Connecticut Department of Energy and Environmental Protection

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Farmington WPCF

Report of the Nitrogen Credit Advisory Board for Calendar Years 2019–2020

To the Joint Standing Environment Committee of the General Assembly

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REPORT OF THE NITROGEN CREDIT ADVISORY BOARD FOR CALENDAR YEARS 2019–2020

TO THE JOINT STANDING ENVIRONMENT COMMITTEE OF THE GENERAL ASSEMBLY

Concerning the

NITROGEN CREDIT EXCHANGE PROGRAM

As required by Section 22a-523(c) of the Connecticut General Statutes

This report has been prepared by the Nitrogen Credit Advisory Board and is respectfully submitted to the Joint Standing Environment Committee of the General Assembly pursuant to the requirement of Connecticut General Statutes Section 22a-523(c). Such section requires that the Nitrogen Credit Advisory Board submit to the Joint Standing Environment Committee of the General Assembly a report that addresses issues associated with the implementation of the Nitrogen Credit Exchange Program. This report covers the period from January 1, 2019 to December 31, 2020.

This report provides a summary of the technical progress and financial requirements that the Nitrogen Credit Advisory Board deems necessary to achieve progress in this important program in reducing nitrogen loads to Long Island Sound. The continued success of this program is dependent upon the development and application of innovative approaches and management techniques to meet nutrient reduction goals for Long Island Sound.

Executive Summary

In accordance with Connecticut General Statutes Sec. 22a-523(c), the Nitrogen Credit Advisory Board (NCAB) submits this Report for the calendar years 2019 and 2020 on the progress of the Nitrogen Credit Exchange (NCE) Program.

One of the Connecticut Department of Energy and Environmental Protection's (DEEP) management strategies to reduce the State's nitrogen load to Long Island Sound (LIS) was the implementation of an innovative nitrogen trading program among the State's publicly owned Water Pollution Control Facilities (WPCFs) regulated under the General Permit for Nitrogen Discharges (NGP). Following the U.S. Environmental Protection Agency's 2001 approval of the Total Maximum Daily Load (TMDL) analysis for nitrogen in LIS, the State instituted the nitrogen trading program in 2002 with the goal of cost-effectively reducing the nitrogen load from WPCFs by 63.5% by the end of 2014 by:

- encouraging denitrification at WPCFs with increased Clean Water Fund (CWF) grants;
- spreading nitrogen removal upgrades over several years, thereby reducing the financial impact on the CWF; and
- providing a fiscal alternative to the immediate expenditure of capital funds.

Major accomplishments and activities relative to the 2019 and 2020 NCE Program operations include:

- In 2019, Connecticut WPCFs regulated under the NGP discharged 9,323 equalized pounds of nitrogen per day (eq. lbs. N/day) to LIS, which did not comply with the aggregate statewide wasteload allocation (WLA) of 9,148 eq. lbs. N/day. Heavy rain events throughout the year hindered nitrogen removal processes. In 2020, Connecticut WPCFs discharged 7,280 eq. lbs. N/day, which was well below the WLA. In fact, it marked the lowest annual discharge of nitrogen from WPCFs since the NCE program began in 2002. A warm winter, a lack of snowmelt in the spring, and an extremely dry summer all had positive impacts on nitrogen removal efficiency at WPCFs throughout the year.

- The Rocky Hill WPCF became a Project Facility in 2019 after finishing a nitrogen removal upgrade project the previous year. The Farmington WPCF became a Project Facility in 2020, for a total of sixty-three (63) Project Facilities to date. On December 10, 2019, the Middletown WPCF was decommissioned, and all flows were diverted to the Mattabassett WPCF in Cromwell via a new intermunicipal pump station. The Middletown WPCF's WLA of 222 eq. lbs. N/day was reassigned to the Mattabassett WPCF at the time of decommissioning.

- The CWF has provided over $456M in funding for nitrogen removal projects to date, with an additional estimated cost of $97M for nitrogen removal projects in progress through 2022 (Southington, Torrington, Vernon, and Wallingford). Hundreds of millions of dollars have been saved by not requiring all facilities to be upgraded for nitrogen removal to the lowest levels.

The Nitrogen Credit Advisory Board (NCAB) highlights:

- In 2019, the NCAB approved values of nitrogen credits for buyers at $5.81 and sellers at $6.453466. That year, thirty-seven (37) facilities were required to purchase credits equivalent to 1856.71 eq. lbs. N/day to remain in compliance with the NGP. Those payments totaled $3,937,432 and were shared amongst the forty-two (42) facilities selling credits equivalent to 1671.58 eq. lbs. N/day.

- In 2020, the NCAB approved values of nitrogen credits for buyers at $4.92 and sellers at $1.361491. That year, twenty-five (25) facilities were required to purchase credits equivalent to 711.18 eq. lbs. N/day to remain in compliance with the NGP. Those payments totaled $1,277,137 and were shared amongst the fifty-one (51) facilities selling credits equivalent to 2,569.98 eq. lbs. N/day. Two facilities recorded a zero balance in 2020, and neither bought nor sold any credits.

I. Introduction

Background

The most pressing water quality issue affecting Long Island Sound (LIS) is the seasonally recurring low levels of dissolved oxygen (DO) in its bottom waters, a condition known as "hypoxia". Generally defined by DO concentrations below 3.0 milligrams per liter (mg/l), hypoxia occurs during the late summer months of July through September and is caused by an overabundance of nitrogen in the water body combined with the naturally occurring density stratification in the water column.

While nitrogen is essential to a productive ecosystem, nitrogen is also the limiting nutrient for algal production in LIS, so an overabundance of nitrogen leads to excessive algae growth. The algae eventually die and sink to the bottom where they are decomposed by bacteria. During decomposition, the oxygen-breathing bacteria use up the available oxygen in the lower water column and sediments, gradually lowering the DO concentration to unhealthy levels. During the summer, there is a high temperature difference between the warm surface waters and cool bottom waters of LIS, which combined with the salinity gradient throughout the water column, results in a density stratification of water layers that hinders the oxygenated surface waters from circulating downward and mixing with the hypoxic bottom waters. The hypoxic conditions are inadequate for supporting healthy marine populations because they create an imbalance in the ecosystem that disrupts the feeding, growth, and reproduction of nearly all forms of aquatic life. Primary sources of nitrogen to LIS include municipal water pollution control facility (WPCF) discharges, atmospheric deposition, and storm water runoff from urban, suburban, and agricultural areas.

The federal Clean Water Act requires that the State of Connecticut ("the State") establish a Total Maximum Daily Load (TMDL) for any water body, such as LIS, that is "impaired" — meaning it does not meet the State's minimum water quality standards to support its designated uses. Once the State has established a TMDL, federal law requires that it be reviewed and approved by the U.S. Environmental Protection Agency (EPA). In April 2001, the EPA approved Connecticut and New York's jointly submitted TMDL to address the impairment of LIS water quality that results from excessive nitrogen loading. The TMDL established the maximum load of nitrogen that LIS can assimilate without causing impaired water quality, apportioned the maximum load among various sources, and created a plan to achieve the load reductions necessary to meet water quality regulations for each state. The TMDL required that by 2014, both Connecticut and New York achieve a 58.5% collective reduction of nitrogen loading from point source discharges and urban and agricultural runoff sources to the LIS from an established baseline. In the TMDL, a 63.5% reduction goal was set for Connecticut WPCFs through a wasteload allocation (WLA) process.

"Nitrogen trading" was identified by the Connecticut Department of Energy and Environmental Protection (DEEP) as a mechanism for cost-effectively attaining the aggregate reduction goal for the State's WPCFs. Public Act 01-180, codified in the Connecticut General Statutes (CGS) in Sections 22a-521 through 527, established a Nitrogen Credit Exchange (NCE) overseen by a Nitrogen Credit Advisory Board (NCAB – Attachments A and B), and authorized the issuance of a General Permit for Nitrogen Discharges (a.k.a. the Nitrogen General Permit – NGP – Attachment O). Collectively, the NCE, NCAB, and NGP form the foundation of the nitrogen trading program which was instituted by the State in 2002 and has now completed 19 years of operation.

Condition of Long Island Sound

Nitrogen trading has led to measurable reductions in Connecticut's nitrogen load to LIS. Signs of improvement to the hypoxia issues are evident, but more reductions are still needed to meet management goals and attain a healthy LIS. Additional attention must be directed toward point and nonpoint sources outside of the State, atmospheric sources, and storm water and nonpoint source runoff.

The areas affected by hypoxia in LIS are monitored each summer by DEEP staff with funding from the EPA Long Island Sound Study (LISS), providing a good indicator of the overall condition of LIS. Although annual variation can be large, subject to changing weather conditions that affect the severity of hypoxia each year, the underlying long-term trend in hypoxic area is downward, as illustrated by the hypoxic area trend line in Figure 1. Since 1987, the affected area has averaged about 160 square miles and during the last 10 years, only 2012 was significantly higher than the long-term average. Considering that warmer weather exacerbates hypoxia, and that several of the warmest years on record have occurred in the last 10 years, the areal indicator still appears to be benefitting from nitrogen management.

