2023 Town of Southampton CPF WQIP Grant Application
Nitrogen Reducing Woodchip Biofilter Polishing Units in Commercial I/A OWTS's

Project Narrative

PROPJECT TITLE
Nitrogen Reducing Woodchip Biofilter Polishing Units in Commercial I/A OWTS's

PROJECT SUMMARY
Innovative and onsite wastewater treatment systems (I/A OWTS) are helping to improve water quality across the Town of Southampton. Still, the Suffolk County standard for I/A OWTS effluent of 19 mg N/L is two orders of magnitude higher than the levels of N found in most Southampton surface waters. The NYS Center for Clean Water Technology (CCWT) has developed a denitrifying woodchip biofilter that is capable of being added to any commercial I/A OWTS and reducing nitrate levels from these systems to 3-4 mg-N/L, greatly improving system performance and better protecting Southampton's most precious natural resource, its water. This project will install eight denitrifying woodchip biofilter polishing units at eight locations, coupling the woodchip bio filters with new commercial I/A OWTS's, selected from leading OWTS vendors, such as Hydro-Action, Fuji Clean, Septi-Tech, and Orenco. All sites will be within Southampton High Priority watershed areas and meet all WQIP Eligibility requirements except they will include some residential as well as NGO, and/or municipal facilities. The woodchip biofilter polishing units will be installed together with the IA OWTS to minimize total installation costs. CCWT will work with local engineers that design I/A OWTS's in Southampton to identify the specific sites. All of the installations will be within High Priority watershed areas, have owners' written consent, be fully permitted, be designed by qualified local engineers, be installed by licensed contractors, and meet all other mandatory requirements for CPF WQIP funding. Projects will be shovel ready by the time the Town completes the contract process and will be completed within the Town's CPF WQIP timing requirements. CCWT will measure the water quality (i.e. ammonium, nitrate, nitrite, TKN and NH4+ DO and pH) before and after the woodchip biofilter polishing unit over three years. Data in final effluent samples from installations of four main IA OWTS (Hydro-Action, Fuji Clean, Septi-tech, Orenco recently FOILED from SC DHS showed nitrate was a large portion of OWTS effluent. Monitoring of installations of woodchip box biofilters coupled to various preliminary treatment technologies including sand beds and commercial I/A OWTS over the previous 1- 5+ years showed mean nitrate % removal of 84% (range 53- 96%), a rate which equates to 63 pounds of nitrogen removed per year at these 8 sites combined. Scenario analysis by NYS CCWT under various woodchip replacement assumptions and N removal rates show cost per pound nitrogen removed varies between $78 and 21 when amortized over 10 and 30 year periods, a range is comparable to costs of a Fuji Clean or Hydro-Action I/A systems.

1) **PROJECT TYPE**
Wastewater Treatment Improvement Project

2) **PRIORITY AREAS**
High

3) **PROJECT DESCRIPTION**
We propose to install woodchip biofilter polishing units at eight sites where new I/A OWTS's are being installed. We will work with leading engineers to identify feasible sites with a variety of vendors and a

variety of uses all located within the High Priority watershed areas. We will meet all WQIP mandatory eligibility requirements except that some of the recipients will be residential homeowners. The purpose of this demonstration is to show how decentralized OWTS's can outperform municipal treatment facilities and that requires demonstration in multiple residential sites. The I/A OWTS's into which we will be installing these polishing units will be paid for by the homeowner with subsidies from the Town, County and State SIP program.

3a) Existing conditions of applicable groundwater/sub-watershed/waterbody and includes most recent and relevant data available (provide sources).
The existing conditions in each of the High Priority watershed areas are described in the Suffolk County Sub Watershed Plan. All of the watersheds in the Southampton High Priority watershed areas suffer from eutrophication which is largely caused by excessive nitrogen delivered from septic systems.

The environmental significance of eutrophication caused by residential wastewater released from conventional septic systems has been well documented, most recently on the front page of the New York

Times (1/1/23). The Gobler lab of Stony Brook University has been monitoring water bodies in Southampton every year since 2013. During that time, multiple significant water quality impairments have been documented in every water body surrounded by a Water Protection District. This includes annual occurrences of blue-green algal blooms above the threshold level set by the NYS Department of Environmental Conservation leading to closure of the water body, levels of the blue-green algal toxin, microcystin above the threshold set for drinking water by the US EPA, , marine harmful algal blooms such as rust tides, and levels of dissolved oxygen below both the chronic and acute standards set by the NYSDEC (4.8 mg/L and 3.0 mg/L, respectively; Gobler et al., 2004, 2011). As such, these impairments are a threat to both aquatic life and public health. Stoichiometric and experimental observations indicate nitrogen plays an important role in promoting harmful algal blooms and thus also indirectly contributes to the low oxygen conditions. Hence, reducing wastewater derived nitrogen loads would contribute toward mitigating these impairments. Excessive nitrogen loading has also led to the degradation of salt marshes, which provides buffering against storm surges. High nitrogen levels lead to algal blooms. Adding our proposed woodchip box technology to commercial OWTS's reduces total nitrogen in residential wastewater from average Septic Tank Effluent levels of 60 to 80 mg/L to effluent levels of 6-8 mg/L.

