
- ☑ Narrative describes qualifications of project staff, consultants and contractors (as applicable)
- ☐ If Homeowner's Association or other community group, describe formal structure and responsibilities of members involved
- ☐ If private property (e.g. farmland), the narrative describes who is being contracted to do the work (qualifications, etc.)

8. REQUIRED CERTIFICATIONS

- ☑ Commitment is provided via Letter of Intent (LOI)* for non-municipal entities or adopted resolution for Incorporated Villages *
  Note: A LOI template is provided in the application packet SEE APPENDIX E FOR LOI AND RESOLUTION #6
- ☐ Plans stamped by NYS licensed Engineer and/or surveyor, where applicable
- ☐ STEPL calculations or equivalent prepared by NYS licensed Engineer, where applicable
- ☑ Certify that request for proposed funding is not otherwise required by Local, State or Federal Law and intended benefits cannot be achieved without external funding
- ☑ Certify that the application will report on project outcomes, including monitoring results

9. MAINTENANCE, MONITORING & EVALUATION

- ☑ A plan related to ongoing maintenance, monitoring and evaluation (reporting to the Town) is provided
- ☑ The Monitoring Plan will provide water quality data at regular intervals for a minimum of five (5) years

SEE APPENDIX A AND G - EXPANDED RESPONSES AND MAINTENANCE CHECKLIST

10. EDUCATIONAL COMPONENT

- ☑ The project sponsor will erect signage displaying the intent and benefit of the project on site
- ☑ As part of the evaluation, the project sponsor will submit a write-up of lessons learned and future needs

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

COMMUNITY PRESERVATION FUND (CPF)
WATER QUALITY IMPROVEMENT PROGRAM
BUDGET PROPOSAL

PLANNING/ENGINEERING/DESIGN	Town CPF Request	Matching Funds Committed	Matching Funds Pending	Estimated Total Project Costs
In-house labor (provide separate sheet with calculations)				
Task 1- Planning for engineered feasibility and concept plan	$- 8,500	$-	$-	$-
Task 2- Survey and Soil Borings	$- 68,000	$-	$-	$-
Task 3- Design, Estimates and Construction documents	$- 136,000	$-	$-	$-
Task 4- Bid document support	$- 8,500	$-	$-	$-
Task 5-	$-	$-	$-	$-
Task 6-	$-	$-	$-	$-
	$-	$-	$-	$-
In House Labor Total	**$-** 221	**$-** 0	**$-** 0	**$-** 0

Materials/Supplies (SEE APPENDIX B - SPREADSHEET)				
Rain garden - mulch, compost, plants, rain guardians	**$-** 293,775	**$-**	**$-**	**$-**
Bioretention - mulch, engineered soils, plants, inlet, outlet, draintile	**$-** 150,000	**$-**	**$-**	**$-**
Pervious Pavement - pavement, rock subgrade, draintile	**$-** 69,000	**$-**	**$-**	**$-**
Tree Trench - engineered soil, concrete, tree, draintile	**$-** 36,000	**$-**	**$-**	**$-**
Road-end Filtration - compost, mulch, plants	**$-** 103,275	**$-**	**$-**	**$-**
Stormwater Wetland - plants, grading	**$-** 33,600	**$-**	**$-**	**$-**
* MATERIALS ARE INSTALLATION COST PER PROJECT	**$-**	**$-**	**$-**	**$-**
Materials/Supplies Total (SEE APPENDIX B)	**$-** 685.65	**$-** 0	**$-** 0	**$-** 0

Contractual Services				
RFP and Bid Process	**$-**	**$-** 0	**$-**	**$-**
Construction Observation and Inspection	**$-** 68,000	**$-** 0	**$-**	**$-**
	$-	**$-**	**$-**	**$-**
	$-	**$-**	**$-**	**$-**
	$-	**$-**	**$-**	**$-**
	$-	**$-**	**$-**	**$-**
	$-	**$-**	**$-**	**$-**
Contractual Services Total	**$-** 68	**$-** 0	**$-** 0	**$-** 0

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

CONSTRUCTION AND SITE IMPROVEMENTS	Town CPF Request	Matching Funds Committed	Matching Funds Pending	Estimated Total Project Costs
In-house labor (provide separate sheet with calculations)				
Task 1- Construct 8 Rain Garden Projects	$-	$-0	$-	$-
Task 2- Construct 6 Bioretention Projects	$-	$-0	$-	$-
Task 3- Construct 2 Pervious Pavement Projects	$-	$-	$-	$-
Task 4- Construct 3 Tree Trench Projects	$-	$-0	$-	$-
Task 5- Construct 6 Road-end Filtration Projects	$-	$-	$-	$-
Task 6- Construct a Stormwater Wetland	$-	$-0	$-	$-
	$-	$-	$-	$-
In House Labor Total	$-0	$-0	$-0	$-0

Equipment/Materials/Supplies				
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
Equipment/Materials/Supplies Total	$-0	$-0	$-0	$-0

Contractual Services				
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
	$-	$-	$-	$-
Contractual Services Total	$-0	$-0	$-0	$-0

ENGINEERING TOTAL	$-974.65	$-0	$-0	$-0

Total Project Cost	$-974.65
Total CPF Funds Requested	$-974.65

Applicant matching funds committed	$-
Applicant matching funds pending approval (e.g. grant request submitted pending determination)	$-

Source of matching funds	Amount

TOWN OF SOUTHAMPTON
Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920
WWW.SOUTHAMPTONTOWNNY.GOV/CPF

COMMUNITY PRESERVATION FUND (CPF)
WATER QUALITY IMPROVEMENT PROGRAM
LETTER OF INTENT

CONTACT INFORMATION

Municipality: Village of Sag Harbor

Contact First and Last Name: Beth Kamper

Contact Address: 55 Main Street, P.O. Box 660

Contact Phone: 631-725-0222

Contact Email: clerk@sagharborny.gov

PROJECT INFORMATION

Project Title: Green Infrastructure for Village of Sag Harbor

Project Location: Village of Sag Harbor

Project Description (1-3 sentences): Design, construct and install numerous green infrastructure practices within Village right-of-ways and on Village properties to reduce direct discharges of stormwater to Sag Harbor Bay and other Sag Harbor surface waters. These projects are designed and located to provide the largest positive impact to surface waters by capturing the heaviest direct discharges using an array of green infrastructure practices. The proposed projects are ranked according to their cost-effectiveness in removing nitrogen.

ANTICIPATED PROJECT TIMELINE

Begin: Spring to Summer of 2019

Complete: 2021

Notes:

APPENDICES

APPENDIX:

- **A** Expanded Responses Attachment
- **B** Spread Sheet: Proposed Sag Harbor Green Infrastructure Projects
- **C** Proposed Projects Maps
- **D** Short Environmental Assessment Form (SEAF)
- **E** Letter of Support from Friends of Long Pond Greenbelt, dated March 7, 2018;
  Village of Sag Harbor Resolution Number 6, July 2016;
  Letter from Village of Sag Harbor Mayor Sandra Schroeder to Town of Southampton Supervisor Jay Schneiderman in support of Town Community Preservation Fund Water Quality Improvement Projects
- **F** Existing Conditions Photos
- **G** Maintenance Checklist

APPENDIX A:

EXPANDED RESPONSES ATTACHMENT

VILLAGE ENVIRONMENTAL PLANNING CONSULTANT
55 Main Street; P.O. Box 660
Sag Harbor, NY 11963
(P) 631-725-0224

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING
572 WALT WHITMAN ROAD, MELVILLE, NY 11747 - 2188
(631) 427-5665 FAX (631) 427-5620
cvoorhis@nelsonpope.com

Village of Sag Harbor
Town of Southampton Community Preservation Fund Application

EXPANDED RESPONSES ATTACHMENT

3.1: Narrative Description of Existing Conditions:
As the Village and neighboring areas have developed and matured, stormwater and other pollutants have increased**.** As a result, areas previously open to shellfish harvesting are now closed and nitrogen and pathogens water quality impairments have resulted in the adoption by the New York State Department of Environmental Conservation (NYSDEC) of nitrogen and pathogens pollutant discharge limits known as Total Maximum Daily Loads (TMDLs) for Peconic Estuary waterbodies, including Sag Harbor.

Surface waters and wetland areas in the Village include Upper, Inner and Outer Sag Harbor Cove, Morris Cove, Ligonee Brook, Sag Harbor, and Sag Harbor Bay. In addition, The Village's Otter Pond, part of an environmentally sensitive nine-mile trail that inter-connects ponds, woods, and wetlands in the Town of Southampton, receives tidal flow through a channel that connects it with Upper Sag Harbor Cove**.**

Sag Harbor is fortunate and unique in having its own Wastewater Treatment Facility (WWTF); however, this primarily serves downtown commercial areas in the heart of the north end of the Village. Since Sag Harbor land use is based on historic settlement patterns, many lots do not conform with current lot size and overall density requirements recognized today as being necessary for groundwater and surface water protection. In addition, portions of the Village are under threat of flooding and storm surge

Addressing stormwater runoff is a concern for the Village of Sag Harbor and the Village has begun a program to implement drainage improvement projects, including bioretention and infiltrative/treatment projects, to improve water quality.