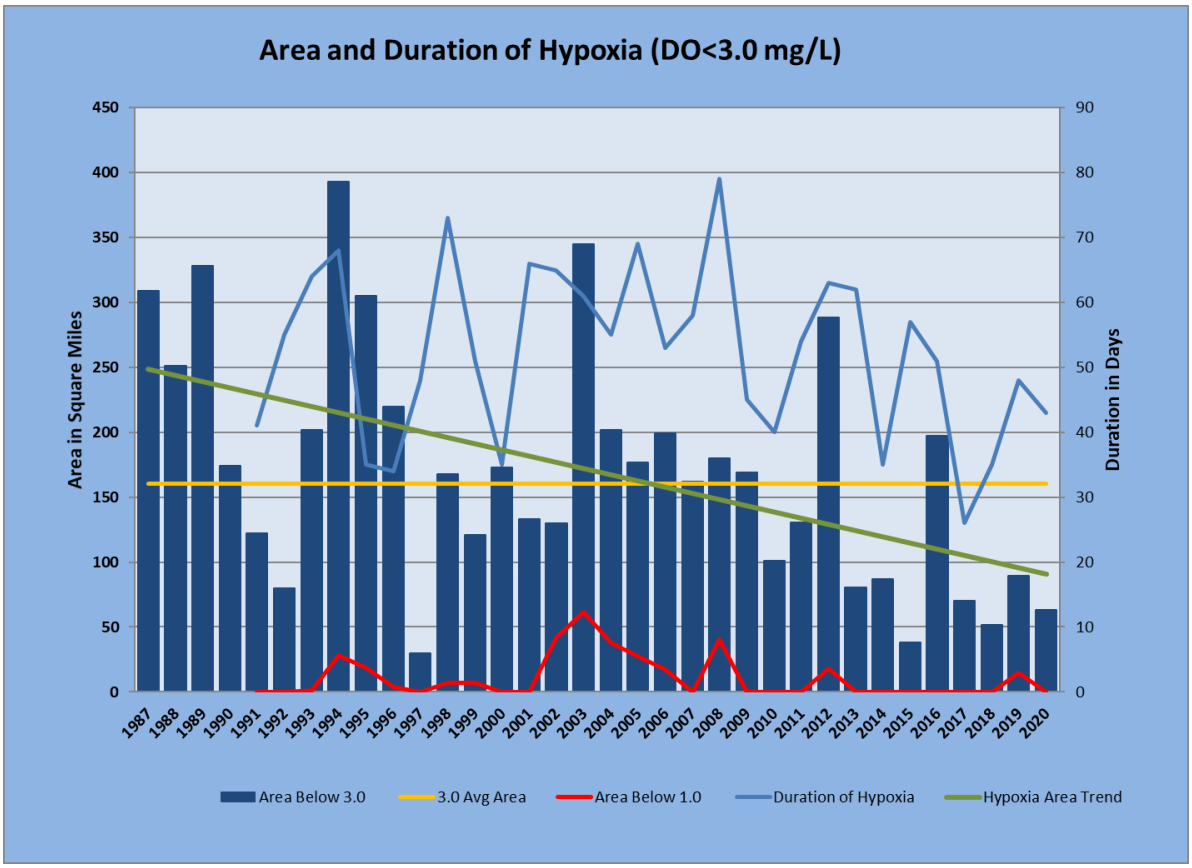


Figure 1. Area and duration of hypoxia in Long Island Sound, 1987-2020.

In 2019, the DEEP conducted eight water quality surveys in LIS between the months of June and September. The maximum hypoxic area for the year was estimated to be 89 square miles, an increase from 52 square miles in 2018. The 2019 hypoxic event lasted an estimated 48 days, beginning on July 12th and ending on August 28th. Anoxic conditions, which are defined by a DO concentration below 1.0 mg/l, were also observed in western LIS for the first time since 2012, affecting a total of 14.75 square miles.

Despite the COVID-19 pandemic, the DEEP completed its 34th consecutive year of summer water quality monitoring in LIS in 2020, conducting seven water quality surveys between June and September. The maximum hypoxic area was estimated to be 63 square miles, a decrease from 89 square miles the previous year. Hypoxic conditions were first noted on July 7th and last seen on September 10th, with an estimated total duration of 43 days. Similar to what was observed during the summers of 2016-18, there was again a period in 2020 when DO concentrations rose above the 3.0 mg/l hypoxia threshold and remained there for 23 days, from August 16th to September 7th, before again falling below the hypoxia threshold from September 8th to September 10th. No anoxic conditions were observed in 2020.

According to the Northeast Regional Climate Center (NRCC), the summer (June-August) of 2019 was warmer than normal (compared to the 30-year average) and was the eleventh warmest summer on record in Connecticut since the NRCC began tracking in 1895. July in particular was the fifth warmest on record in the State, with temperatures averaging 2.5°F higher than normal. The winter and spring (December 2018-May 2019) were unusually wet, with the State receiving 25% more precipitation than normal over that span. The State received 50+% more precipitation than normal during the months of January, April, October, and December.

2020 was the second warmest year on record in Connecticut, behind only 2012. The summer was the warmest on record in the State, with an average temperature of 72.2°F, 2.3°F higher than normal. The winter (December 2019-February 2020) was the sixth warmest on record with an average temperature of 32.9°F, 3.1°F higher than normal. While most of 2020 was drier than normal, the summer was exceptionally dry. It was the eleventh driest summer on record, with the State receiving only 63% of the normal amount of rainfall from June to August. During each month from May to September, the state received between 49-76% the normal amount of precipitation. The month of January was also exceptionally dry; the eighteenth driest on record. According to the U.S. Drought Monitor, nearly the entire State suffered from mild-to-severe drought conditions throughout the whole summer, with over one-third of the state reaching extreme drought (D3) conditions by early-October. The State received more precipitation than normal from October to December, which relieved the drought conditions.

2019 and 2020 Performance of the Nitrogen Credit Exchange

The Total Maximum Daily Load (TMDL) aggregate statewide wasteload allocation (WLA) for Connecticut WPCFs regulated under the NGP is 9,148 equalized pounds of nitrogen per day (eq. lbs. N/day). In 2019, NGP-regulated facilities discharged 9,323 eq. lbs. N/day to LIS (Attachment C) and did not comply with the aggregate WLA. Heavy rain events during the year hindered nitrogen removal processes.

In 2020, NGP-regulated facilities discharged 7,280 eq. lbs. N/day (Attachment D), which was well below the aggregate WLA. In fact, it marked the lowest annual discharge of nitrogen from NGP-regulated facilities since the NCE program began in 2002, surpassing the previous best performance of 7,583 eq. lbs. N/day in 2016. A warm winter, a lack of snowmelt in the spring, and an extremely warm and dry summer all had positive impacts on nitrogen removal efficiency throughout the year.

The aggregate monthly performance of NGP-regulated facilities is shown in Figure 2 below. The worst aggregate monthly performance over the 2019-2020 span was January 2019, when NGP-regulated facilities discharged 11,645 eq. lbs. N/day. The best aggregate monthly performance during that span was in October 2020, when facilities discharged only 5,680 eq. lbs. N/day.

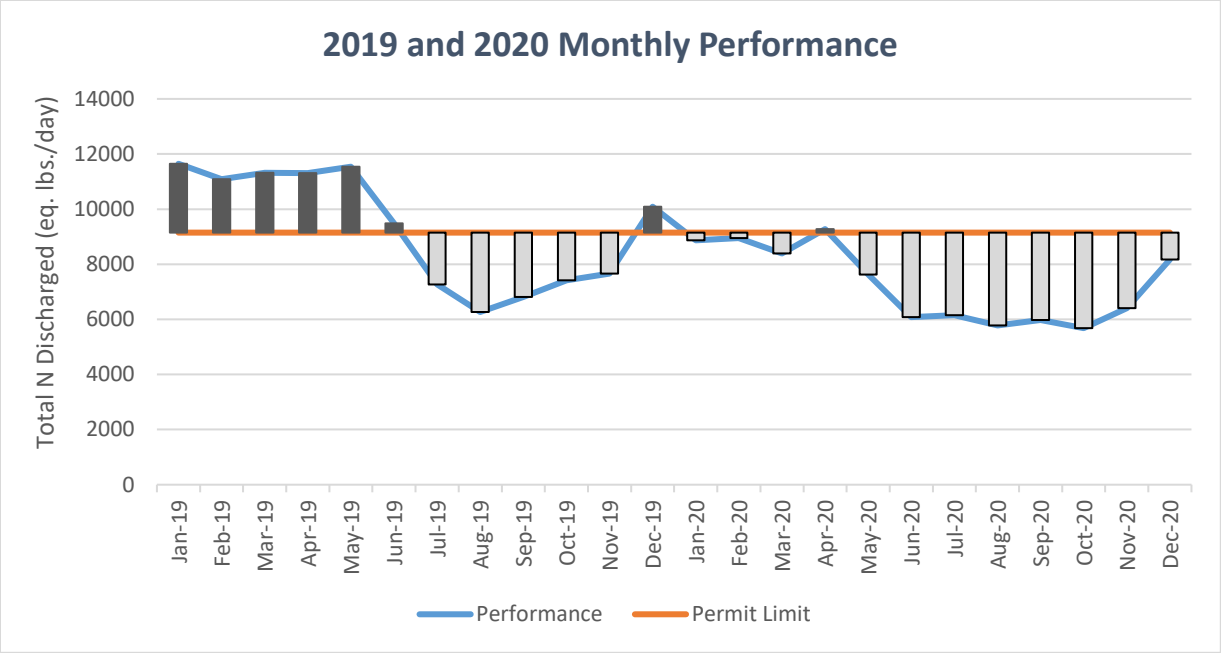


Figure 2. Aggregate Monthly Performance of NGP-Regulated Facilities during 2019 and 2020.

II. 2019 and 2020 Nitrogen Credit Exchange

Credit Price

To remain in compliance with the NGP, a WPCF that discharges more nitrogen in a calendar year than its NGP annual limit allows is required to buy nitrogen credits from the State equivalent to the amount by which they exceeded the limit. A WPCF that discharges less nitrogen that its NGP annual limit sells its excess allowance back to the State.