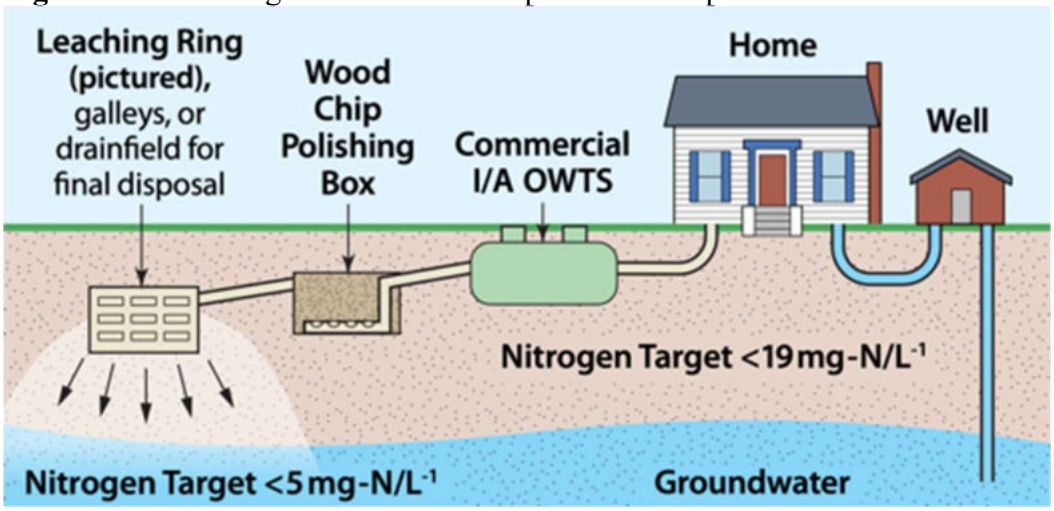
3b) How the proposed solution addresses the issue in the context of Reduction, Remediation and/or Restoration as per the CPF Water Quality Project Plan. Note all remediation and restoration projects must ensure that reduction measures are also addressed.
This project will reduce nitrogen flowing into High Priority watersheds by 1,886 lbs over the 30 year useful life at an average cost of $21.2/pound. Further widespread adoption of this approach in 25% of Southampton households would result in 145,060 pounds of nitrogen in nitrate removed.

3c) Describe the proposed technology and its demonstrated efficacy in similar settings. May include published data.

This project will demonstrate the nitrogen removal benefit of coupling denitrifying woodchip biofilters to commercially approved OWTS's (See Figure 1) at new installation sites. Most OWTS's approved for provisional or general use by SC DHS use aerators to nitrify ammonia in wastewater and, as a result, residual nitrogen in final effluent is substantially or predominantly in the form of nitrate, an oxidized form of nitrogen. The CCWT has installed and monitored samples from multiple woodchip biofilters coupled to a specific manufacturer's IA OWTS's and found near complete nitrate removal to concentrations 3-4 mg-N/L (Fig. 3). NYS CCWT has also tested woodchip biofilters coupled to simple nitrifying sand beds and found 78 to > 90%

removal rates of high nitrate concentrations (40- 60 mg-N/L) over multiyear periods. We have also collaborated with Drew Bennett and a local contractor to install woodchip biofilters coupled to OWTS's at two sites at Georgica Pond (Fig. 3). This proposal for a water treatment improvement project seeks funds ($123,619) to install and monitor woodchip biofilters at eight sites during installation of new OWTS's (the remainder of the OWTS and leaching system will be funded by others).

Fig. 1. Overall configuration of woodchip biofilter coupled to commercial OWTS.



Nitrate & nitrite concentrations in final effluent of IA OWTS. A review of IA OWTS effluent data by NYS CCWT found residual nitrogen in final effluent from four commercially approved systems was predominantly in the form of nitrate and nitrite ("NOx", Table 1). These systems use aerators to achieve nitrification of wastewater nitrogen and these aerators generally work well for this purpose. Over the periods reviewed, four IA OWTS showed mean NOx in final effluent of 9.2 mg-N L/L representing 58% of TN of 15.8 mg-N/L.

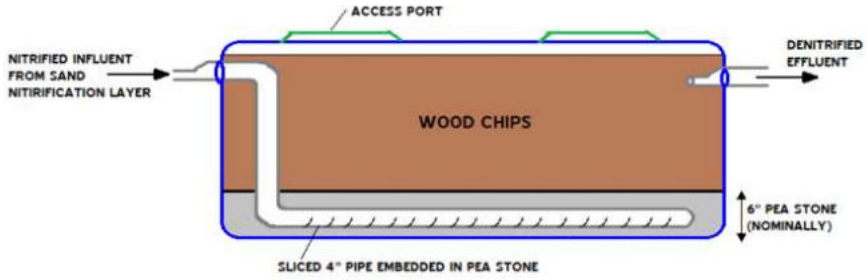
The greater challenge for complete nitrogen removal is achieving full denitrification and it is more difficult because the treatment is temperature dependent and must occur in an anoxic or suboxic environment and because, as a heterotrophic process, denitrification requires carbon which is almost always limited in residential wastewater. Residual nitrate can be further removed from IA OWTS effluent by supplying additional carbon in an anoxic environment. This process can be achieved by adding a denitrifying woodchip biofilter inserted in the effluent line between the IA unit and the final disposition unit (e.g. leaching ring or galleys) (Fig. 1).