The Village of Sag Harbor's lowest topographic elevations occur along its extensive shorelines and northeastern boundary, where shallow depth to groundwater is also evident**.** Greater than 50% of the Village lies within the 0-2 year groundwater contributing area to local surface waterbodies**.** As a result, green infrastructure projects are preferable to traditional drainage projects in mitigating the impacts of polluted stormwater on surface waterbodies in the Village. In addition, the proposed green infrastructure projects are recommended by the NYSDEC Design Manual.

3.2: Narrative Describes Proposed Technology:
Six different technologies are proposed throughout the Town of Southampton portion of the Village of Sag Harbor where there are direct drainage outfalls to Sag Harbor surface waterbodies. The proposed projects include: Bio-infiltration (Rain Garden), Bio-retention, Pervious Pavement, Tree Trenches, Road-end Filtration, and a Stormwater Wetland. **(SEE APPENDIX C.)** All of the technologies will conform to the NYSDEC Stormwater Management Design Manual and, where necessary, will be enhanced to improve pre-treatment and inlet control and outlet control. Eastern Long Island native plants will be used where applicable.

Bio-infiltration (Rain Garden): A stormwater water quality management practice intended to manage and treat small volumes of stormwater runoff from impervious surfaces using a conditioned planting soil and plantings. A rain garden is a simplified version of a bio-retention project that uses the native soils with a passive filter system without an underdrain connected to the storm drain system. The runoff temporarily ponds in the garden and seeps into the soil over one to two days. The system consists of an inflow, shallow ponding area that is planted, mulch layer and an overflow system. The main purpose of a rain garden is to provide treatment of solids, metals, nutrients and hydrocarbons. They can also provide a micro habitat when planted with native species. Estimated pollutant removal using the 2013 NYS DEC Watershed Treatment Model is conservative vs. other models and research recently published. However, the estimates are achievable given the local conditions and locations. Estimated pollutant removals: 75-95% Nitrogen, 70-85% Phosphorous, 80-100% Total Suspended Solids depending on overflow/outlet design.

Bio-retention: Is very similar to a bio-infiltration basin, however the local native soils do not allow water to infiltrate as quickly into the groundwater. To remediate the slow infiltration, an engineered soil mix will be used as a replacement to the native soils with an installed underdrain connection to the stormwater system that is suspended above the base of the replaced soils for improved nitrogen fixation. The design is a variation of physical filtering and adsorption with bio-geochemical processes to remove pollutants. The estimates of pollutant removal are typically the low end of the range of the bio-infiltration system (above) due to the use of the underdrain.

Pervious Pavement: Similar to conventional pavement, this practice typically consists of a structural support pavement that has a minimum of 5% void space between the pavement to allow stormwater runoff to drain directly into the underlying base and soils. This system is best utilized in low traffic roads, parking lots, sidewalks and other impervious areas with low pollutant loads. Permeable paving is intended to capture, infiltrate and/or manage small frequent rainfall events that can recharge groundwater, reduce runoff to ease capacity of existing drain networks, provide effective treatment for solids, metals, nutrients and hydrocarbons, and an aesthetic improvement to otherwise hard surfaces. The NYSDEC Stormwater Management Design Manual estimates pollutant removal at 65% for Phosphorous, 80-85% for Nitrogen and 82-95% for Total Suspended Solids.

Tree Trenches: Planting new trees within a tree trench will promote evapotranspiration, increase nutrient uptake, provide shading and thermal reductions and encourage wildlife habitat. The technology is similar to bio-retention, however the basin is usually underground providing a minimum of 500 cubic feet of area for tree roots and an open space above for stormwater to enter and infiltration through the roots of the tree. Usually a trench has a pervious pavement or curb inlets to provide allow stormwater into the trench. The practice has similar benefits as compared to bio-infiltration and has nutrient load reductions estimated on the lower end.

Road-end Filtration: A vegetated filter strip with a small depression in the natural landscape of road-ends can be used to treat and control stormwater runoff to the waterbodies. Vegetated strips

are designed to treat sheet flow from adjacent surfaces and remove pollutants through filtration and infiltration. The objective in using natural areas for stormwater infiltration is to intercept runoff before it has become substantially concentrated and then distribute this flow evenly to the buffer/filtration strip. A mechanism for the bypass of higher-flow events will be provided to reduce erosion or damage the strip. The use of native vegetation will also provide micro habitats along the waterbody. The wider the strip or the longer the water flows through a filtration area, more nutrients are filtered. The range for nutrient removal is broader due to the design capacity. Estimates: 40-85% Nitrogen, 35-85% Phosphorous, and 40-93% Total Suspended Solids.

Stormwater Wetland: Is a created shallow marsh area that has stormwater directed to it for treatment of nutrients, solids, metals, and hydro-carbons. The small permanent pool and/or extended detention areas provide storage to achieve the full water quality volume of water from a storm event. Constructed stormwater wetlands can provide peak discharge control to existing wetlands to protect them from excess volumes and from channelization. A pretreatment/forebay is required for easy maintenance and prevention of large volumes of solids from entering the wetland.

3.3: Narrative on the Long Island Nitrogen Action Plan (LINAP):

Green infrastructure (6.11) is part of the Long Island Nitrogen Action Plan and goals. As such, the potential projects will employ biological and chemical processes to help decrease the amount of nitrogen that is entering Sag Harbor via direct stormwater outfall discharges. Pollutant load reductions for each project group were determined using the 2013 NYS DEC Watershed Treatment Model after creating sub-watersheds for each project **(SEE APPENDIX B).**

The attached spreadsheet shows that if all the projects are implemented it is estimated that 152.4 pounds of nitrogen will be captured annually **(SEE APPENDIX B)**. Projects will vary in their ability to capture nitrogen depending on their watershed and the size of the practice. A cost per pound of nitrogen removed was calculated to rank the projects. The lower the number in the final column, the higher the “bang for the buck” the project is.

3.4: Other Required Information:

Each practice will conform to the NYSDEC Stormwater Management Design Manual. Enhancements to design will be made to improve pretreatment and maintenance. In addition, native plants will be selected based on the soils conditions, and inlets and outlets will be protected. IWS (Internal Water Storage) systems will be used in conjunction with the bio-retention basins. For example, where practical, rain guardians will be installed at the inlets to provide pretreatment and easy maintenance for staff. And where areas have a higher tendency to flood, a dry well will be used for the outlet and protected from direct discharge and erosion for larger volumes of stormwater.

An Operations and Maintenance Plan for each practice has been developed for the Village of Sag Harbor. **(SEE APPENDIX G.)** Depending on the project and location, the Village of Sag Harbor may perform the initial maintenance on a project for a time period after which the responsibility for maintenance of rain garden projects may be divided between the neighboring property owner and the Village for maintenance of projects within the right-of -way. Decisions on implementation of projects may depend on obtaining long-term Maintenance Agreements or a Memorandum of Understanding between the Village and the adjacent property owner. After that time period, the responsibility for maintenance will be divided between the neighboring property owner and the Village for maintenance of projects within the right-of -way. Only those projects for which a long-term Maintenance Agreement or a Memorandum of Understanding between the Village and the property owner has been obtained will be implemented.

The following outlines the responsibilities of the landowner in the operation and maintenance of the curb cut raingardens. <u>See also Maintenance, Monitoring and Evaluation below.</u>

Village Inspections

As part of routine Village of Sag Harbor infrastructure maintenance the Village will inspect the projects annually to ensure their functionality. Rain gardens will be considered functional if no standing water is present 24-48 hours after a rainfall event, pre-treatment chambers are operational, no erosion is present, minimal weeds are present, and plants are well-established. When necessary the Village will work with property owners to evaluate and restore rain gardens to their design condition.

Maintenance

Materials, instruction, and technical assistance will be provided to the entity responsible for maintenance by the Village or Design Engineer. Within the second year, a rain garden maintenance workshop will be provided to participating landowners within the Green Infrastructure project area to ensure correct maintenance is performed. Maintenance activities may include:

A. *<u>Pre-Treatment Chamber Inlet:</u>* Inspect pre-treatment chamber inlet periodically and remove debris from the grate surface as needed (an estimated 3-4 times per year). Remove any sediment that makes it into the rain garden.
B. *<u>Mulch:</u>* Inspect mulch coverage annually and add double shredded hardwood mulch in order to maintain an average 3" layer. Adequate mulch coverage will suppress weeds and ensure adequate moisture availability for plants. Once plants are established and the mulch is not visible, mulch replenishment can be stopped.
C. *<u>Edging:</u>* Inspect the edging every spring for damage, including edging that has lifted up from the freeze/thaw cycle. If the edging has lifted, remove a few inches of soil underneath and reinstall the edging. The top of the edging must be flush with the grass to minimize potential damage during lawn maintenance and to ensure that runoff can enter the raingarden from a maximum amount of area, depending on the design of the individual raingarden.
D. *<u>Watering:</u>* During the first growing season, add a minimum of 1" of water per week if no rainfall occurs. This amount should be adjusted based on observed plant stress. Once established, rain gardens generally do not require any water unless several weeks have passed without rain.