Annually, the NCAB proposes the price of an equalized nitrogen credit for buyers and the value for sellers to the Commissioner of the DEEP. The price of a credit for buyers is calculated by dividing the total annual project cost by the total annual equalized nitrogen reduction by all Project Facilities (in eq. lbs. N/year). The state statute identifies the total annual project cost as: 1) capital expenditures for planning, design, and construction of nitrogen removal facilities and 2) ongoing operation and maintenance costs for nitrogen removal treatment.

Therefore, the price of a credit for buyers is calculated from the following formula:

Price of an equalized credit = (Capital Costs + Operation and Maintenance Costs) / Total annual equalized nitrogen reduction from Project Facilities

- *"Capital Costs" are derived from "Nitrogen Removal Projects" as defined below.*
- *"Operation and Maintenance Costs" and "Total annual equalized nitrogen reduction" are calculated from "Project Facilities" as defined below.*

The value of a credit for sellers is then determined by dividing the total revenue collected from the buyers by the total amount of credits available from the sellers. Thus, the revenue collected from buyers is distributed proportionally amongst the sellers based upon the number of credits each seller has available.

"Nitrogen Removal Project" is defined as any alteration of the physical structure of a wastewater treatment facility specifically constructed to remove nitrogen and financed by Connecticut's CWF program.

"Project Facility" is defined as any facility with a fully operational nitrogen removal system of any scale as of January 1st of the trading year. The WPCFs in Groton City, Montville, Rocky Hill, Stonington Mystic, and Torrington all became Project Facilities in 2019. The Farmington WPCF and Naugatuck Treatment Co. WPCF became Project Facilities in 2020, for a total of sixty-three (63) Project Facilities to date.

"Capital Costs" were established by the NCAB using the annual CWF repayment amount associated with the construction of nitrogen treatment facilities, as set forth in the loan agreements between the municipalities and DEEP. The grant portion of CWF financing is not considered to be part of the capital cost for the purpose of setting credit prices. Using this procedure, the NCAB established the total annual capital cost for nitrogen removal as $15,843,691 in 2019 (Attachment J) and as $16,039,175 in 2020 (Attachment K). These values represent the annual interest and repayment of principal cost on the 2% low-interest loans for Nitrogen Removal Projects.

"Operation and Maintenance (O&M) Costs" related to nitrogen removal are estimated by means of an annual survey that is sent to all Project Facilities. The DEEP modified the annual survey template in 2019 and again in 2020 both to improve user-friendliness, and to obtain more detailed O&M data from facilities in an effort to more accurately estimate O&M costs related to nitrogen removal. In 2019, the NCAB adopted an annual O&M cost of $16,904,371 for nitrogen removal. In 2020, the NCAB adopted an annual O&M cost of $15,683,574 for nitrogen removal. The O&M costs were likely lower in 2020 due to cost savings from more ideal weather conditions for nitrogen removal processes, despite the addition of more Project Facilities that year. Combining capital costs and O&M costs yields a total annual project cost of $32,748,063 in 2019 and $31,722,749 in 2020 (Attachments J and K).

The total annual equalized nitrogen reduction is calculated by subtracting each Project Facility's average daily nitrogen load for the year from their respective baseline loads established in the TMDL for LIS. The load reductions are then multiplied by their respective equivalency factors, which are listed in the NGP and are based off of each facility's proximity and likely contribution to the hypoxic area in LIS. This converts the load reductions from lbs. N/day to eq. lbs. N/day. All of the equalized load reductions are then totaled and multiplied by the number of days in the year to get the total annual equalized nitrogen reduction. Following this procedure, the total annual nitrogen reduction from the baseline for Project Facilities in 2019 was calculated to be 5,632,298.9 eq. lbs. N, equivalent to 15,430.96 eq. lbs. N/day (Attachment H). In 2020, the total annual nitrogen reduction from the baseline was 6,451,659.7 eq. lbs. N, equivalent to 17,675.78 eq. lbs. N/day (Attachment I).

For 2019, the cost of an equalized credit for buyers was determined by dividing the total annual project cost of $32,748,063 by the total annual nitrogen reduction of 5,632,298.9 eq. lbs., equaling $5.81. Thirty-seven (37) facilities were required to purchase an aggregate total of 677,699.15 equalized credits at $5.81 each in order to meet their NGP limits, resulting in $3,937,432 being shared proportionally among the sellers. Forty-two (42) facilities performed better than their NGP limits and had a total of 610,126.7 equalized credits to sell. Dividing the $3,937,432 from the buyers by the 610,126.7 credits produced by the sellers results in an equalized nitrogen credit value of $6.453466 for sellers (Attachment F).

For 2020, the cost of an equalized credit for buyers was determined by dividing the total annual project cost of $31,722,749 by the total annual nitrogen reduction of 6,451,659.7 eq. lbs., equaling $4.92. Twenty-five (25) facilities were required to purchase an aggregate total of 259,580.7 equalized credits at $4.92 each in order to meet their NGP limits, resulting in $1,277,137 being shared proportionally among

the sellers. Fifty-one (51) facilities met their NGP limits and had 938,042.7 equalized credits to sell. Dividing the $1,277,137 from the buyers by the 938,042.7 credits produced by the sellers results in an equalized nitrogen credit value of $1.361491 for sellers (Attachment G). Two facilities (Stonington Mystic and Stratford) recorded zero balances in 2020 by meeting their NGP limits exactly, and neither bought nor sold any credits.

Revision of the 2019 Credit Values

Prior to the finalization of the 2019 credit values calculated above, the NCAB had originally established 2019 values at $5.83 for buyers and $6.67115 for sellers in May 2020. DEEP issued a draft ruling accepting those values on June 16, 2020 and sent draft invoices to all facilities participating in the NCE program. However, DEEP received comments from one facility during the comment period and upon review of the comments, made a decision in conjunction with NCAB to modify the credit values to $5.81 for buyers and $6.453466 for sellers (Attachment M).

III. Compliance with TMDL Goal

Nitrogen Loading Trend

Looking at the linear regression line (dashed line) as well as the 12-month moving average (yellow line) in Figure 3, it is evident that the total equalized nitrogen load to LIS has been decreasing throughout the duration of the NCE program, as more WPCFs complete nitrogen removal upgrades. While nitrogen removal performance was poor in 2018 and 2019 compared to previous years, the 7,280 eq. lbs N/day discharged by Connecticut WPCFs in 2020 was the lowest since the program began in 2002, 303 eq. lbs N/day lower than the previous best performance of 7,583 eq. lbs N/day in 2016. The load is expected to decrease further in coming years as more facilities complete nitrogen removal upgrade projects.

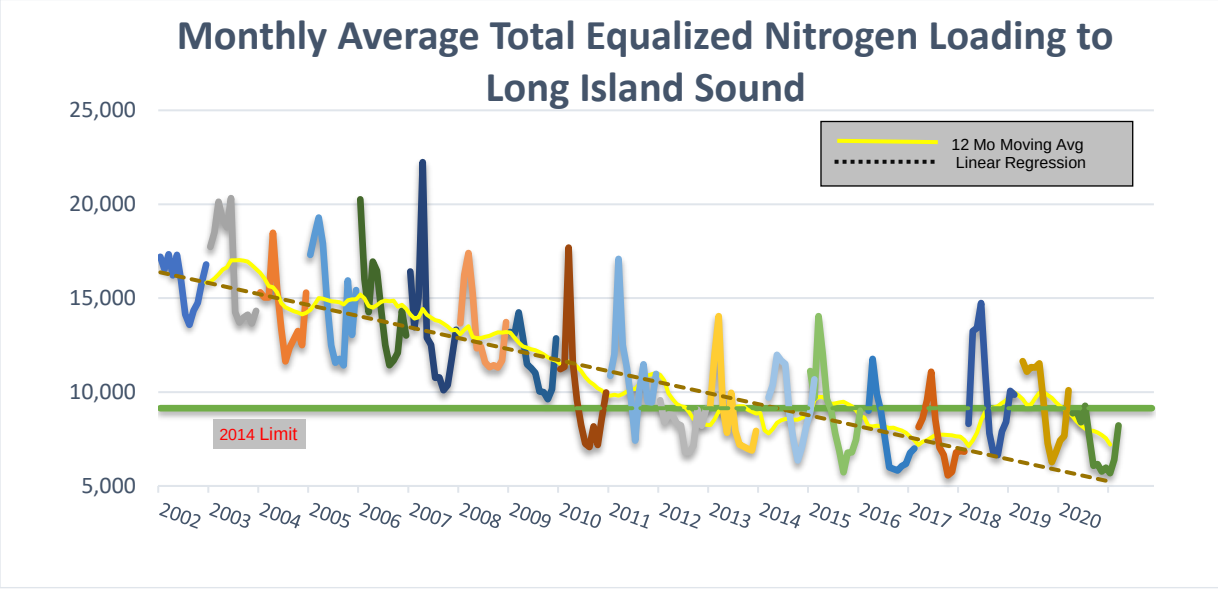


Figure 3. Monthly Average of Total Nitrogen Loading to Long Island Sound

Meeting the Wasteload Allocation and Permit Limits.

The nitrogen trading program has been an innovative approach to cost effectively meet the TMDL goal of reducing nitrogen loading to LIS by 63.5% through:

- Encouraging denitrification at WPCFs by providing enhanced Clean Water Fund grants,
- Spreading nitrogen removal upgrades over fifteen years, allowing WPCFs to purchase credits rather than immediately upgrade to meet 63.5% removal requirements,
- Providing a fiscal alternative to the immediate expenditure of capital funds.