Table 1. Results based on NYS CCWT calculations of data supplied by SC DHS for samples collected April 2017 to October 2021 (Fuji & Hydro Action) and in 2022 (Orenco AX & Septitech).

I/A Techology	Final Effluent TN mg-N/L	NOx in Final Effluent mg-N/L	NOx as % of effluent TN
Fuji CEN	16.6	7.5	45%
Hydro Action	13.4	8.9	66%
Orenco AX	15.1	8.2	58%
Septitech	18.1	11.1	64%
Mean (n=4)	15.8	9.2	58%

A woodchip biofilter works by gravity flow from an OWTS. Wastewater is piped to a 4" slotted pipe in pea stone on the bottom of a water-tight, precast concrete or off-the-shelf monolithic plastic tank and percolates up thru woodchips before exiting by gravity thru a T-shaped 4" PVC pipe near the top of the tank (Fig. 2). Residence time in the tank must be a minimum of 1.25 days and preferably 1.5 days. Woodchips do not necessarily need to be screened but should be free of dirt and debris (e.g., leaves) and uniform in a size range of 3/8- 2 ½" diameter.

Figure 2



(a)

(b)

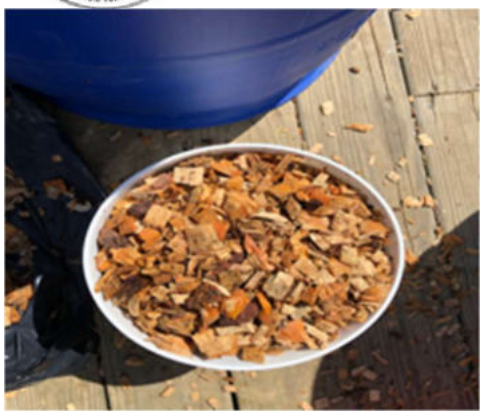
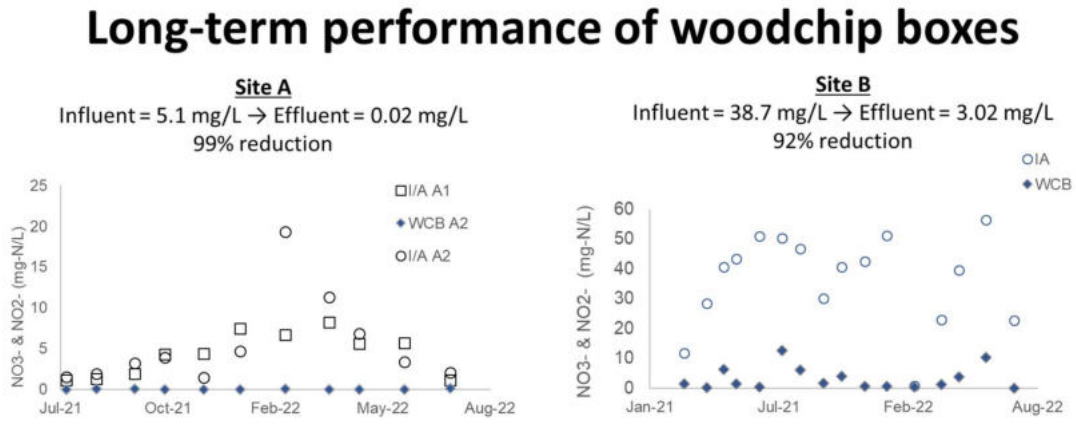
(c) 

Fig 2 (a) Schematic illustrating basic components of woodchip biofilter;
Fig 2 (b) Piping an off-the-shelf commercial plastic commercial septic tank to function as an upflow woodchip biofilter. A1,200 G tank can accommodate ~ 1,100 G of woodchips which is sufficient to treat 440 G of wastewater daily.
Fig 2 (c) Woodchips after screening. Woodchips should be free of debris (e.g., leaves) and uniform in size range from 3/8- 2 ½" diameter.

N removal capacity of woodchip biofilters

CCWT collaborated with a homeowner on Georgica Pond to install woodchip biofilters at two sites in 2020. Nitrate/nitrite ("NOx") removal performance of these systems is summarized in Fig. 3. In Site (A), the OWTS was working well and the woodchip biofilter further reduced residual nitrate/nitrite by ~ 50% and, in the second Site (B), the OWTS wasn't working well and the WCB reduced nitrate/nitrite by 90% so TN still passed the Article 19 standard. These coupled systems have been in operation for several years now.

Figure 3



CCWT has also installed woodchip biofilters coupled to sand beds without an OWTS. These systems rely on the percolation of wastewater thru the sand bed to achieve nitrification and the woodchip biofilter for denitrification. Three of these designs installed at residences in Suffolk County have achieved removal of nitrate from sand bed percolate of 83% over 3.75 years, 91% over 3 years and 96% over ¾ year. Other investigators have installed proprietary biofilters

(e.g.the commercial Nitrex system) and reported NOx removal rates of >87- 98% over multiple years (Robertson et al. 2005).