VILLAGE ENVIRONMENTAL PLANNING CONSULTANT
55 Main Street; P.O. Box 660
Sag Harbor, NY 11963
(P) 631-725-0224

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING
572 WALT WHITMAN ROAD, MELVILLE, NY 11747 - 2188
(631) 427-5665 FAX (631) 427-5620
cvoorhis@nelsonpope.com

E. *Weeding:* Weeding must be performed a minimum 3 times a growing season during the first three seasons. Weeding may be increased to monthly to maintain the desired appearance. Contact the Village with questions about weed identification.

F. *Replacement Plants:* Replace plants as needed to maintain intended plant coverage within the raingarden. Use plant species from the approved raingarden plan. If a large percentage of plants require replacement, contact the Village to help determine the cause and to develop a replacement planting plan.

G. *Pest Maintenance:* If severe pest damage is noted, contact the Village for more information.

4: Water Quality Benefit:

The reduction of pollutants by each of the proposed projects was estimated using the 2013 NYS DEC Watershed Treatment Model instead of the EPA's Spreadsheet Tool. Both models are similar in construction and assumptions **(SEE APPENDIX B).**

According to research conducted by the University of North Carolina, St. Anthony Falls Laboratory in Minneapolis, MN, University of MN, Villanova, and University of Maryland all of the proposed projects are expected to have longevity of a minimum of 20 years when constructed correctly.

5: Duration of Project:

The proposed projects will likely begin between Spring and Summer of 2019, to allow for all budgeting to be approved by the Village. The Village will not require permits. However, NYS DEC and Town of Southampton wetland permits may be necessary for road end projects. Once permits are acquired, designs will be finalized. It is anticipated that all of the projects will take a minimum of 2 years to complete to allow for spring and fall plantings.

6: Project Readiness:

Conceptual and preliminary plans have been prepared for the proposed projects. The Village is prepared to begin soliciting property owner interest in participating in rain gardens projects. Once final projects have been selected and property owner Maintenance Agreements or Memorandums of Understanding are obtained, the design engineer will begin surveys and soil borings, and full construction documents, shop drawings, or sketch plans will be prepared as necessary for each project. When construction plans are finalized, an RFP will be issued for construction and the bid will be let. Site preparation and planting will occur in early spring or fall to minimize plant maintenance the first two years. An outreach task list has been created and is attached.

Sag Harbor Green Infrastructure Project Outreach to Village Landowners
(PROPOSED TASK OUTLINE)

Task 1:

- Send letters to eligible priority property owners.
- Create and distribute door hangers on priority property owners' doors to encourage participation.
- Publish announcement in the local paper and on the Village's website.

Task 2:

- Conduct first Informational Meeting to advise eligible property owners regarding the benefits of the Village of Sag Harbor Green Infrastructure Project and their roles in it.
- Issue property owner Green Infrastructure Project RSVP deadline.

Task 3:

- Selection of final project sites. Notify property owners.

Task 4:

- Conduct second Informational Meeting where selected property owners will sign a Maintenance Agreement or Memorandum of Understanding and provide input on the design of the rain garden. A raingarden template specific to their property will be used to accommodate utilities, trees, etc.
- Issue project bid for curb cut construction. Select contractor.

Task 5:

- Complete green infrastructure projects designs.
- Issue bid for raingarden construction. Select contractor.

The Village and the Village Harbor Committee are in support of the proposed project and has prepared a Water Quality Improvement Projects Plan (WQIPP). The Village passed a Board Resolution in support of this CPF grant application in July of 2016 **(SEE APPENDIX E**). The Village Harbor Committee and the Village have conducted a number of public meetings and educational meetings about green infrastructure, the state of the water, and how individuals in the Village can help. The Community has shown strong support for the potential projects on a Village-wide approach.

7: Management, Experience, Ability:
Nelson Pope & Voorhis (NP&V) is the Village consultant that prepared the Village of Sag Harbor CPF Water Quality Improvement Projects Plan (WQIPP) for the Village in 2016 and numerous stormwater management plans for Great Cove, Lake Montauk, and Shelter Island as well as green infrastructure BMP plans for the Village of Northport and Glen Cove. NP&V has also created a prioritized green infrastructure project list for all of Sag Harbor Village.

Rusty Schmidt (Landscape Ecologist). Mr. Schmidt is a landscape ecologist specializing in managing stormwater runoff in environmentally conscious ways. He has designed and constructed hundreds of alternative stormwater projects for habitat restorations, rain gardens, bio-infiltration swales, bio-retention basins and stormwater ponds. His projects range from small backyard rain gardens to large projects on commercial and municipal properties. His expertise is in integrating

naturalized ecology or systems into modern human places and lifestyles. Mr. Schmidt has a B.S. in Biology and Chemistry and a B.A. in Art from the University of Minnesota at Duluth and co-authored the *Blue Thumb Guide to Raingardens*.

Mr. Schmidt trains homeowners and design professionals on raingardens techniques nationwide. He has assisted raingarden initiatives such as the "10,000 Rain Garden Initiative" in Kansas City and the MetroBlooms and BlueThumb Programs in Minnesota. He has co-authored two other books on plant selections for stormwater management, "Plants for Stormwater Design; Volumes 1 and 2." In addition, he has created a green infrastructure BMP plan for the Village of Glen Cove, Sub-watershed assessments for the Village of Northport, and for areas around numerous lakes and watersheds within Washington County in MN prior to moving to Long Island.

Chris Voorhis, is a Project Engineer in the Nelson & Pope Site Engineering Department. Mr. Voorhis' responsibilities include the design of multi-family, single-family, commercial, industrial and waterfront site development projects for private and municipal clients. Mr. Voorhis is responsible for overseeing draftsmen and working with other project engineers and managers. Typical assignments include grading and drainage plans, utility plans, road an drainage profiles, sewer plans and profiles, sediment and erosion control plans, details and notes; design of stormwater collection systems; design and computer modeling of stormwater detention ponds; design of waterfront structures and stabilization; preparation of slope analysis and cut/fill analysis; preparation of stormwater pollution prevention plans (SWPPP); preparation of construction cost estimates; preparation of project specifications and bid packages; attendance at project meetings and regulatory agency inspections.

8: Required Certifications:

The proposed projects are not otherwise required by Local, State, or Federal Law. The intended benefits of the proposed projects cannot be achieved by the Village of Sag Harbor without external funding.

The Village passed Board Resolution Number 6, authorizing the Village to support and request inclusion in the Town of East Hampton and Town of Southampton CPF Water Quality Improvement Plans in July 2016 **(SEE APPENDIX E)**. In August of 2016 the Village approved a Resolution for NP&V to submit an application to the Towns of East Hampton and Southampton for CPF programs for water quality improvement projects funding.

9: Maintenance, Monitoring and Evaluation:

A Village of Sag Harbor operation, maintenance, and monitoring plan has been developed for the proposed projects. Some of the projects will have simple observation monitoring and/or will utilize time lapse cameras to observe the speed of infiltration and growth of the gardens. Other projects where easy long-term monitoring can occur, such as near a stormwater catch basin, monitoring the quantity and quality of the water entering the basin prior to installation and after installation will

provide data that indicate how effective the project is in protecting the waterbody. In addition, the Village of Sag Harbor has hired Dr. Christopher Gobler of Stony Brook University to monitor the nutrient load within Sag Harbor's waterbodies. The Village has contracted Dr. Gobler to provide ongoing water quality monitoring on all of the waterbodies within the Village, including 5 sites for continuous water monitoring. The Village will continue to utilize his data as a baseline prior to green infrastructure installation and outcomes after installation.

10: Educational Component:

As part of the project design, educational signage will be installed (see figure below for an example) that will show the benefit of the project and provide a description of how such projects can be replicated by property owners elsewhere. Signage may also include details on exactly how much nitrogen is being captured by Sag Harbor's green infrastructure projects annually where appropriate.

When the project is complete, a report on its effectiveness will be prepared, which will provide helpful lessons learned for future projects.