The Rocky Hill WPCF became a Project Facility in 2019 and the Farmington WPCF became a Project Facility in 2020 after both completing CWF-funded nitrogen removal projects the previous years, for a total of sixty-three (63) Project Facilities to date.

On December 10, 2019, the Middletown WPCF was decommissioned, and all flows were diverted to the Mattabassett WPCF in Cromwell via a new intermunicipal pump station. The Middletown WPCF's wasteload allocation (WLA) of 222 eq. lbs. N/day from the NGP was reassigned to the Mattabassett WPCF at the time of decommissioning. In 2019, the Mattabassett WPCF received a prorated WLA increase to account for their treatment of Middletown's flow the final 22 days of the calendar year. This increase was equivalent to 13 eq. lbs. N/day averaged over the whole year, an increase from 834 to 847 eq. lbs. N/day. The Middletown WPCF received a corresponding decrease, from 222 to 209 eq. lbs. N/day. In 2020, the WLA of the Mattabassett WPCF increased to 1056 eq. lbs. N/day. With the decommissioning of the Middletown WPCF, only 78 municipalities are participating in the NCE Program as of 2020, rather than 79.

The DEEP expects that the State will continue to comply with the NGP aggregate WLA in the future as more facilities continue to complete nitrogen removal upgrades. CWF-funded upgrades in Southington, Torrington, Vernon, and Wallingford are expected to be completed by the end of 2022.

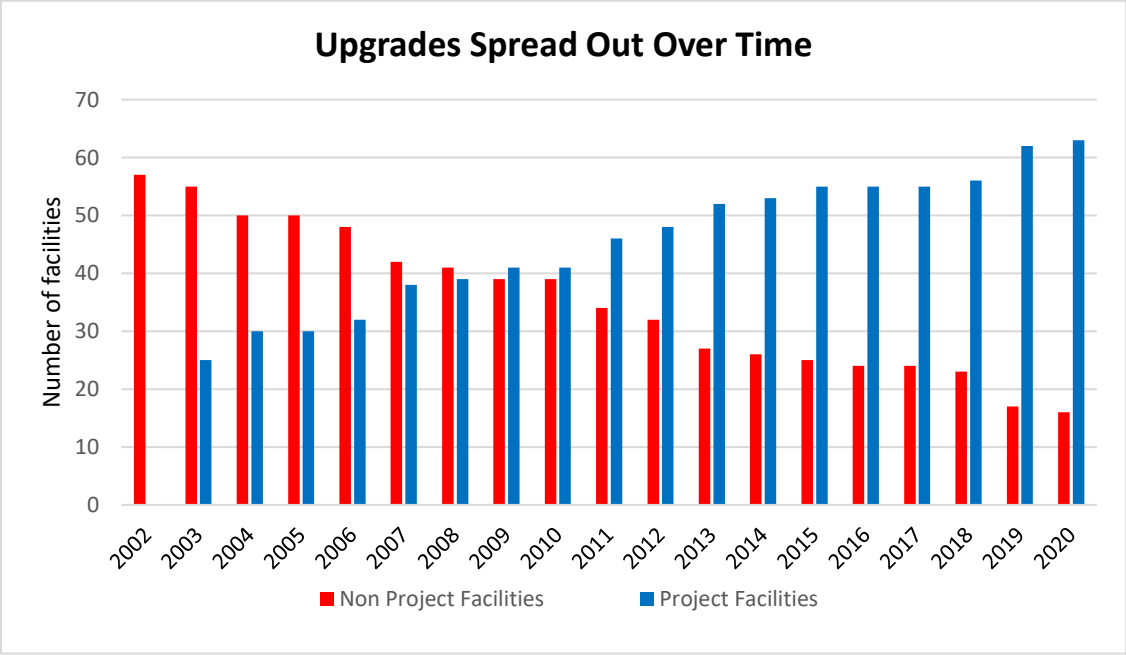


Figure 4. Upgrades of WPCFs, 2002-2020

IV. Finances

The Clean Water Fund (CWF)

The CWF Priority List for fiscal year (FY) 2018 and FY 2019 was issued in final form on June 11, 2018. The FY 2020 and FY 2021 CWF Priority List was issued on May 25, 2021. The amount of State funding authorized for the CWF program for FY 2019 and FY 2020 is as follows:

FY	General Obligation Bonds	Revenue Bonds	Total Funding
2019	$85M	$350M	$435M
2020	$75M	$0	$75M

More information on the CWF and associated funding can be found in the State's Clean Water Fund Reports, which are released annually.

Use of Nitrogen Credit Exchange Funds

According to CGS Sec. 22a-524(b)(11), the Commissioner, in consultation with the NCAB, shall: "Establish accounts of funds created from the purchase and sale of equivalent nitrogen credits to be used for administration of the Nitrogen Credit Exchange Program and which may be used for nitrogen removal projects, habitat restoration projects and research". Furthermore, per CGS Sec. 22a-524(b)(12), the Commissioner, in consultation with the NCAB, shall: "Establish any other policies or procedures the Commissioner may deem necessary to carry out the Nitrogen Credit Exchange Program"; and per CGS Sec. 22a-524(b)(13), may "establish a technical assistance program to educate and assist municipalities in implementing the Nitrogen Credit Exchange Program".

In previous years, the NCAB has recommended that funds be used for a variety of purposes, including providing training and technical assistance to wastewater operators throughout the State, funding the purchase of modern nitrogen monitoring equipment for those facilities without it, and funding data collection initiatives.

Projects that are in progress and funded with the nitrogen credit exchange funds are:

- Providing funding to the United States Geological Survey (USGS) for enhanced nitrogen monitoring. The NCAB has provided the USGS with nearly $2 million in funding since 2007 to support nitrogen monitoring statewide, and specifically, in the tidal portion of the Connecticut River. Most recently, the NCAB approved supplemental funding of $221,500 for federal fiscal year 2020 to continue monitoring of the Connecticut River at Middle Haddam. The work at Middle Haddam uses new and novel approaches for continuous total nitrogen monitoring. The project is ongoing, and the data analysis developed under this project will help to advance the understanding of the hydrologic and water-quality processes in the tidal portion of the Connecticut River, as well as advance both field and analytical methodology. Statewide nitrogen monitoring by USGS has helped improve our understanding of the nitrogen loads to LIS throughout the State. In 2013, the USGS released a report on nitrogen loads from the State entitled *Estimated Nitrogen Loads from Selected Tributaries in Connecticut Draining to Long Island Sound, 1999 – 2009*, which is available to view here.

V. Revisions to the TMDL/Upper Connecticut River

The Total Maximum Daily Load (TMDL) for nitrogen loading to LIS, adopted in 2001 and available to view here on the DEEP's website, includes a timeline for regular evaluation of TMDL progress and revisions, as appropriate, in order to provide for a phased implementation approach of the TMDL. Regular evaluations were anticipated in order to account for finalization of the federal dissolved oxygen criteria for coastal waters, anticipated changes in Connecticut and New York water quality regulations, a new System-Wide Eutrophication Model (SWEM) for LIS, more specific nitrogen reduction targets for upper Connecticut River sources throughout Massachusetts, New Hampshire and Vermont and for atmospheric deposition. To date, the federal dissolved oxygen criteria has been finalized, Connecticut and New York's water quality regulations for dissolved oxygen have been adopted, the SWEM model has been adapted for LIS, and several studies related to nitrogen loading and delivery in the upper Connecticut River watershed have been completed.

In 2010, the EPA Regional Administrators (Regions 1 and 2) and the Commissioners from the LIS watershed states agreed to proceed with a five-state TMDL. A TMDL workgroup was formed which held bi-weekly conference calls to work through the necessary tasks relative to TMDL implementation and evaluation. In 2011, the workgroup identified technical issues and held a joint meeting with state water directors and the EPA. The outcome of this meeting was to develop an enhanced implementation plan for the current TMDL, while moving forward with a more comprehensive analysis to support the revision of the TMDL at a later date. In 2013, the five states and the New England Interstate Water Pollution Control Commission completed an evaluation of current storm water and nonpoint source control efforts to qualitatively assess whether they were adequate for meeting the 2000 TMDL load allocations.

In 2015, EPA released a new Nitrogen Reduction Strategy for LIS, which is intended to advance implementation of the TMDL and increase the area subject to nitrogen reductions. The approach addresses three watershed groups of LIS: coastal watersheds (embayments), large riverine watersheds (Housatonic River, Connecticut River, and Thames River), and western LIS. EPA's strategy involves the use of nitrogen thresholds to develop ecologically based targets for each of these groups. EPA initiated the first phase of this process in the fall of 2016 which focused on six embayment complexes in CT, the Connecticut River, and the eastern and western narrows of LIS. DEEP, along with NYDEC and select members of the academic and non-profit community serve on the technical stakeholder group for this project. Recently, EPA has embarked on Phase 2 of its Nitrogen Reduction Strategy, which includes a peer review of the work completed in Phase 1, additional collaboration with similar efforts, and completion of the analysis developed in Phase 1 for four additional embayments, as well as the Housatonic and Thames Rivers.