3d) 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).

Suffolk County has wisely decided to replace conventional septic systems near priority watersheds. This 150 year old technology is clearly inadequate for treating increasingly complex wastewater streams in increasingly congested development. The alternatives would be to:

- install decentralized I/A OWTSs in thousands of households over the next 20 years at a typical cost of $25-30,000/home,
- install sewers and build new centralized treatment plants which would typically cost more than $100,000 dollars per home and treat the wastewater to a standard of 10 mg/L for TN,
- do nothing and continue to devastate the water bodies that sustain this town in many ways.

Source: MASS DEC, Recently Promulgated Amendments, https://www.mass.gov/regulations/310-CMR-15000-septic-systems-title-5#strategy-for-nitrogen-impaired-estuaries

Suffolk County plans to install over 200,000 decentralized I/A OWTS's which are currently only designed to meet a 19 mg/L limit for Total Nitrogen ("TN"). These systems could and should be doing much better than that. Several commercial vendors are completing pilot demonstrations and typically averaging 15.8 mg-N/L residual TN in their final effluent. When we analyze that final effluent, we typically find close to 60% of the residual TN is in the form of nitrate. By adding a woodchip biofilter to those systems, we can denitrify the nitrate and reduce it to 3 mg-N L^{-1} or lower.

As Suffolk County leads most other jurisdictions in the country in the adoption of decentralized I/A OWTS's, this project would also have a significant impact on decentralized treatment standards in many other jurisdictions. There are 26 million households in the US, representing 24% of the population, that use conventional septic systems. (Source: pg xiv, OWTS Manual, Feb '02, Office of Water, Office of Research and Development, USEPA). So, this project could be very relevant to a very big problem. CCWT aggressively publishes and distributes its work through social media and the Town of Southampton could receive significant positive nationwide publicity for this project, which just might inspire other communities to adopt CPF WQIP funding programs.

4. WATER QUALITY BENEFIT

4a. Identify Nitrogen, Pathogen or Pollutant of Concern (POC) including Existing Condition and Target Reduction

The project's impact on water quality in the Town of Southampton will derive from demonstration of the capacity of woodchip biofilters to remove incremental residual nitrate/nitrite in OWTS effluent. While CCWT's project at Georgica Pond demonstrated the benefits of coupling denitrifying woodchip biofilters with one manufacturer's OWTS, this project seeks to demonstrate this N removal capacity on a wider scale by using multiple commercial manufacturer's IA systems. The initial results of the project should be available after 12 months of operation of the installed base of eight coupled systems. These findings can then inform Town and Suffolk County DHS policy on use of biofilters for enhanced nitrogen removal in Southampton. Eight sites would remove 7.9 pounds/year each, or 63.2 pounds N/year, in

total.

The table below describes projected outcomes in terms of nitrogen removed by woodchip biofilters from septic systems in Southampton High Priority watershed areas over a thirty-year period under the assumption that 100 OWTS's are installed each year and eventually, woodchip biofilters would be installed in 25% of those sites. The results show an incremental 145,060 lbs of N removed by 750 woodchip biofilters (25 polishing units installed per year for 30 years) over the 30-year period. Costs per pound of nitrogen removed would average $21.2/pound amortized over 30 years. These costs are roughly equivalent to the $26.0/pound of nitrogen removed by the OWTS's without the woodchip biofilter when amortized over 30 years.

Price/Performance Comparison with the Leading Commercial OWTS's

WOODCHIP BIOFILTER PERFORMANCE & COST	CASE 1 - Replace Woodchips every 10 years	CASE 2 - Replace Woodchips every 30 years		Fuji or Hydro-Action $/lbs N 30 yr	
NOx- in IA effluent (mg/L)	9.2	9.2		$ 30,000	initial cost
Average WCB removal (1-5 yrs)	84%	84%		$ 400	annual service
Average WCB removal (5+ yrs)	55%	84%		$ 5,000	repairs
est. wastewater volume 4 bedroom house (G/d)	330	330		$ 47,000	30 year cost
est. wastewater volume 4 bedroom house (L/d)	1,249	1,249			
annual lbs NOx- removed/house (1-5 yrs)	7.8	7.8		75	influent (mg-N/L)
annual lbs NOx- removed/house (5+ yrs)	5.1	7.8		15	effluent (mg- N/L)
cumulative lbs Nox- removed 10 yrs	64.3	77.7		60	N removed (mg-N/L)
cumulative lbs Nox- removed 30 yrs	192.8	233.0			
				330	G/d
8 HOUSES:				1,249	L/d
cumulative incremental N removal 10 year period	514	621			
cumulative incremental N removal 30 year period	1,542	1,864		60	N removed (lbs-N/yr)
				1,809	N removed 30 years
cost of WCB installation	$ 5,000	$ 5,000		$ 26	cost/lbs-N
cost per lbs N removed per house (10 years)	$ 78	$ 64			
cost of woodchip replacement every 10 years	$ 5,000	$ -		603	N removed 10 years
cost per lbs N removed per house (30 years)	$ 78	$ 21		$ 78	cost/lbs-N
Source: NYS CCWT					

4b. Describe plans for collecting and reporting on water quality over time.
CCWT is committing to $106,077 of services to monitor these eight sites for three years – at an average cost of $11,815/site in monitoring and project management services (see calculation below).