APPENDIX B:

SPREAD SHEET: PROPOSED SAG HARBOR GREEN INFRASTRUCTURE PROJECTS

Village of Sag Harbor - Recommended Water Quality Improvement Projects

Project #	Location	Ownership	BMP Type	Impervious Treatment Area (SF)	Size Required - 1" Rain (CF)	Size Required - 1.5" Rain (CF)	Size of Practice (SF)	Volume Captured (CF)	TP (lbs/yr.)	TN (lbs/yr.)	TSS (lbs/yr.)	Bacteria (billion/ yr.)	Runoff (acre-feet/yr.)	Unit Price	Estimated Cost *	Ranking **
TOWN OF SOUTHAMPTON																
SH-1	ROW along Long Island Avenue	ROW of Village	ROW Raingardens	43,560	3,630	5,445	3,600	3,600	1.5	14.1	852	600	2.2	$12/SF	$43,200	$3,063
SH-2	Spring Street wetland	Village	Stormwater Wetland	22,651	1,887	2,831	2,800	2,800	0.8	7.3	442	312	1.2	$12/SF	$33,600	$4,602
SH-3	Median of Main Street downtown	ROW of Village	Bioretention	38,332	3,194	4,791	3,000	3,000	1.4	12.4	750	529	2.0	$15/SF	$45,000	$3,629
SH-4	Parking lot at Meadow Street and Nassau Street	Village	Bioretention and Pervious Pavement	21,780	1,815	2,722	3,000	6,000	0.8	7.1	425	300	1.1	$20/SF	$60,000	$8,450
SH-5	ROW along Glover Street	ROW of Village	ROW Raingardens	78,400	6,533	9,800	6,500	6,500	2.8	25.3	1,532	1,080	4.0	$12/SF	$78,000	$3,083
SH-6	FD property along Columbia Street	Village	Bioretention and Pervious Pavement	36,154	3,012	4,519	3,900	5,850	1.2	11.7	706	498	1.8	$20/SF	$78,000	$6,666
SH-7	Green Street Road-end	ROW of Village	Road-end Filtration	7,840	1,270	1,905	3,000	3,000	0.0	2.5	153	108	0.4	$10/SF	$30,000	$12,000
SH-8	Wharf Street	Village	Bioretention and Tree Trench	15,246	1,270	1,905	1,200	1,800	0.6	4.9	298	210	0.8	$20/SF	$24,000	$4,897
SH-9	W. Water Street	Village	Bioretention and Tree Trench	20,473	1,706	2,560	1,700	2,550	0.7	6.6	400	282	1.0	$20/SF	$34,000	$5,151
SH-10	Parking lot at Division Street and Washington St.	Village	Bioretention and Tree Trench	7,840	653	980	700	1,050	0.3	2.5	153	108	0.4	$20/SF	$14,000	$5,600
SH-11	Cove Road road-end	Village	Raingarden and Road-end Filtration	20,475	1,706	2,560	1,700	1,700	0.8	7.5	401	282	1.0	$15/SF	$25,500	$3,400
SH-12	Amherst Road road-end	Village	Raingarden and Road-end Filtration	26,571	2,214	3,321	2,250	2,250	1.0	8.6	519	366	1.3	$15/SF	$33,750	$3,924
SH-13	John Street road-end	Village	Road-end Filtration	12,196	1,016	1,524	1,260	1,260	0.2	2.4	141	96	0.4	$10/SF	$12,600	$5,250
SH-14	Oakland Avenue and White Street road-end	ROW of Village	Raingarden and Road-end Filtration	39,204	3,267	4,900	2,860	2,860	1.4	12.5	745	520	2.0	$15/SF	$42,900	$3,432
SH-15	Joels Lane	ROW of Village and Village Property	ROW Raingardens	41,382	3,448	5,172	4,100	4,100	1.4	12.6	766	541	2.0	$15/SF	$61,500	$4,880
SH-16	Archibald Way	ROW of Village	ROW Raingardens	33,976	2,831	4,247	3,360	3,360	1.2	10.9	664	469	1.7	$15/SF	$50,400	$4,623
SH-17	Middle Line Highway	ROW of Village	Raingarden and Road-end Filtration	10,600	883	1,325	1,280	1,280	0.4	3.5	212	151	0.6	$15/SF	$19,200	$5,485
TOTAL									16.5	152.4	9159.0	6452.0	23.9		$685,650	

Note: * The cost figures are for preliminary budgetary purposes only. Costs may be more or less depending on the bidding process and local factors. Costs may be reduced through use of in-kind services, if available.

** cost per pound of Nitrogen removed annually. (Cost/TN)

APPENDIX C:

PROPOSED PROJECT MAPS

N

EH-1 - EH-6
EH-7
EH-7 & EH-9
EH-10
EH-8
SH-8
SH-3, SH-4, & SH-10
SH-1 & SH-9
SH-2
SH-11
SH-5
SH-5 & SH-7
SH-14
SH-12
SH-13
SH-6
SH-15
SH-16

Legend

Improvement

- Bioretention
- Pervious Pavement
- Raingarden
- Road-end Filtration
- Stormwater Wetland
- Tree Trench
- ROW Raingardens Selected
- Sag Harbor Village
- Federal Non Recreation
- Village Owned Parcels
- NYSDEC Freshwater Wetlands

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

RECOMMENDED WATER QUALTY IMPROVEMENTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 700 feet

VILLAGE OF SAG HARBOR

LEGEND:

- TREE TRENCH/BOX (SH-9)
- BIORETENTION (SH-9)
- ROW RAINGARDENS (SH-1)
- 1' CONTOUR
- 5' CONTOUR
- CATCH BASIN
- TREATMENT AREA

SH-1 TREATMENT:
3,630 SF OF RAIN GARDEN WILL CAPTURE THE 1" RAIN EVENT

RAIN GARDENS PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 21.5 LBS/YEAR
TN = 14.1 LBS/YEAR
TSS = 852 LBS/YEAR
BACTERIA = 600 BILLION/YEAR

SH-9 TREATMENT:
1,706 SF OF BIORETENTION AND TREE TRENCHES WILL CAPTURE THE 1" RAIN EVENT

RAIN GARDENS PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 0.7 LBS/YEAR
TN = 6.6 LBS/YEAR
TSS = 400 LBS/YEAR
BACTERIA = 282 BILLION/YEAR

SH-010
SH-012
SH-011
SH-9
SH-9
SH-1
SH-1
WEST WATER STREET
LONG ISLAND AVENUE
HOWARD STREET
GARDEN STREET

PROJECTS: SH 1 & SH 9
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

Long Island Avenue
& W. Water Street

VILLAGE OF SAG HARBOR

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

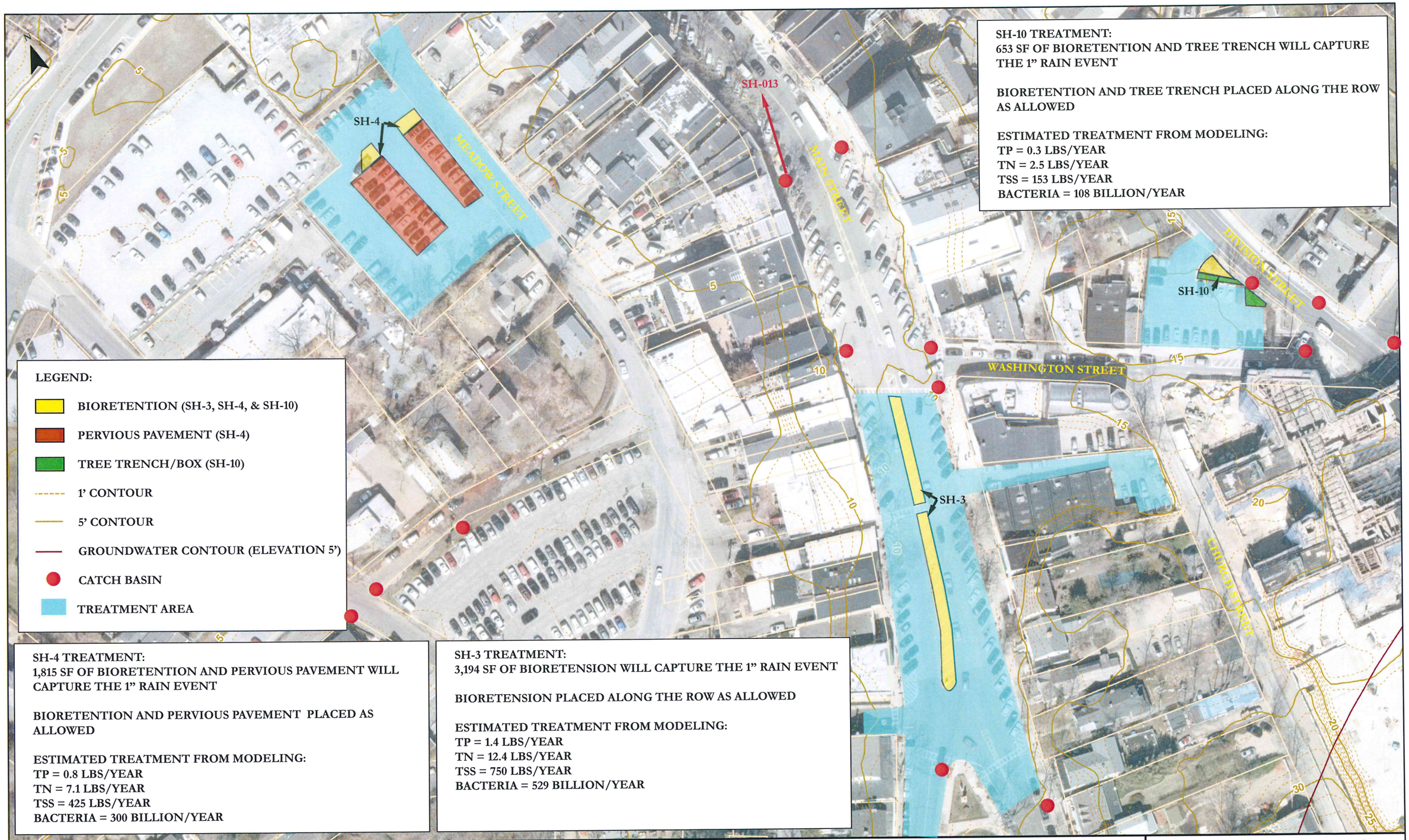
NELSON POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 2
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