Subsequently, DEEP formalized a new nitrogen reduction plan named the Second-Generation Nitrogen Strategy, as it follows initial efforts aimed at reducing nitrogen in order to achieve healthy dissolved oxygen concentrations in LIS. The Second-Generation Nitrogen Strategy will focus on nitrogen reduction efforts in three main areas: wastewater treatment plants, nonpoint sources and storm water, and embayments. DEEP's strategy also includes prioritizing watersheds and embayments for additional actions towards nitrogen reductions within the next five years (*Integrated Resources Water Management Report*); as well as a special study to develop nitrogen guidelines for the Niantic River Estuary; and evaluate the nitrogen load from onsite wastewater treatment systems (septic systems). This effort also included a project with UConn's Center for Land Use Education and Research (CLEAR) to communicate coastal nitrogen issues and provide best management options to mitigate nitrogen pollution. The project was completed in September 2017 and CLEAR continues to host an education and outreach website explaining coastal nitrogen pollution.

In 2010, a project to improve the SWEM model was undertaken and funded by the LISS. The project improved the calibration of SWEM to more accurately reflect actual production and respiration estimates, incorporated an algal production formulation, implemented a high-resolution output in NETCDF format, and included development of a website dedicated to making the SWEM more accessible to the scientific community. The project also made the model more consistent with the scientific community's understanding of mixing and circulation in estuaries. While the model is now more consistent with observed estimates of primary production and community respiration, it continues to over-predict DO levels in the bottom waters of LIS and has been deemed limited for management use. Considering advancements in technology since SWEM was developed, LISS has decided to contract with the New York City Department of Environmental Protection to develop a more robust water quality model that, in addition to taking advantage of processing and storage advances, may include a finer grid resolution and extend spatially into embayments and tributaries. Conceptually, this effort will result in an integrated watershed, estuary, and ecosystem model. The model will be developed in stages with input from modeling experts and a team of reviewers.

EPA's LISS continues to support the development of a tracking system to quantitatively assess progress relative to the original 2000 TMDL nonpoint source and storm water allocations. The New England Interstate Water Pollution Control Commission (NEIWPCC) has obtained grant funding to pursue the development of a tracking tool for the LIS Watershed and is in the process of preparing a request for proposals document.

VI. Attachments

A. Nitrogen Credit Advisory Board Members – 2019
B. Nitrogen Credit Advisory Board Members – 2020
C. Total Nitrogen Balance Sheet – 2019 Monthly Averages by Plant
D. Total Nitrogen Balance Sheet – 2020 Monthly Averages by Plant
E. Total Nitrogen Balance Sheet – Monthly Averages by Plant 2002-2020
F. LIS Total Nitrogen Credit Exchange Balance – 2019
G. LIS Total Nitrogen Credit Exchange Balance – 2020
H. Nitrogen Load Reductions by Project Facilities – 2019
I. Nitrogen Load Reductions by Project Facilities – 2020
J. Total Annual Project Cost – 2019
K. Total Annual Project Cost – 2020
L. Nitrogen Removal Projects Funded by the CWF through 2020
M. Notification of Revised Invoice – 2019
N. Notification of Final Invoice – 2020
O. 2019 General Permit for Nitrogen Discharges

VII. Acknowledgements

DEEP wishes to thank the members of the NCAB for their contributions to this document and their ongoing participation in the NCE Program.

Attachment A

NITROGEN CREDIT ADVISORY BOARD MEMBERS – 2019

	Name	**Appointing Authority**	**Term***
1.	Jennifer Perry (Chair) DEEP 79 Elm St Hartford, CT 06016 Phone: (860) 424-3704	Katherine S. Dykes Commissioner Energy & Environmental Protection	No specific term
2.	Eric Lindquist Office of Policy and Management 450 Capitol Avenue Hartford, CT 06016	Melissa McCaw Secretary Office of Policy and Management	No specific term
3.	Marie Moylan Hoadley Office of the Treasurer 165 Capitol Avenue Hartford, CT 06106 Phone: (860) 702-3000	Shawn T. Wooden State Treasurer	No specific term
4.	William Norton, Director City of West Haven WPCA 355 Main Street West Haven, CT 06516 Phone: (203) 937-3706	Joe Aresimowicz Speaker of the House (Amann appointee)*	3 years
5.	Thomas A. Tyler The Metropolitan District 240 Brainard Road Hartford, CT 06114	Martin M. Looney Senate President Pro Tempore (Williams appointee)*	3 years
6.	VACANT	Matthew Ritter House Majority Leader	3 years

7.	VACANT	Matthew Ritter House Majority Leader	3 years
8.	VACANT	Bob Duff Senate Majority Leader	3 years
9.	VACANT	Bob Duff Senate Majority Leader	3 years
10.	Astrid T. Hanzalek 31 Abraham Terrace Suffield, CT 06078	Themis Klarides House Minority Leader (Ward appointee)*	3 years
11.	Joseph Michelangelo 1 Fitzgerald Lane Branford, CT 06405	Len Fasano Senate Minority Leader (McKinney appointee)*	3 years
12.	VACANT	Ned Lamont Governor	3 years

* Appointees remain active until removed by their appointing authority

Attachment B

NITROGEN CREDIT ADVISORY BOARD MEMBERS – 2020

	Name	**Appointing Authority**	**Term***
1.	Jennifer Perry (Chair) DEEP 79 Elm St Hartford, CT 06016 Phone: (860) 424-3704	Katherine S. Dykes Commissioner Energy & Environmental Protection	No specific term
2.	Eric Lindquist Office of Policy and Management 450 Capitol Avenue Hartford, CT 06016	Melissa McCaw Secretary Office of Policy and Management	No specific term
3.	Kimberly Masson Office of the Treasurer 165 Capitol Avenue Hartford, CT 06106 Phone: (860) 702-3000	Shawn T. Wooden State Treasurer	No specific term
4.	William Norton, Director City of West Haven WPCA 355 Main Street West Haven, CT 06516 Phone: (203) 937-3706	Joe Aresimowicz Speaker of the House (Amann appointee)*	3 years
5.	Thomas A. Tyler The Metropolitan District 240 Brainard Road Hartford, CT 06114	Martin M. Looney Senate President Pro Tempore (Williams appointee)*	3 years
6.	VACANT	Matthew Ritter House Majority Leader	3 years

7.	VACANT	Matthew Ritter House Majority Leader	3 years
8.	VACANT	Bob Duff Senate Majority Leader	3 years
9.	VACANT	Bob Duff Senate Majority Leader	3 years
10.	Gary Zrelak Greater New Haven WPCA 260 East Street New Haven, CT 06511	Themis Klarides House Minority Leader	3 years
11.	VACANT	Len Fasano Senate Minority Leader	3 years
12.	VACANT	Ned Lamont Governor	3 years

* Appointees remain active until removed by their appointing authority

Attachment C

Total Nitrogen Balance Sheet – 2019 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zone 1														
GROTON CITY WPCF	99	77	130	94	91	52	59	91	90	46	59	59	58	97
GROTON TOWN WPCF	153	152	158	109	141	187	157	127	152	145	120	114	165	252
JEWETT CITY WPCF	15	12	19	59	38	7	4	3	3	2	2	2	3	7
KILLINGLY WPCF	131	153	131	147	117	158	286	160	143	145	240	129	84	101
LEDYARD WPCF	7	4	3	3	3	4	4	3	3	4	4	5	6	7
MONTVILLE WPCF	118	67	61	64	99	78	70	65	80	63	32	43	71	75
NEW LONDON WPCF	386	301	334	294	336	308	311	273	325	329	265	304	244	289
NORWICH WPCF	201	535	436	698	614	593	578	496	472	498	421	522	599	495
PLAINFIELD NORTH WPCF	34	52	118	85	107	65	50	30	28	27	27	20	27	35
PLAINFIELD VILLAGE WPCF	24	30	73	68	61	41	50	12	4	4	10	5	7	19
PUTNAM WPCF	53	44	54	38	49	55	50	44	31	32	33	39	64	42
SPRAGUE WPCF	7	30	49	37	36	33	40	37	17	19	20	23	21	26
STAFFORD SPRINGS WPCF	60	79	84	85	80	104	94	71	65	75	63	75	71	84
STONINGTON BOROUGH WPCF	14	6	5	4	3	4	4	6	8	9	7	5	5	10
STONINGTON MYSTIC WPCF	27	26	18	25	23	23	20	19	26	39	23	55	22	23
STONINGTON PAWCATUCK WPCF	24	23	38	37	44	31	19	16	15	16	11	14	15	18
THOMPSON WPCF	10	32	49	45	83	36	24	15	7	7	12	26	33	49
UCONN WPCF	44	62	76	70	47	79	32	43	42	56	102	82	57	55
WINDHAM WPCF	125	107	251	134	115	120	97	77	63	63	74	70	94	122
Zone 2														
BRISTOL WPCF	398	630	820	742	747	762	818	598	529	393	370	399	547	836
CANTON WPCF	24	51	73	72	68	60	55	38	43	37	35	37	41	55
EAST HAMPTON WPCF	54	102	107	103	176	148	125	75	67	85	124	62	59	87
EAST HARTFORD WPCF	292	399	367	358	517	433	603	333	300	383	339	343	391	423
EAST WINDSOR WPCF	59	51	62	82	67	105	67	24	21	9	20	31	47	73
ENFIELD WPCF	278	253	346	342	354	308	275	329	195	204	151	116	174	242
FARMINGTON WPCF	178	255	253	308	256	235	272	240	195	219	254	279	296	258
GLASTONBURY WPCF	98	62	57	55	59	72	58	73	52	57	60	53	76	66
HARTFORD WPCF	2377	4218	5267	6421	6631	6308	4648	3207	2417	2100	2468	3712	3484	3947
MANCHESTER WPCF	312	313	360	377	332	429	322	243	190	275	249	230	291	460
MATTABASSETT WPCF	847	499	621	605	635	811	650	376	440	232	278	373	402	560
MIDDLETOWN WPCF	209	488	657	630	581	517	685	635	448	437	453	367	182	259
NEW HARTFORD WPCF	3	1	2	1	1	0	1	0	1	1	1	1	1	2
PLAINVILLE WPCF	101	109	98	89	103	134	116	76	91	53	113	84	143	204
PLYMOUTH WPCF	42	115	110	91	86	78	99	79	109	128	162	140	147	156