CCWT monitors wastewater analytes in the final effluent of all systems it installs and reports results to the public broadly including to SC DHS, NYS DEC and as part of design-based articles in engineering journals. Wastewater analytes will include Total Kjeldahl Nitrogen, ammonium, nitrate/nitrite, DO, pH, and temperature (final effluent and air), which will be measured on site. The Center has over four years' experience collecting and measuring these analytes; its labs are certified by the NYS Environmental Laboratory Assessment Program (ELAP) for these analytes.

4c. Indicate Useful Life of the proposed technology (must meet or exceed five years).
Woodchip biofilters tested for > six years at MASSTC continue to remove nitrate. These results support analyses at Waterloo University which show woodchip biofilters continue to remove nitrogen over a 15year period. Nitrex systems have been operating effectively for well over 5 years. The scenario analysis above shows N removal and associated costs over 30 years under two different scenarios: case 1 where woodchips are replaced every 10 years and N removal rates in second 5 year of each 10 year intervals is 2/3 rd of the rate in the first five years ($78 cost per lbs removed) and case 2 where no replacement is necessary over 30 years ($21 cost per lbs removed).

5. COST FACTORS

5a. Explain how you have confirmed that the proposed budget is reasonable, appropriate and necessary. If available, provide third party estimates of other documentation of how costs were determined.
CCWT has installed over 20 nitrogen reducing biofilters and several woodchip biofilter as polishing units in particular. The details of the budget are provided below. We have requested $9,750 per unit (excluding the monitoring). CCWT will work with the relevant engineer to help design the OWTS installation incorporating the woodchip box. As we have done in the past, they will put a separate detail and specifications in the bid drawings and the associated cost item in the bid package. The contractor will submit an invoice for that line item to CCWT and CCWT will pay the contractor for that cost item and submit invoices for reimbursement out of the proposed funds from this application. Funds will flow from the Town to CCWT to the contractor or engineer. We spoke to two of the leading engineers in Southampton about the incremental engineering they will need to do. We will be providing each of them with guidance documents and specifications for the polishing units. We also spoke to Nugent and Potter about the cost of tanks and delivery. Frank Russo, PE has over 46 years of experience in this field and he reviewed the budget. Over half of the budget is for post installation monitoring. We have requested funds for about half of that to cover hard costs associated with laboratory analysis. Otherwise, we are contributing all of our labor at no cost. The details of the Match are below.

5b. Describe any matching funds to be provided.

Please see detailed estimate on page 14. CCWT proposes to spend $106,077 to manage this project and monitor and analyze monthly samples from these systems for three years.

- Of this, $60,458 is soft costs (labor) for technicians to go into the field and take the samples, lab analysts to measure the nitrogen analytes, senior analytical chemist to oversee the lab work to evaluate the data, project management to coordinate the site development, engineering, installation, contracting, and administrative overhead of 10%. We are not asking the CPF to pay for any of that.
- We are asking for CPF WQIP grant to reimburse us for $45,619 of hard cost analytical lab work to determine the nitrogen concentrations in those samples. Those hard costs are listed in the university's standard lab analyis price list, are less than commercial labs would charge, and are ELAP test quality certified.

5c. Explain: i. Why project cannot proceed and intended benefits cannot be achieved without external funding. ii. If funds are awarded at a lower level than requested, or if there are cost overruns, explain how the project will proceed.

In order for this demonstration to be statistically significant, we need to look at multiple sites. We have budgeted eight sites so that we can monitor performance in at least two sites for each of the four leading systems. It is important to show that this approach works across many sites for many vendors. This is a major commitment of our resources in a demonstration project that could impact millions of I/A systems, a project that will have nationwide impact on the hundred-billion-dollar infrastructure debate between centralized and decentralized wastewater treatment (at $25,000/unit, replacing only 10% of the 26 million US households that rely on septic systems with I/A OWTS's would cost $65 billion, while installing sewers to them would cost over twice that amount) . It provides a way to improve the performance competition in all I/A systems which would have a huge impact on nitrogen pollution.

Homeowners and vendors will not pay the incremental cost to add woodchip biofilters to their OWTS. Suffolk County DHS has not formalized reimbursement for woodchip boxes under its $5,000 incremental grant for polishing units. Part of the motivation for this project is to give DHS the supporting data to do so.