Spring Street Wetland

VILLAGE OF SAG HARBOR



LEGEND:

- BIORETENTION (SH-3, SH-4, & SH-10)
- PERVIOUS PAVEMENT (SH-4)
- TREE TRENCH/BOX (SH-10)
- 1' CONTOUR
- 5' CONTOUR
- GROUNDWATER CONTOUR (ELEVATION 5')
- CATCH BASIN
- TREATMENT AREA

SH-10 TREATMENT:
653 SF OF BIORETENTION AND TREE TRENCH WILL CAPTURE THE 1" RAIN EVENT

BIORETENTION AND TREE TRENCH PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 0.3 LBS/YEAR
TN = 2.5 LBS/YEAR
TSS = 153 LBS/YEAR
BACTERIA = 108 BILLION/YEAR

SH-4 TREATMENT:
1,815 SF OF BIORETENTION AND PERVIOUS PAVEMENT WILL CAPTURE THE 1" RAIN EVENT

BIORETENTION AND PERVIOUS PAVEMENT PLACED AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 0.8 LBS/YEAR
TN = 7.1 LBS/YEAR
TSS = 425 LBS/YEAR
BACTERIA = 300 BILLION/YEAR

SH-3 TREATMENT:
3,194 SF OF BIORETENSION WILL CAPTURE THE 1" RAIN EVENT

BIORETENSION PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 1.4 LBS/YEAR
TN = 12.4 LBS/YEAR
TSS = 750 LBS/YEAR
BACTERIA = 529 BILLION/YEAR

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 3, SH 4, & SH 10
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

Downtown Sag Harbor

VILLAGE OF SAG HARBOR

LEGEND:

- ROW RAINGARDENS (SH-5)
- 1' CONTOUR
- 5' CONTOUR
- CATCH BASIN
- TREATMENT AREA

SH-5 TREATMENT:
6,533 SF OF RAIN GARDEN WILL CAPTURE THE 1" RAIN EVENT

RAIN GARDENS PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 2.8 LBS/YEAR
TN = 25.3 LBS/YEAR
TSS = 1,532 LBS/YEAR
BACTERIA = 1,080 BILLION/YEAR

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 5
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

Glover Street

VILLAGE OF SAG HARBOR

LEGEND:

- ROW RAINGARDENS (SH-5)
- ROAD-END FILTRATION (SH-7)
- 1' CONTOUR
- 5' CONTOUR
- CATCH BASIN
- TREATMENT AREA

SH-7 TREATMENT:
1,270 SF OF ROAD END FILTRATION WILL CAPTURE THE 1" RAIN EVENT

ROAD END FILTRATION PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 0.0 LBS/YEAR
TN = 2.5 LBS/YEAR
TSS = 153 LBS/YEAR
BACTERIA = 108 BILLION/YEAR

LONG ISLAND AVENUE
GLOVER STREET
GREEN STREET
SH-5
SH-5
SH-5
SH-7

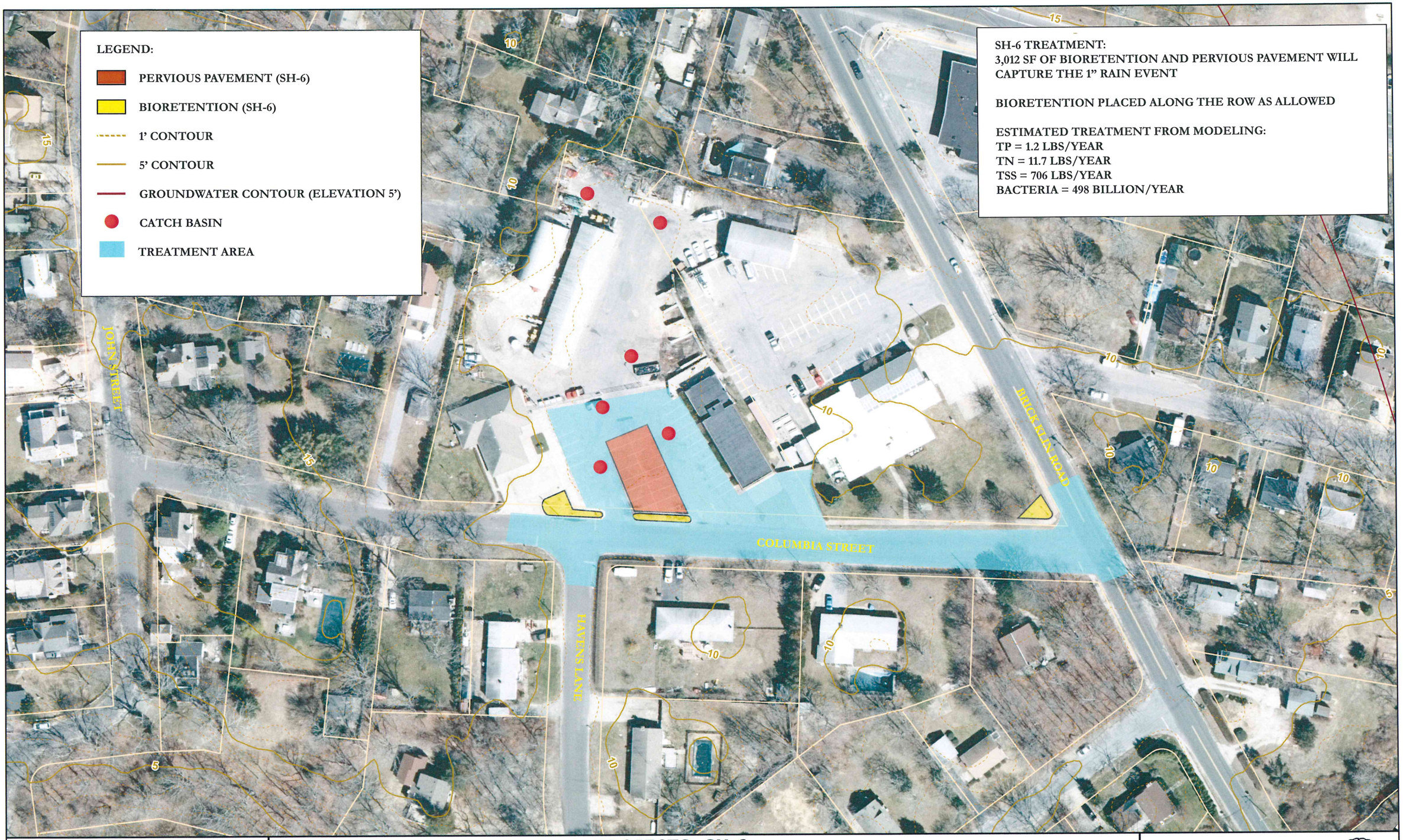
PROJECTS: SH 5A & SH 7
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

Glover Street & Green Street

VILLAGE OF SAG HARBOR

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING



NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 6
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

FD & DOT Yard @ Columbia Street

VILLAGE OF SAG HARBOR

N

LEGEND:

- BIORETENTION (SH-8)
- 1' CONTOUR
- 5' CONTOUR
- CATCH BASIN
- TREATMENT AREA

SH-8 TREATMENT:
1,270 SF OF BIORETENTION WILL CAPTURE THE 1" RAIN EVENT

BIORETENTION PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 0.6 LBS/YEAR
TN = 4.9 LBS/YEAR
TSS = 298 LBS/YEAR
BACTERIA = 210 BILLION/YEAR