Total Nitrogen Balance Sheet – 2019 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PORTLAND WPCF	31	25	37	42	36	33	37	25	14	12	13	14	14	22
ROCKY HILL WPCF	288	247	274	197	334	388	343	181	177	172	164	183	196	357
SIMSBURY WPCF	107	40	72	54	52	39	31	31	26	24	32	25	33	55
SOUTH WINDSOR WPCF	106	93	120	103	87	96	105	85	74	83	88	81	86	103
SUFFIELD WPCF	45	17	18	28	21	16	14	19	9	11	7	14	16	31
VERNON WPCF	184	510	607	476	670	709	646	561	552	380	377	328	374	434
WINDSOR LOCKS WPCF	66	85	111	92	85	132	106	78	69	54	52	59	56	124
WINDSOR POQUONOCK WPCF	98	574	554	540	580	666	651	619	567	535	528	558	536	550
WINSTED WPCF	64	103	147	152	179	184	111	71	62	45	59	55	68	101

Zone 3

BRANFORD WPCF	192	86	113	102	53	58	118	62	49	61	60	73	60	219
CHESHIRE WPCF	103	91	216	214	107	112	148	62	29	34	24	13	43	85
MERIDEN WPCF	449	239	993	193	287	126	222	110	78	118	95	105	211	333
NEW HAVEN EAST WPCF	1568	1950	1410	1964	2071	3890	4669	4232	1360	593	649	798	470	1299
NORTH HAVEN WPCF	158	200	254	256	213	244	220	224	142	136	133	154	202	224
SOUTHINGTON WPCF	204	149	114	248	203	179	174	94	93	66	78	87	92	356
WALLINGFORD WPCF	269	413	777	587	603	433	493	334	252	224	204	243	289	514
WEST HAVEN WPCF	353	264	411	371	330	316	370	207	166	195	156	157	177	317

Zone 4

ANSONIA WPCF	115	53	85	69	71	52	68	75	58	22	24	24	35	52
BEACON FALLS WPCF	12	70	68	63	76	89	67	65	65	69	71	61	63	85
DANBURY WPCF	442	355	518	384	414	374	335	451	360	322	269	271	293	271
DERBY WPCF	71	78	105	89	96	90	98	73	59	59	51	56	92	73
LITCHFIELD WPCF	24	29	72	28	22	68	24	10	9	13	19	25	26	29
MILFORD BEAVER BROOK WPCF	94	70	111	82	127	65	66	51	43	47	48	62	60	80
MILFORD HOUSATONIC WPCF	307	299	366	406	435	413	265	175	453	295	225	167	189	193
NAUGATUCK TREATMENT Co.	246	356	727	944	464	340	319	213	259	236	170	154	157	294
NEW MILFORD WPCF	28	25	36	26	25	24	25	19	26	28	26	21	21	27
NEWTOWN WPCF	42	16	23	26	26	20	14	10	10	8	9	8	13	19
NORFOLK WPCF	11	19	18	16	21	39	21	21	19	8	10	27	14	13
NORTH CANAAN WPCF	13	36	38	51	57	45	37	29	22	20	24	32	40	37
SALISBURY WPCF	21	25	35	24	27	43	32	18	11	15	19	28	25	19
SEYMOUR WPCF	61	65	91	95	93	71	73	57	52	49	56	32	49	61
SHELTON WPCF	106	100	138	119	176	116	162	109	75	66	78	44	49	73
STRATFORD WPCF	356	250	253	414	528	350	181	137	157	203	170	211	181	217
THOMASTON WPCF	42	23	42	38	47	26	18	15	13	19	21	12	10	16

Total Nitrogen Balance Sheet – 2019 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TORRINGTON WCPF	248	191	220	310	189	223	284	190	161	111	99	104	138	265
WATERBURY WPCF	1010	1286	1240	1290	1662	1587	1562	979	554	597	1025	1081	1878	1978
Zone 5														
BRIDGEPORT EAST WPCF	362	249	336	312	243	181	196	182	444	163	215	205	245	264
BRIDGEPORT WEST WPCF	1041	1528	1928	1698	1602	1384	1240	1426	1150	1235	1659	1732	1474	1809
FAIRFIELD WPCF	406	308	350	276	291	263	345	358	309	332	328	303	246	291
WESTPORT WPCF	87	34	47	37	49	37	47	24	26	22	20	20	26	47
Zone 6														
GREENWICH WPCF	479	508	796	501	568	444	604	384	448	401	372	475	478	622
NEW CANAAN WPCF	64	22	44	27	31	27	23	10	13	13	10	19	17	34
NORWALK WPCF	718	567	749	612	697	575	578	489	557	513	459	531	432	610
RIDGEFIELD SOUTH ST. WPCF	29	44	69	54	51	49	56	34	28	27	26	31	43	65
STAMFORD WPCF	926	302	307	241	284	248	316	303	296	271	296	312	366	388
End of Pipe Total			26327	26223	26983	27242	26257	20816	16068	14099	15120	16814	17510	22490
Equalized Total			11645	11081	11316	11310	11537	9484	7262	6269	6808	7416	7662	10090

End of Pipe Permit = 18,450

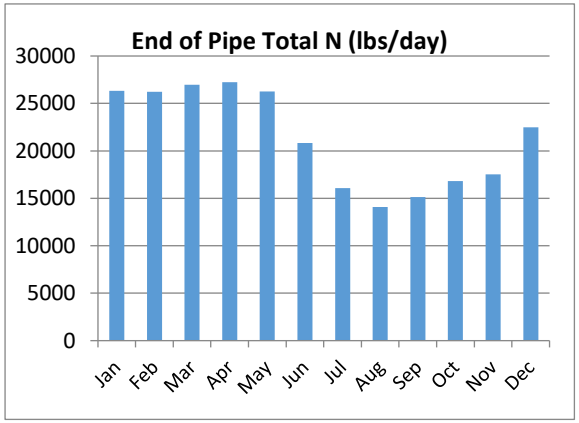
End of Pipe Avg = 21,329

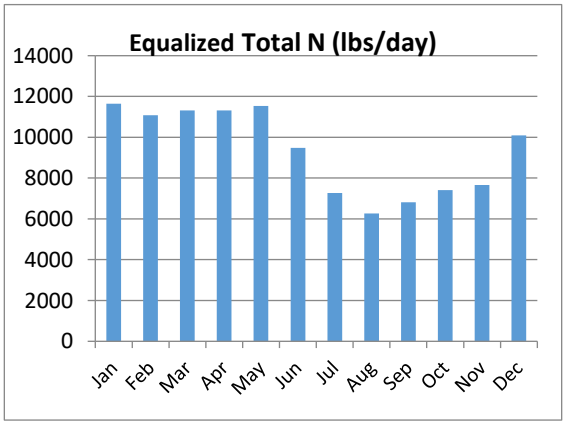
Equalized Permit = 9,148

Equalized Avg = 9,323

Project Facilities are in BOLD

SHADED ROW indicates the facility exceeded their limit





Attachment D

Total Nitrogen Balance Sheet – 2020 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zone 1														
GROTON CITY WPCF	99	72	89	94	81	78	81	42	48	52	55	71	78	98
GROTON TOWN WPCF	153	128	197	118	124	160	118	116	136	140	103	101	108	120
JEWETT CITY WPCF	15	5	6	11	4	4	4	3	2	2	2	3	3	10
KILLINGLY WPCF	131	197	116	126	140	298	376	446	278	216	106	121	82	58
LEDYARD WPCF	7	3	2	2	3	3	3	3	2	2	3	3	3	4
MONTVILLE WPCF	118	52	86	62	59	62	40	53	50	42	35	28	49	61
NEW LONDON WPCF	386	270	272	332	281	338	285	298	241	199	227	193	214	360
NORWICH WPCF	201	546	533	694	699	719	556	422	426	381	494	552	481	593
PLAINFIELD NORTH WPCF	34	50	76	76	85	108	89	34	21	12	13	17	23	44
PLAINFIELD VILLAGE WPCF	24	19	34	42	13	20	35	4	4	7	5	18	9	35
PUTNAM WPCF	53	39	97	71	43	40	27	25	29	19	31	21	32	33
SPRAGUE WPCF	7	17	18	20	17	13	13	20	17	21	13	14	15	20
STAFFORD SPRINGS WPCF	60	87	84	100	115	135	113	73	64	48	81	70	66	90
STONINGTON BOROUGH WPCF	14	9	7	4	5	4	5	12	24	27	14	3	3	5
STONINGTON MYSTIC WPCF	27	27	12	12	16	22	20	26	45	50	40	29	25	26
STONINGTON PAWCATUCK WPCF	24	20	36	52	20	23	17	19	15	12	11	10	12	15
THOMPSON WPCF	10	20	35	35	21	27	26	10	5	6	11	21	27	16
UCONN WPCF	44	28	47	56	51	68	9	5	5	16	17	20	28	19
WINDHAM WPCF	125	80	96	97	94	104	82	66	56	58	57	55	93	105
Zone 2														
BRISTOL WPCF	398	544	691	763	772	857	825	456	254	264	279	320	431	620
CANTON WPCF	24	48	54	59	52	58	59	61	41	43	38	33	36	47
EAST HAMPTON WPCF	54	89	95	102	105	127	126	100	80	52	52	51	73	106
EAST HARTFORD WPCF	292	313	428	383	346	367	326	251	242	267	296	278	279	291
EAST WINDSOR WPCF	59	40	61	53	50	69	44	43	25	14	19	29	29	48
ENFIELD WPCF	278	208	254	210	206	324	184	186	173	233	167	196	161	199
FARMINGTON WPCF	178	192	235	210	267	270	203	186	142	134	158	124	154	219
GLASTONBURY WPCF	98	85	80	83	67	113	96	62	80	75	49	63	85	162
HARTFORD WPCF	2377	2882	3662	3264	4155	3326	2658	1938	2636	2593	2690	2170	2095	3398
MANCHESTER WPCF	312	250	376	341	293	290	303	141	94	86	96	200	396	384
MATTABASSETT WPCF	1056	758	950	1064	892	1010	692	859	537	386	486	531	726	967
NEW HARTFORD WPCF	3	1	1	1	1	1	1	1	1	1	1	1	1	0
PLAINVILLE WPCF	101	107	220	153	208	127	119	66	49	48	61	53	80	104
PLYMOUTH WPCF	42	147	136	164	167	169	136	99	134	139	168	190	156	110
PORTLAND WPCF	31	26	17	29	29	31	27	26	18	16	19	9	51	37