It is not practical or necessary to identify the eight specific sites prior to completing the grant award process because the grant process will take from March 15 to some time in October when the grant contract is available from the Town. If we were to identify a home prior to March 15, the engineer, contractors and homeowners (who would have already engaged the engineer) would have to wait until next October to know what configuration to submit for the SCDHS permit. We have continuous contact with several of the leading engineers in Southampton and have been assured: that they are processing plenty of applications each month, and that it will be easy to find eligible sites when the time comes. Once the grant is awarded and expenditures become reimbursable, it will take one meeting each with the engineers to identify the most appropriate specific sites from their pipeline, a visit to each of the homeowners, and then confirmation of the details of eligibility to the Town if requested (tax number, location within high priority areas, selected vendor, homeowner's LOI, would also be required in the SIP application for the remainder of the system). Once a site has been deemed eligible, as the work is completed, we will then pay the incremental line items associated with installing the woodchip biofilter polishing unit and submit for reimbursement.

This is a demonstration project aimed at a very important technology (denitrifying polishing unit) which

has been in limbo for the past several years. The SCDHS has not begun funding polishing units yet, the vendors have not designed it into their products, and engineers have taken the path of least resistance. We can show cost/benefit effectiveness with this project, but it needs to be across many residential sites. This project has the potential to lead to broad based adoption of this technology which would eliminate tons of nitrogen from our water bodies, but we need broad based evidence to support additional expenditure for denitrification technology by the vendors, engineers, Town, SCDHS and NY State. A multi-site demonstration project will provide irrefutable support and can be justified by the 1,542 pounds of nitrogen we will eliminate from these eight sites. Applying for eight individual projects would add no more value than grouping them into one application.

6. MANAGEMENT, EXPERIENCE, ABILITY

6a. Describe applicant's experience in completing similar projects.

CCWT has installed over 30 I/A systems. We have staffing that includes PhD scientists and veteran engineers focused on OWTS's. We are outsourcing the project engineering, installation and construction to the most highly respected professionals in Suffolk County.

6b. Describe community support or opposition to project. If there is opposition, explain how this is to be addressed.

Community support for OWTS's is well established as demonstrated by the resoundingly positive vote to use part of the CPF tax on real estate transactions for the WQIP. People don't know much about non-proprietary technologies and doing this project will help promulgate this important technology. Our calculations show that Southampton is embarking on a $141 million investment in decentralized wastewater treatment (assuming 100 homes per year, for 30 years, $30,000 per treatment system installed, $400/year O&M, and average of $5,000/unit in major maintenance expenses). If the approach proposed here is implemented, it could lead to significantly more nitrogen being removed from these installation and competitive motivation for commercial vendors to do a better job of denitrification.

6c. Describe any permits needed and time frame/status of approvals. If permits are approved, indicate same.

Article 19 regulations apply. SCDHS has permitted these woodchip biofilter polishing units in the past.

7. MAINTENANCE, MONMITORING, EVALUATION

Estimate ongoing maintenance costs and explain how these will be supported. Explain stewardship and monitoring activities planned for ensuring sustainability of the project.

Each I/A system, with which these woodchip biofilter polishing units will be installed, is subject to Article 19 O&M regulations. CCWT provides full maintenance of the polishing units for three years but there are no moving parts and they should not require any additional maintenance. While there is no indication in the literature that these woodchips will not last longer, the scenario analysis above shows cost of N removal under two cases: case 1 where woodchips are replaced every 10 years and case 2 with no replacement. They can be removed by VAC truck and supplied by any local tree service at the homeowner's expense.

8. DURATION OF PROJECT

8a. Provide a projected project timeline. Note: The Committee will only make recommendations for shovel-ready projects that can commence this fiscal year.

This project will be shovel ready as soon as Town contract is released and county process the permit

applications, which will be very similar to previously permitted projects.

Project Timeline

15-Mar	May, '23	June, 23	June, 23	July, 23	Aug, 23	Sept, 23	Nov, 23	Dec, 23	Jan, '24	Jan, '24
Submit WQIP Grant Application	WQIP Committee Recommends Approval	Meet with Engineers to Sellect 8 Qualified Sites	Meet with Homeowners to get their LOI	Confirm Site Eligibility with WQIP Committee Prior to Town Board Approval	Final Town Board Approval for 8 Sites	Details, Specifications Bid Package to Engineers, Contractor Sellected	Grant Contract Executed by Town & CCWT	Pay Installers for Procurement and Assembly of WC Biofilters	Pay Engineer to Observe and Manage Proper Installation	Complete installation and Submit for Reimburse-ment

8b. If the project is multi-year or phased, provide a breakdown of budget and milestones for each year and phase.

N/A

BUDGET PROPOSAL

PLEASE INCLUDE ANY AND ALL ESTIMATES AND JUSTIFICATION OF ALL PROPOSED COSTS

Please be aware that any work on public property may be subject to prevailing wage requirements.