WHARF STREET
BAY STREET
MAIN STREET
FERRY ROAD
WEST WATER STREET
5
10

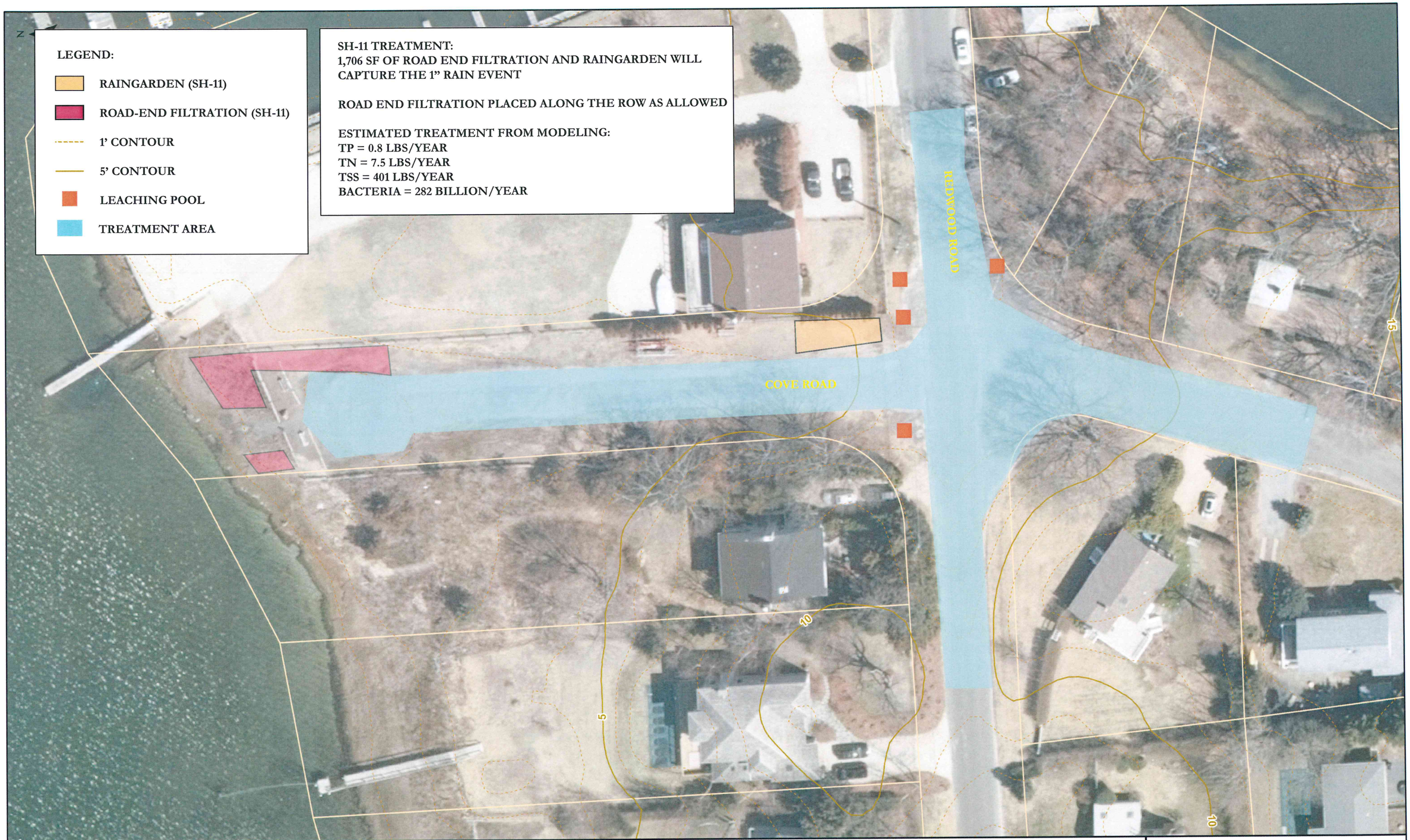
NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 8
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

Wharf Street

VILLAGE OF SAG HARBOR



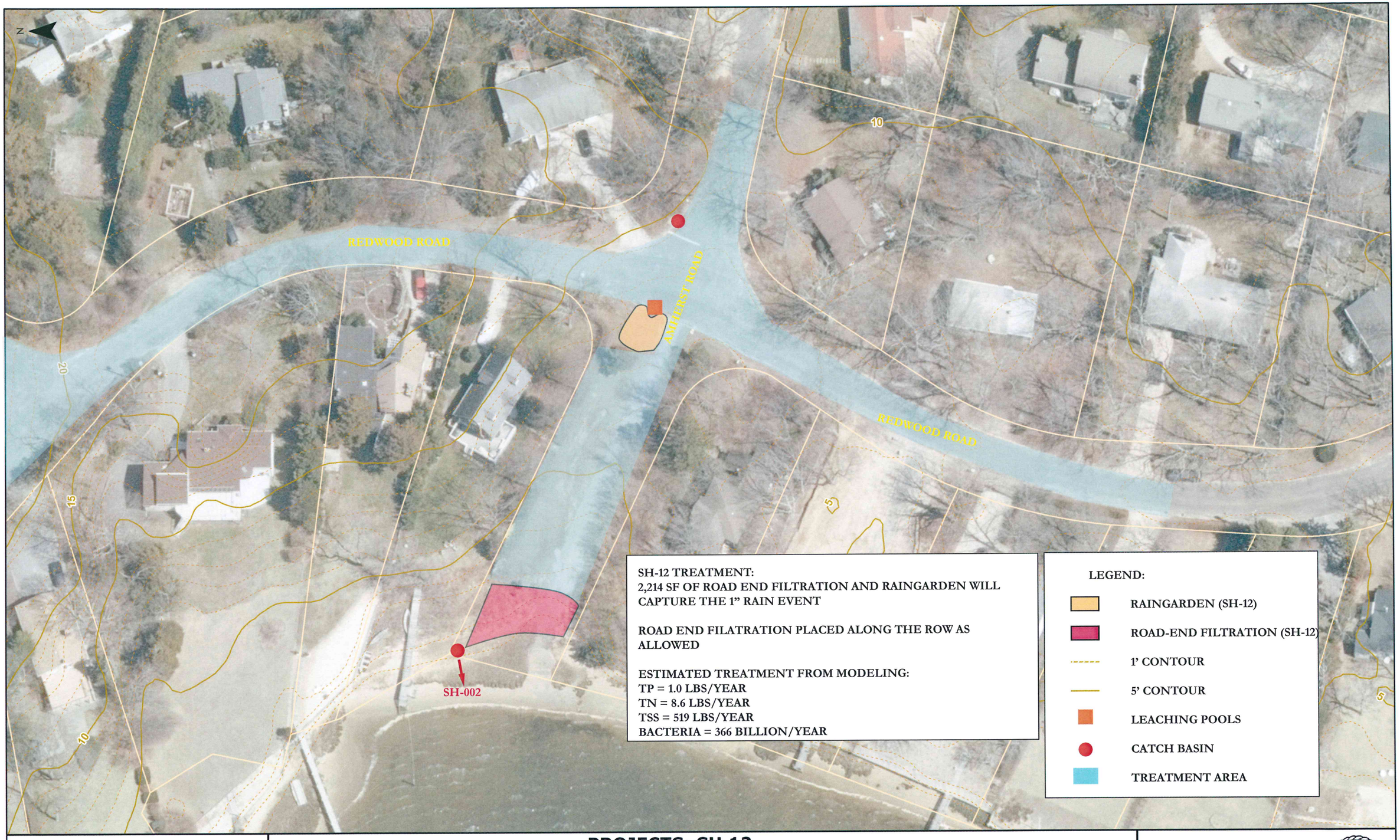
NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 11
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 40 feet

Cove Road Road-end

VILLAGE OF SAG HARBOR



NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 12
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 50 feet

Amherst Road Road-end

VILLAGE OF SAG HARBOR

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 13
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 40 feet

John Street Road-end

VILLAGE OF SAG HARBOR

LEGEND:

- BIORETENTION (SH-14)
- RAINGARDEN (SH-14)
- ROAD-END FILTRATION (SH-14)
- 1' CONTOUR
- 5' CONTOUR
- GROUNDWATER CONTOUR (ELEVATION 5')
- CATCH BASIN
- TREATMENT AREA

SH-14 TREATMENT:
3,267 SF OF ROAD END FILTRATION, RAINGARDENS AND BIORETENTIONS WILL CAPTURE THE 1" RAIN EVENT

ROAD END FILTRATIONS, BIORETENTION AND RAINGARDENS PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 1.4 LBS/YEAR
TN = 12.5 LBS/YEAR
TSS = 745 LBS/YEAR
BACTERIA = 520 BILLION/YEAR

PROJECTS: SH 14
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 80 feet

Oakland Avenue and White Street Road-end

VILLAGE OF SAG HARBOR

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

SH-15 TREATMENT:
3,448 SF OF RAINGARDENS WILL CAPTURE THE 1" RAIN EVENT

RAINGARDENS PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 1.4 LBS/YEAR
TN = 12.6 LBS/YEAR
TSS = 766 LBS/YEAR
BACTERIA = 541 BILLION/YEAR