Total Nitrogen Balance Sheet – 2020 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ROCKY HILL WPCF	288	270	278	307	279	525	362	183	156	146	174	183	210	435
SIMSBURY WPCF	107	44	64	72	47	52	39	34	35	25	43	35	47	40
SOUTH WINDSOR WPCF	106	96	104	87	96	126	108	82	95	84	81	87	85	113
SUFFIELD WPCF	45	18	32	18	17	25	27	14	14	9	12	14	18	21
VERNON WPCF	184	424	365	473	543	632	573	435	381	277	294	365	351	400
WINDSOR LOCKS WPCF	66	64	112	70	74	88	72	51	43	37	35	42	54	86
WINDSOR POQUONOCK WPCF	98	413	511	539	518	432	395	359	350	356	349	305	396	440
WINSTED WPCF	64	87	96	111	123	136	106	55	55	61	63	55	73	104

Zone 3

BRANFORD WPCF	192	111	236	89	82	217	129	69	74	68	82	123	69	95
CHESHIRE WPCF	103	67	72	104	127	120	77	20	78	47	31	40	35	54
MERIDEN WPCF	449	139	152	190	160	257	156	79	93	82	77	86	92	244
NEW HAVEN EAST WPCF	1568	838	1078	1440	1372	1349	1147	693	389	499	549	458	648	429
NORTH HAVEN WPCF	158	138	159	156	175	261	181	114	112	87	20	84	122	189
SOUTHINGTON WPCF	204	133	228	138	60	142	53	50	90	55	59	425	73	218
WALLINGFORD WPCF	269	399	511	460	500	539	485	343	266	226	279	292	340	541
WEST HAVEN WPCF	353	273	278	395	342	339	194	193	187	166	371	253	229	327

Zone 4

ANSONIA WPCF	115	37	47	38	33	47	57	38	22	19	25	23	44	49
BEACON FALLS WPCF	12	69	69	59	66	80	63	75	54	49	69	60	82	96
DANBURY WPCF	442	277	334	312	230	201	239	277	328	303	276	261	274	285
DERBY WPCF	71	69	59	59	61	61	67	57	56	73	51	55	83	140
LITCHFIELD WPCF	24	13	27	29	18	13	8	7	6	6	5	8	12	16
MILFORD BEAVER BROOK WPCF	94	68	73	65	71	78	83	72	89	51	51	59	54	66
MILFORD HOUSATONIC WPCF	307	230	249	184	237	338	352	194	151	239	163	172	218	264
NAUGATUCK TREATMENT Co.	246	225	260	244	252	301	231	136	135	282	237	188	193	241
NEW MILFORD WPCF	28	24	23	22	20	19	17	34	25	27	23	30	20	29
NEWTOWN WPCF	42	12	11	13	11	21	13	8	10	8	10	9	12	19
NORFOLK WPCF	11	16	19	25	27	24	19	10	9	6	8	10	17	15
NORTH CANAAN WPCF	13	26	35	32	25	26	25	18	23	20	20	25	30	30
SALISBURY WPCF	21	32	24	22	22	20	29	26	34	34	42	45	45	36
SEYMOUR WPCF	61	85	82	106	111	126	115	110	76	63	57	51	58	68
SHELTON WPCF	106	75	92	116	101	96	88	56	48	53	42	39	48	125
STRATFORD WPCF	356	356	754	389	306	375	231	338	689	247	342	227	157	212
THOMASTON WPCF	42	22	27	27	26	37	22	29	16	17	13	15	13	25

Total Nitrogen Balance Sheet – 2020 Monthly Averages by Plant

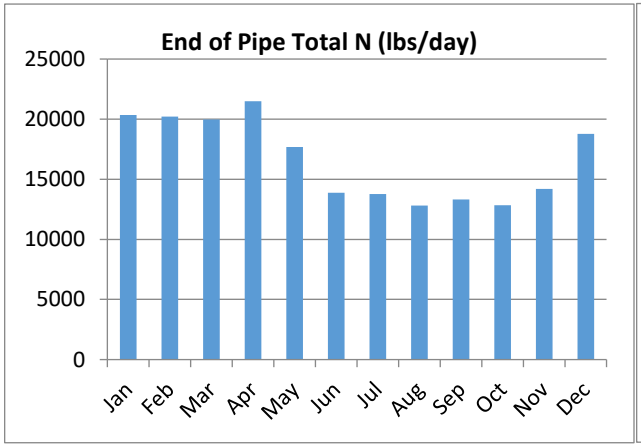
Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TORRINGTON WCPF	248	244	253	234	309	531	281	165	137	134	130	100	237	416
WATERBURY WPCF	1010	789	1199	853	757	1096	1177	633	644	482	499	492	695	940
Zone 5														
BRIDGEPORT EAST WPCF	362	220	235	275	200	274	261	288	173	144	192	143	231	225
BRIDGEPORT WEST WPCF	1041	1274	1134	1471	1277	1280	954	1104	1463	1414	1458	1103	1160	1465
FAIRFIELD WPCF	406	285	277	339	402	302	225	271	354	296	263	209	222	259
WESTPORT WPCF	87	31	64	62	39	35	22	23	21	16	15	17	28	35
Zone 6														
GREENWICH WPCF	479	418	515	376	369	469	421	324	291	343	369	461	507	576
NEW CANAAN WPCF	64	15	14	20	15	32	18	9	6	8	6	7	15	26
NORWALK WPCF	718	499	618	943	674	620	503	394	305	380	342	340	399	470
RIDGEFIELD SOUTH ST. WPCF	29	44	50	47	49	71	55	32	27	26	32	38	43	52
STAMFORD WPCF	926	278	413	313	264	323	316	211	179	189	168	210	356	394
End of Pipe Total			20336	20207	19968	21501	17694	13865	13763	12815	13324	12842	14199	18717
Equalized Total			8866	8954	8396	9270	7626	6083	6155	5776	5973	5680	6407	8170

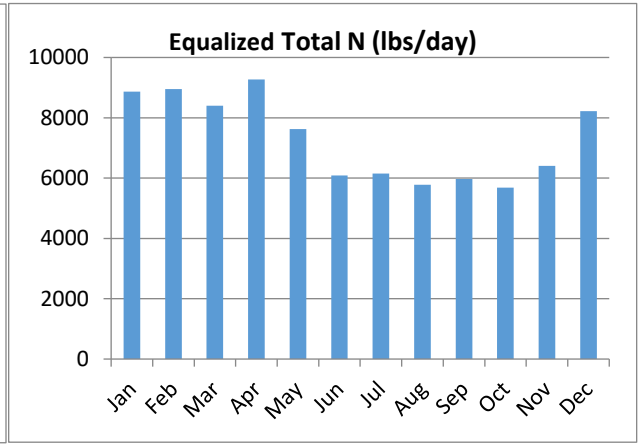
End of Pipe Permit = 18,450
End of Pipe Avg = 16,603