PLANNING, ENGINEERING OR DESIGN	PER SITE	CPF REQUEST	OTHER FUNDS	SUBTOTAL PROJECT COST
(*For municipal applications provide in-house labor calculations on separate sheet)				
				$ -
Supplemental Engineering to add the woodchip biofilter	$ 2,000	$ 16,000	$ -	$ 16,000
Engineering During Construction			$ 2,000	$ 2,000
Project Management & Administration			$ 8,000	$ 8,000
Project Closeout, O&M, Start up			$ 2,000	$ 2,000
Application Preparation (CCWT Funds)			$ 3,000	$ 3,000
Project Closeout, O&M, Start up			$ 2,000	$ 2,000
Administrator			$ 624	$ 624
Subtotal	**$ 2,000**	**$ 16,000**	**$ 17,624**	**$ 33,624**

MATERIALS/SUPPLIES	PER SITE	CPF REQUEST	OTHER FUNDS	SUBTOTAL PROJECT COST
Woodchips - Stored, Screened, Delivered	$ 1,250	$ 10,000	$ -	$ 10,000
Woodchip Biofilter Tank, Delivered	$ 2,600	$ 20,800	$ -	$ 20,800
Piping Inside Woodchip Biofilter Tank	$ 400	$ 3,200	$ -	$ 3,200
Sampling Ports	$ 700	$ 5,600	$ -	$ 5,600
Piping Outside Woodchip Biofilter Tank	$ 200	$ 1,600	$ -	$ 1,600
Sand Delivered	$ 500	$ 4,000	$ -	$ 4,000
Subtotal	**$ 5,650**	**$ 45,200**	**$ -**	**$ 45,200**

CONTRACTUAL SERVICES for Construction & Site Improvements	PER SITE	CPF REQUEST	OTHER FUNDS	SUBTOTAL PROJECT COST
Installation of Woodchips	$ 500	$ 4,000	$ -	$ 4,000
Plumbing	$ 600	$ 4,800	$ -	$ 4,800
Excavation	$ 500	$ 4,000	$ -	$ 4,000
Material removed and disposal	$ 500	$ 4,000	$ -	$ 4,000
		$ -	$ -	$ -
Monitoring (See Section 5b of Narrative)	$ 11,057	$ 45,619	$ 42,834	$ 88,453
Subtotal		**$ 62,419**	**$ 42,834**	**$ 105,253**

ENGINEERING/DESIGN TOTAL	$ 33,624
CONSTRUCTION/SITE IMPROVEMENT TOTAL	$ 150,453
TOTAL PROJECT COST	$ 184,077
TOTAL CPF FUNDS REQUESTED	$ 123,619
TOTAL OTHER FUNDS	$ 60,458
SOURCE(S) OF OTHER FUNDS & AMOUNTS: NYS CCWT In Kind Match	33%

Monitoring Costs for Eight Sites, 1x/month, 36 months

Below is a detailed estimate of the cost of services that CCWT will be contributing. The CPF request includes only the shaded area, $45,619 for Analytical Services and 10% of that for Overhead charged to CCWT by the university for lab space, administration, etc. All labor and associated overhead ($48,902) on that is being contributed by CCWT as an in-kind matching contribution to the project. CCWT's lab is ELAP certified, and costs less than commercial labs.

Contribution Schedule	**NYS Center for Clean Water Technology**				
Analytical Services:	Description	cost/ sample	samples/ analyte	duration (months)	$ Amount
NH4+		$20	2	36	$ 1,440
NO3-/NO2-		$12	2	36	$ 864
NO2-	Shaded area includes no labor	$12	2	36	$ 864
TkN	2 samples/analyte, 1 analysis per month, 36 mo.s	$28	2	36	$ 2,016
Sampling & Analytical Services per site					$ 5,184
Sites per project					$ 8
Subtotal Analytical Services/3 years					$ 41,472
Stony Brook University Research Foundation Overhead				10%	$ 4,147
					$ 45,619
Labor			hours	hourly rate	
Wastewater Analyst	Analysis & Reporting		288	$52.37	$ 15,082
Field Technician	2 technicians, 8 hours per day, 4 sites per day		864	$25.76	$ 22,256
SubTotal Monitoring Labor/yr					$ 37,338
Project Manager	Engineering During Construction				$2,000
	Project Management & Administration				$8,000
	Project Closeout, O&M, Start up				$2,000
	Application Preparation (CCWT Funds)				$3,000
	Project Closeout, O&M, Start up				$2,000
	Administrator		12	$52.00	$ 624
SubTotal Management and Admin Costs					$ 17,624
SubTotal NYS CCWT Labor					$ 54,962
Stony Brook University Research Foundation Overhead on Labor				10%	$ 5,496
Fully Burdened Labor Cost					$ 60,458
Total Project Cost					**$ 106,077**

TOWN OF SOUTHAMPTON COMMUNITY PRESERVATION FUND (CPF)
WATER QUALITY IMPROVEMENTPROGRAM
Nitrogen Reducing Woodchip Biofilters Polishing Units

LETTER OF INTENT

CONTACT INFORMATION

CONTACT FIRST AND LAST NAME: Frank Russo

CONTACT ADDRESS: 1000 Innovation Rd, Suite 100, Stony Brook, NY 11794-6044

CONTACT PHONE: 631-252-3797

CONTACT EMAIL: Frank.Russo.3@stonybrook.edu

PROJECT INFORMATIION

PROJECT TITLE: Nitrogen Reducing Woodchip biofilter Polishing Units in Commercial I/A Systems

PROJECT LOCATION: Various, within Southampton High Priority Areas

PROJECT DESCRIPTION (1-3 SENTENCES): This project will demonstrate the performance of woodchip biofilter polishing units which will denitrify residual nitrate in wastewater effluent from leading commercial I/A OWTS's in various use cases. NYS CCWT will provide engineering, construction management, and consultation for homeowners in designing, installing, and implementing this technology and then monitor the performance of the woodchip biofilters monthly for three years. As Southampton embarks on a $138 million investment in decentralized wastewater treatment, this project is expected to demonstrate that decentralized wastewater treatment can perform as well or better than centralized wastewater treatment at roughly half the cost of sewers and centralized treatment plants.