LEGEND:

- RAINGARDENS (SH-15)
- 1' CONTOUR
- 5' CONTOUR
- CATCH BASIN
- LEACHING POOL
- TREATMENT AREA

NELSON POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 15
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 60 feet

Joels Lane

VILLAGE OF SAG HARBOR

LEGEND:

- RAINGARDENS (SH-16)
- 1' CONTOUR
- 5' CONTOUR
- CATCH BASIN
- TREATMENT AREA

SH-16 TREATMENT:
2,831 SF OF RAINGARDENS WILL CAPTURE THE 1" RAIN EVENT

RAINGARDENS PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 1.2 LBS/YEAR
TN = 10.9 LBS/YEAR
TSS = 664 LBS/YEAR
BACTERIA = 469 BILLION/YEAR

ARCHIBALD WAY

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 16
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 100 feet

Archibald Way

VILLAGE OF SAG HARBOR

N

LEGEND:

- RAINGARDENS (SH-17)
- 1' CONTOUR
- 5' CONTOUR
- CATCH BASIN
- TREATMENT AREA
- NATIVE REVEGITATION

SH-17 TREATMENT:
883 SF OF RAINGARDEN AND ROAD END FILTRATION WILL CAPTURE THE 1" RAIN EVENT

RAINGARDEN AND ROAD END FILTRATION PLACED ALONG THE ROW AS ALLOWED

ESTIMATED TREATMENT FROM MODELING:
TP = 0.4 LBS/YEAR
TN = 3.5 LBS/YEAR
TSS = 212LBS/YEAR
BACTERIA = 151 BILLION/YEAR

NELSON, POPE & VOORHIS, LLC
ENVIRONMENTAL • PLANNING • CONSULTING

PROJECTS: SH 17
CONCEPTUAL PROJECTS

Source: NYS Orthophotography, 2013; Topography from FEMA LiDAR, 2006
Scale: 1 inch = 50 feet

Middle Line Highway

VILLAGE OF SAG HARBOR

APPENDIX D:

SHORT ENVIRONMENTAL ASSESSMENT FORM (SEAF)

Short Environmental Assessment Form
Part 1 - Project Information

Instructions for Completing

Part 1 - Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 - Project and Sponsor Information

Name of Action or Project:
Green Infrastructure for Village of Sag Harbor

Project Location (describe, and attach a location map):
Multiple locations in Village of Sag Harbor. See Recommended Water Quality Improvements Map.

Brief Description of Proposed Action:
Funding is sought from the Town of Southampton Community Preservation Fund (CPF) for multiple green infrastructure water quality improvement projects that will utilize six different technologies throughout the Town of Southampton portion of the Village of Sag Harbor where there are direct drainage outfalls to Sag Harbor surface waterbodies. The proposed projects include: Bio-infiltration (Rain Garden), Bio-retention, Pervious Pavement, Tree Trenches, Road-end Filtration, and a Stormwater Wetland. All of the technologies will conform to the NYSDEC Stormwater Management Design Manual. Preliminary sites have been identified. Final sites to be selected. See attached proposed project locations map and supplemental project description information (See Appendix C).

Name of Applicant or Sponsor:	Telephone: 631 725 0222
Village of Sag Harbor	E-Mail: clerk@sagharborny.gov

Address:
55 Main Street, P.O. Box 660

City/PO:	State:	Zip Code:
Sag Harbor	NY	11963

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	☑	☐
2. Does the proposed action require a permit, approval or funding from any other governmental Agency? If Yes, list agency(s) name and permit or approval: NYSDEC and Town of Southampton wetlands permits may be required.	☐	☑

3.a. Total acreage of the site of the proposed action? _____ acres
b. Total acreage to be physically disturbed? _____ acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? _____acres
To be determined when final projects sites are selected.

4. Check all land uses that occur on, adjoining and near the proposed action.
☐ Urban ☐ Rural (non-agriculture) ☐ Industrial ☑ Commercial ☑ Residential (suburban)
☐ Forest ☐ Agriculture ☐ Aquatic ☐ Other (specify): Will vary by project location.
☐ Parkland

	NO	YES	N/A
5. Is the proposed action,			
a. A permitted use under the zoning regulations?	☐	☐	☑
b. Consistent with the adopted comprehensive plan?	☐	☐	☑

	NO	YES
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	☐	☑
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area?	NO	YES
If Yes, identify: Not all sites are are in or adjoin Critical Environmental Areas.Locations of projects to be determined. See Project Description above.	☐	☑
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☑	☐
b. Are public transportation service(s) available at or near the site of the proposed action?	☐	☑
c. Are any pedestrian accommodations or bicycle routes available on or near site of the proposed action?	☐	☑
9. Does the proposed action meet or exceed the state energy code requirements?	NO	YES
If the proposed action will exceed requirements, describe design features and technologies:	☐	☑
10. Will the proposed action connect to an existing public/private water supply?	NO	YES
If No, describe method for providing potable water:	☑	☐
This EAF Part 1 is for an application for funding to implement multiple green infrastructure water quality improvement projects in the Village of Sag Harbor. See Project Description above.		
11. Will the proposed action connect to existing wastewater utilities?	NO	YES
If No, describe method for providing wastewater treatment:	☑	☐
This EAF Part 1 is for funding to implement multiple green infrastructure water quality improvement projects in V Sag Harbor.		
12. a. Does the site contain a structure that is listed on either the State or National Register of Historic Places? Not all proposed sites contain State or National Register of Historic Places structures. To be determined when final sites are selected.	☐	☑
b. Is the proposed action located in an archeological sensitive area? Not all proposed sites are located in an archeological sensitive area.. To be determined when final sites are selected. See Project Description.	☐	☑
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	☐	☑
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody?	☑	☐
If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres:		
This EAF Part 1 is for an application for funding to implement multiple green infrastructure water quality improvement projects in the Village of Sag Harbor. Final sites to be selected. See Project Description above.		

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply:

☐ Shoreline ☐ Forest ☐ Agricultural/grasslands ☐ Early mid-successional

☐ Wetland ☐ Urban ☑ Suburban ** **To be determined when final sites are selected*.

	NO	YES
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?	☐	☑
16. Is the project site located in the 100 year flood plain?	NO	YES
Not all sites are within the 100 year flood plain. To be determined when final sites are selected.	☐	☑
17. Will the proposed action create storm water discharge, either from point or non-point sources?	NO	YES
If Yes, a. Will storm water discharges flow to adjacent properties? ☑ NO ☐ YES	☑	☐
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)? If Yes, briefly describe: ☐ NO ☑ YES		
This EAF Part 1 is for an application for funding to implement multiple green infrastructure water quality improvement projects in the Village of Sag Harbor. Final sites to be selected. See Project Description above.		

	NO	YES
18. Does the proposed action include construction or other activities that result in the impoundment of water or other liquids (e.g. retention pond, waste lagoon, dam)? If Yes, explain purpose and size: _____ Rain Gardens designed to improve water quality. This EAF Part 1 is for an application for funding to implement multiple green infrastructure water quality improvement projects in the Village of Sag Harbor. Final sites to be selected. See Project Description above.	☐	☑
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe: _____ This EAF Part 1 is for an application for funding to implement multiple green infrastructure water quality improvement projects in the Village of Sag Harbor. Final sites to be selected.See Project Description above.	☐	☐
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe: _____ This EAF Part 1 is for an application for funding to implement multiple green infrastructure water quality improvement projects in the Village of Sag Harbor. Final project sites to be selected. See Project Description above.	☐	☑

I AFFIRM THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: _____ Date: _____

Signature: _____

PRINT FORM

APPENDIX E:

LETTER OF SUPPORT, RESOLUTION #6, AND LETTER FROM VILLAGE

VILLAGE OF SAG HARBOR

Sandra Schroeder, Mayor
James L. Larocca, Trustee
Ken O'Donnell, Trustee
Beth M. Kamper, Village Clerk

PO Box 660
55 Main Street
Sag Harbor, NY 11963-0015
Tel: 631-725-0222 Fax: 631-725-0316

Robby Stein, Deputy Mayor
Edward Deyermond, Trustee
Eileen Tuohy, Village Treasurer
David J. Gilmartin, Jr., Village Attorney

RESOLUTION No. 6 – JULY 2016

INCORPORATED VILLAGE OF SAG HARBOR RESOLUTION AUTHORIZING THE VILLAGE TO SUPPORT AND REQUEST INCLUSION IN THE TOWN OF EAST HAMPTON AND TOWN OF SOUTHAMPTON CPF WATER QUALITY IMPROVEMENT PLANS

RESOLVED, that the Incorporated Village of Sag Harbor, hereby supports the Water Quality Improvement Plan for the Town of East Hampton and the Town of Southampton; and

BE IT FURTHER RESOLVED, that the Incorporated Village of Sag Harbor, hereby requests the Town of East Hampton and the Town of Southampton to include the Village jurisdiction within in each respective Town's Water Quality Improvement Plan.

Motion Made By: Trustee Larocca
Motion Seconded By: Deputy Mayor Stein

All in favor motion so carried.

Beth M. Kamper, Clerk-Administrator

July 25, 2016

VILLAGE OF SAG HARBOR

Sandra Schroeder, Mayor
James L. Larocca, Trustee
Ken O'Donnell, Trustee
Beth M. Kamper, Village Clerk

PO Box 660
55 Main Street
Sag Harbor, NY 11963-0015
Tel: 631-725-0222 Fax: 631-725-0316

Robby Stein, Deputy Mayor
Edward Deyermond, Trustee
Eileen Tuohy, Village Treasurer

August 4, 2016

COPY

Mr. Jay Schneiderman, Supervisor
Town of Southampton
116 Hampton Road
Southampton, New York 11968

Re: Community Preservation Fund - Water Quality Improvement Projects

Dear Supervisor Schneiderman:

The Village of Sag Harbor is pleased to support the Town of Southampton's efforts to extend the effective date of the Community Preservation Fund (CPF) and to authorize use of a portion of the fund for water quality improvement projects. Southampton water resources are central to the quality of life enjoyed by its residents and to the abundant opportunities for recreation and tourism that the community and its visitors value so highly.

Similarly committed to open space preservation and restoration of its groundwater and surface water resources, the Village of Sag Harbor applauds the Town's efforts to advance watershed management and healthy water quality. The Village's Stormwater Management Program, Wetland Permit Program, Local Waterfront Revitalization Plan (1986; amended in 2006), and Harbor Management Plan (1998) have been primary vehicles through which Sag Harbor coastal resources have been protected for over thirty years. Further, in 2015 the Village joined the Town of Southampton and other Town, County, Village, and State partners in formalizing the inter-municipal Peconic Estuary Protection Committee (PEPC) in order to leverage funds and technical resources in pursuit of effective water quality initiatives.

The Village of Sag Harbor has reviewed the Town of Southampton Water Quality Improvement Project Plan (WQIPP). The following comments are offered in the spirit of joining the Town in achievement of our shared water quality goals.

The Community Preservation Fund, if authorized by the November 2016 voter referendum, will be an important source of funding for wastewater treatment, nonpoint source pollution abatement and pollution prevention projects, all of which are needed to address Sag Harbor nitrogen and pathogens impairments, and to meet TMDL pollutant load reduction goals.

On July 25, 2016 the Village of Sag Harbor Board of Trustees adopted Resolution No. 6 to support the Town of Southampton CPF Water Quality Improvement Project Plan. Funding and implementation of wastewater and stormwater improvement projects in the Village of Sag Harbor can benefit water quality in

the waters of Southampton. Based on historic settlement patterns and existing infrastructure, much of the Village is developed on smaller lots (some of which are in high groundwater areas), and many parts of the Village are not sewered. Consequently, upgrades of sanitary systems and/or installation of new alternative systems once approved by Suffolk County Department of Health Services (SCDHS) would assist in reducing groundwater nitrogen that outflows to surrounding marine waters. Similarly, based on drainage patterns and road systems, there are many opportunities for stormwater improvement projects in the Village that would improve water quality.

The Village of Sag Harbor is appreciative that the Town of Southampton has included the Village in its mapping of CPF Water Quality Improvement Project Plan priority areas and that it has recognized Sag Harbor as a first level of priority stormwater target area.

The Village requests the opportunity to provide further information and to assist the Town with its water resource protection efforts in the Southampton portion (west of Division Street) of Sag Harbor. Development of a Village of Sag Harbor Water Quality Improvement Project Plan (WQIPP) has been initiated. This plan will include mapping of high groundwater, sewered and unsewered areas and lot sizes to assess water quality improvement potential and benefits. The plan will include a full assessment of water quality related conditions in the Village and priority areas for CPF water quality improvement projects will be identified.

We look forward to working with the Town of Southampton on Community Preservation Fund water quality protection and restoration initiatives. Please let me know if you would like additional information at this time.

Sincerely,

Sandra Schroeder

Sandra Schroeder
Mayor

Cc: Harbor Committee
Charles J. Voorhis, CEP, AICP, Planning & Environmental Consultant

APPENDIX F:

EXISTING CONDITIONS PHOTOS

Many catchbasins throughout the Village need cleaning and have opportunities to add a raingarden around it to eliminate first flush of water.

Village parking and property along the harbor are prone to flooding. Opportunities to install pervious pavement, raingardens, and tree trenches will improve volume and water quality in the bay.

Along frequently flooding streets like Long Island Avenue, many opportunities are available for ROW raingardens and tree trenches.

At the numerous road-ends throughout the village, consider a raingarden behind the catchbasin in the foreground to capture water before entering the basin and a filter strip along the road-end to filter and clean any water directly discharging to the bay.

Habitat improvements as well as filtration strips are opportunities at road-ends.

Not many recharge basins are available, however modifications to improve the basins are available to reduce flooding in key portions of the Village.

APPENDIX G:

MAINTENANCE CHECKLIST

Volume Control Facilities Maintenance Checklist

VOLUME CONTROL PRACTICE
Routine Maintenance Activity (Interval)

BIORETENTION/RAINGARDEN

- ☐ **Check for Standing Water (Monthly)**
  Ponding longer than 24-48 hours indicates a problem and non-routine maintenance or repairs are needed
- ☐ **Litter and debris Removal (Monthly)**
  Practice and contributing drainage area clean of litter and vegetative debris
- ☐ **Weed Removal (Monthly)**
  Undesirable vegetation removed
  No evidence of erosion
  Interval may be extended after vegetation established
- ☐ **In/Outlet Maintenance (Annual, Major Storms)**
  Water is able to enter and leave facility
  No evidence of sediment buildup or erosion
  Sumps should not be more than 50% full of sediment
  Underdrain(s) functioning properly
- ☐ **Sediment Removal (Annual)**
  Pretreatment areas and practice clean of sediments
  Winter sand removed in spring
- ☐ **Mulch Replacement (Annual)**
  Add mulch to obtain 3" depth until vegetation is established
- ☐ **Plant Replacement (Annual)**
  Remove dead or dying plants
  Replace with appropriate species

VEGETATED FILTER/GRASSED SWALE

- ☐ **Litter and Debris Removal (Monthly)**
  Contributing drainage areas clean of litter and vegetative debris
  No dumping of yard wastes into practice
  Practice clean of litter and vegetative debris
- ☐ **Mowing and Weed Removal (Monthly)**
  Mowing to maintain a minimum of 6" depth
  Undesirable vegetation removed
  Reseed as needed
  Weeding interval may be extended after vegetation established
- ☐ **Inlet Maintenance (Annual, Major Storms)**
  Water is able to enter facility
  No evidence of sediment buildup
  No evidence of erosion at toe of drop structure
- ☐ **Sediment Removal (Annual)**
  No evidence of erosion within the practice
  Practice clean of sediments
  Winter sand removed in spring
- ☐ **Aeration (Every 2-3 Years)**
  Dethatch and aerate compacted grass areas

PERVIOUS PAVEMENT

- ☐ **Check for Standing Water (Major Storms)**
  Ponding longer than a few hours indicates a problem and non-routine maintenance or repairs are needed
- ☐ **Sediment and debris Removal (Monthly)**
  Ensure that paving area is clean of debris
  Ensure that the area is clean of sediments
  Ensure upland and adjacent areas are stabilized
- ☐ **Sweeping (Every Three-Six Months)**
  Vacuum sweep to keep the surface free of sediment
  Replace pore chips as needed (interlocking concrete block pavers)
- ☐ **Repairs (Annual)**
  Inspect the surface for deterioration or spalling, repair as needed

TREE TRENCH AND BELOW GRADE INFILTRATION

- ☐ **Check for Standing Water (Major Storms)**
  Ponding longer than 48 hours indicates a problem and non-routine maintenance or repairs are needed
- ☐ **Litter and Debris Removal (Major Storms)**
  Trash and debris removal from pretreatment, inlet, and outlet structures
  Practice clean of litter and vegetative debris
- ☐ **Weed Removal (Monthly)**
  Undesirable vegetation removed
  No evidence of erosion
  Interval may be extended after vegetation established
- ☐ **In/Outlet Maint. (Annual, Major Storms)**
  Water is able to enter and leave facility
  No evidence of sediment buildup or erosion
  Sumps should not be more than 50% full of sediment
  Underdrain(s) functioning properly
- ☐ **Sediment Removal (Annual)**
  No evidence of erosion within the practice
  Practice clean of sediments
  Winter sand removed in spring
- ☐ **Check Structural Components (Annual)**
  Clean or fix structural components as needed