ANTICIPATED PROJECT TIMELINE

BEGIN: Dec 2023

COMPLETE: Dec 2024

ATTESTATION:
Allocation of CPF funds will not be used for the purpose of accommodating new growth, as this is prohibited by State Law.

☑ Check box to certify that funds will not be directed for projects for the purpose of accommodating new growth

Signature: [signature] Date: 3/15/23

PROPERTY OWNER CERTIFICATION

Public Property:
Property is owned by a municipality and a resolution from the appropriate board of directors specifically allowing the completion of this project in its entirety has been obtained and is attached to this application.

CCWT will be evaluating several municipal sites for one or more of the eight sites and will obtain requisite permissions.

Private Property:
Applicant is the property owner and certifies that the project will be completed as described or property owner has provided an attached letter or completed the below certification allowing the access to the premises for the purposes of planning, designing, constructing and completing the proposed project as described.

CCWT will be obtaining specific addresses, project designs, letters from all private property owners allowing access to the premises for the above purposes, within the timing and all other requirements of the Town CPF WQIP program.

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:

Nitrogen Reducing Woodchip Biofilter Polishing Units in Commercial I/A Systems

Project Location (describe, and attach a location map):

Eight different single family homes, NGO's, or municipal sites within Town of Southampton Highest Priority watershed areas

Brief Description of Proposed Action:

Innovative and onsite wastewater treatment systems (I/A OWTS) are helping to improve water quality across the Town of Southampton. Still, the Suffolk County standard for I/A OWTS effluent of 19 mg N/L is two orders of magnitude higher than the levels of N found in most Southampton surface waters. The NYS Center for Clean Water Technology (CCWT) has developed a denitrifying woodchip biofilter that is capable of being added to any commercial I/A OWTS and reducing nitrate levels from these systems to 0 mg N/L, greatly improving system performance and better protecting Southampton's most precious natural resource, its water. This project will install eight denitrifying woodchip biofilter polishing units at eight locations, coupling the woodchip biofilters with new commercial I/A OWTS's, selected from the four leading OWTS vendors, including Hydro-Action, Fuji Clean, Septi-Tech, and Orenco. All sites will be within Southampton Highest Priority watershed areas and meet all WQIP Eligibility requirements except they will include some residential as well as NGO, and/or municipal facilities. The woodchip biofilter polishing units will be installed at the same time as the new I/A OWTS during new construction projects. CCWT will work with three of the leading engineers that design I/A OWTS installs in Southampton to identify the specific sites. All of the sites will have owners' written consent, and fully meet SH WQIP eligibility requirements.

Name of Applicant or Sponsor:	Telephone: 631-632-6400
New York State Center for Clean Water Technology, Stony Brook University	E-Mail: hilary.brooks@stonybrook.edu

Address:

1000 Innovation Rd, Suite 100

City/PO:	State:	Zip Code:
Stony Brook	New York	11974

	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 government Agency? If Yes, list agency(s) name and permit or approval:	☐	☑

3. a. Total acreage of the site of the proposed action? 1 acres
   b. Total acreage to be physically disturbed? 0.1 acres
   c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 1 acres

4. Check all land uses that occur on, are adjoining or near the proposed action:

☐ Urban ☐ Rural (non-agriculture) ☐ Industrial ☑ Commercial ☑ Residential (suburban)
☐ Forest ☐ Agriculture ☐ Aquatic ☐ Other(Specify):
☐ 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?	☐	☑

	NO	YES
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area?		
If Yes, identify: _____	☑	☐

	NO	YES
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☑	☐
b. Are public transportation services available at or near the site of the proposed action?	☑	☐
c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	☑	☐

	NO	YES
9. Does the proposed action meet or exceed the state energy code requirements?		
If the proposed action will exceed requirements, describe design features and technologies:	☐	☑

	NO	YES
10. Will the proposed action connect to an existing public/private water supply?		
If No, describe method for providing potable water: _____	☐	☑

	NO	YES
11. Will the proposed action connect to existing wastewater utilities?		
If No, describe method for providing wastewater treatment: _____	☑	☐

	NO	YES
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places?	☑	☐
b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	☑	☐

	NO	YES
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: _____		

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

	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 plan?	✓	
17. Will the proposed action create storm water discharge, either from point or non-point sources?	✓	
If Yes,		
a. Will storm water discharges flow to adjacent properties?	✓	
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)?	✓	
If Yes, briefly describe:		
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)?	✓	
If Yes, explain the purpose and size of the impoundment:		
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:		
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:		

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

Applicant/sponsor/name: Robert Dunbar Date: 3/15/23

Signature: Robert Dunbar Title: Consultant