Equalized Permit = 9,148
Equalized Avg = 7,280

Project Facilities are in BOLD

SHADED ROW indicates the facility exceeded their limit





Attachment E

Total Nitrogen Balance Sheet - Monthly Averages lbs/day by plant , 2002 - 2020

ZONE:1	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg. from 2016 to 2020
GROTON CITY WPCF	210	161	179	132	118	129	110	114	107	99	76	98	98	80	80	83	80	77	72	78
GROTON TOWN WPCF	566	465	447	444	470	421	451	353	278	260	246	199	220	240	244	266	211	152	128	200
JEWETT CITY WPCF	36	40	39	13	10	13	13	8	9	6	5	11	7	9	7	14	6	12	5	9
KILLINGLY WPCF	162	147	159	177	152	158	191	126	170	247	225	277	151	129	102	128	223	153	197	161
LEDYARD WPC	5	3	4	5	7	5	7	5	5	6	6	6	7	4	6	6	7	4	3	5
MONTVILLE WPCF	187	153	222	92	98	69	82	91	82	115	63	54	62	55	51	45	63	67	52	56
NEW LONDON WPCF	449	405	332	434	423	414	377	391	335	304	243	296	281	280	380	373	366	301	270	338
NORWICH WPCF	758	986	769	748	828	684	673	612	481	470	457	535	562	452	512	515	507	535	546	523
PLAINFIELD NORTH WPCF	50	87	78	90	119	108	105	88	481	65	66	108	88	63	68	46	50	52	50	53
PLAINFIELD VILLAGE WPCF	32	44	41	49	54	42	42	43	51	31	28	48	49	56	29	31	29	30	19	28
PUTNAM WPCF	163	170	174	193	205	206	206	157	140	147	153	68	42	43	44	35	36	44	39	40
SPRAGUE WPCF	15	7	10	13	22	14	15	21	21	16	7	12	12	9	10	24	31	30	17	22
STAFFORD SPRINGS WPCF	135	131	121	131	114	120	160	162	129	191	208	164	89	74	63	76	88	79	87	79
STONINGTON BOROUGH WPCF	55	55	42	47	37	22	19	13	11	8	7	11	14	4	5	7	8	6	9	7
STONINGTON MYSTIC WPCF	36	43	49	48	51	31	30	25	32	28	30	41	30	15	20	41	60	26	27	35
STONINGTON PAWCATUCK	46	34	46	30	25	18	19	25	33	32	22	18	16	11	16	19	20	23	20	20
THOMPSON WPCF	21	35	29	33	28	28	21	18	30	29	44	31	47	36	41	45	48	32	20	37
UCONN WPCF	78	70	107	65	94	67	103	83	65	55	52	60	73	57	104	124	103	62	28	84
WINDHAM WPCF	265	243	216	165	167	174	258	364	340	289	146	112	141	92	82	133	202	107	80	121
End of Pipe Total	3269	3279	3064	2909	3022	2723	2882	2699	2800	2398	2084	2149	1989	1709	1864	2011	2138	1792	1669	1895
ZONE:2																				
BRISTOL WPCF	949	1121	793	567	575	532	511	452	560	632	416	517	508	427	414	506	613	630	544	541
CANTON WPCF	70	87	101	106	113	92	99	100	121	103	90	95	81	59	44	41	50	51	48	47
EAST HAMPTON WPCF	86	119	96	85	140	110	136	121	117	127	82	101	83	80	80	92	103	102	89	93
EAST HARTFORD WPCF	755	749	812	803	902	391	417	418	366	505	397	525	462	309	346	389	389	399	313	367
EAST WINDSOR WPCF	20	34	31	45	32	32	27	26	20	31	32	29	30	28	37	45	61	51	40	47
ENFIELD WPCF	914	839	275	535	331	218	272	282	248	324	219	252	253	238	155	203	247	253	208	213
FARMINGTON WPCF	386	354	401	398	440	433	309	269	250	340	241	289	311	373	268	315	382	255	192	282
GLASTONBURY WPCF	263	307	340	214	290	295	364	223	118	101	77	51	62	49	62	84	75	62	85	74
HARTFORD WPCF	5978	5900	6529	6831	7408	5839	5326	4217	3841	5090	3282	3888	3194	4360	3563	3546	3846	4218	2882	3611
MANCHESTER WPCF	822	762	755	772	785	715	705	851	866	1069	1064	946	674	293	174	152	271	313	250	232

Total Nitrogen Balance Sheet - Monthly Averages lbs/day by plant , 2002 - 2020

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg. from 2016 to 2020
MATTABASSETT WPCF	2120	1795	1453	1408	1202	1129	1053	1123	1261	1377	1200	1127	1198	822	402	529	797	535	758	604
MIDDLETOWN WPCF	392	385	424	486	440	397	446	490	497	567	521	581	544	501	503	467	512	488		493
NEW HARTFORD WPCF												3	4	1	1	2	1	1	1	1
PLAINVILLE WPCF	252	304	311	285	301	280	315	135	97	129	122	104	112	82	67	117	134	109	107	107
PLYMOUTH WPCF	73	69	68	76	80	71	87	85	68	100	74	83	67	57	23	57	85	115	147	85
PORTLAND WPCF	24	28	36	33	34	26	33	33	28	39	25	23	21	23	29	27	33	25	26	28
ROCKY HILL WPCF	631	767	780	919	787	610	484	526	498	542	446	412	420	457	350	293	376	247	270	307
SIMSBURY WCPF	344	316	323	368	206	84	70	84	43	84	50	48	57	37	36	48	37	40	44	41
SOUTH WINDSOR WPCF	298	324	317	340	298	322	323	326	342	276	111	109	103	104	95	90	96	93	96	94
SUFFIELD WPCF	34	37	38	72	88	74	88	47	25	35	34	36	27	22	21	26	21	17	18	21
VERNON WPCF	483	663	538	488	580	469	426	361	386	520	422	344	427	395	424	529	565	510	424	490
WINDSOR LOCKS WPCF	131	116	100	143	98	94	110	113	96	89	58	71	56	51	49	64	88	85	64	70
WINDSOR POQUONOCK	427	422	441	467	432	419	457	450	494	500	483	512	525	503	482	534	571	574	413	515
WINSTED WPCF	250	187	201	206	223	120	82	66	64	70	63	79	84	72	60	71	92	103	87	83
End of Pipe Total	15701	15683	15163	15647	15785	12752	12140	10798	10406	12650	9509	10225	9303	9343	7685	8227	9445	9276	7106	8446
ZONE:3																				
BRANFORD WPCF	142	79	129	135	103	111	105	94	110	102	94	131	108	92	113	100	101	86	111	102
CHESHIRE WPCF	468	492	536	480	171	74	75	63	38	74	48	78	73	60	56	93	145	91	67	90
MERIDEN WPCF	860	917	882	781	827	810	1008	1051	696	253	142	164	145	116	159	98	189	239	139	165
NEW HAVEN EAST WPCF	1400	1630	1408	1703	2271	2201	1650	1592	1494	1993	1493	1667	2894	3183	1224	648	1696	1950	838	1271
NORTH HAVEN WPCF	534	502	489	424	226	214	249	191	164	199	172	150	158	138	145	179	213	200	138	175
SOUTHINGTON WPCF	819	798	768	754	761	868	911	725	194	262	99	99	198	83	136	180	114	149	133	142
WALLINGFORD WPCF	549	601	627	657	522	340	381	429	456	517	356	427	423	463	379	415	529	413	399	427
WEST HAVEN WPCF	796	668	511	601	546	498	779	549	612	673	326	249	291	211	196	229	257	264	273	244
End of Pipe Total	5568	5687	5349	5535	5427	5116	5158	4694	3764	4073	2730	2965	4290	4346	2408	1942	3244	3392	2098	2617
ZONE:4																				
ANSONIA WPCF	273	307	260	287	289	237	260	270	178	76	63	59	59	52	43	44	61	53	37	48
BEACON FALLS WPCF	41	45	38	42	44	50	57	58	60	52	40	42	52	50	48	50	56	70	69	59
DANBURY WPCF	1866	1875	1825	1766	2072	1778	1885	1974	644	576	462	401	374	339	346	348	395	355	277	344
DERBY WPCF	53	64	58	59	65	63	64	64	63	82	71	54	66	68	81	63	67	78	69	72
LITCHFIELD WPCF	67	54	35	49	39	38	45	43	35	39	24	24	21	16	12	18	22	29	13	19
MILFORD BEAVER BROOK	130	180	120	127	130	132	121	137	101	127	74	70	55	51	48	70	113	70	68	74

Total Nitrogen Balance Sheet - Monthly Averages lbs/day by plant , 2002 - 2020

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg. from 2016 to 2020
MILFORD HOUSATONIC	439	429	431	479	574	662	742	324	238	598	291	343	365	262	206	263	291	299	230	258
NAUGATUCK TREATMENT	479	440	234	279	263	250	344	345	248	320	222	251	232	182	162	240	306	356	225	258
NEW MILFORD WPCF	76	52	56	91	86	88	103	109	135	117	32	27	25	24	23	38	26	25	24	27
NEWTOWN WPCF	34	50	32	24	36	26	19	18	21	20	18	15	13	15	13	13	17	16	12	14
NORFOLK WPCF	9	13	12	20	29	32	29	26	23	30	21	17	16	12	14	15	16	19	16	16
NORTH CANAAN WPCF	18	22	21	31	23	25	24	25	26	26	24	28	25	27	28	42	35	36	26	33
SALISBURY WPCF	27	27	23	28	29	28	34	32	34	35	28	33	28	22	21	28	34	25	32	28
SEYMOUR WPCF	55	56	61	69	66	62	58	69	62	89	41	52	63	53	57	58	85	65	85	70
SHELTON WPCF	452	545	509	501	480	413	219	219	113	121	69	61	64	87	86	99	197	100	75	111
SOUTHBURY TR. SCHOOL	17	18	16	14	10	7	8	4	7	9	3	3								
STRATFORD WPCF	535	646	431	539	537	616	1425	605	245	259	179	300	352	245	198	305	386	250	356	299
THOMASTON WPCF	35	51	45	45	44	32	42	40	25	27	18	31	29	21	20	24	29	23	22	24
TORRINGTON WCPF	283	299	287	254	265	247	275	226	242	298	195	266	250	274	227	236	254	191	244	230
WATERBURY WPCF	778	1335	913	965	1001	1034	869	857	802	914	582	742	667	571	504	814	907	1286	789	860
End of Pipe Total	5667	6508	5407	5669	6082	5820	6623	5445	3302	3815	2457	2819	2756	2371	2137	2768	3297	3346	2669	2843
ZONE:5																				
BRIDGEPORT EAST WPCF	568	615	459	470	468	271	253	301	412	376	325	444	400	357	228	213	271	249	220	236
BRIDGEPORT WEST WPCF	2305	2306	1158	1564	1145	1146	1262	1019	1211	1017	1006	919	925	1029	1452	1277	1761	1589	1274	1471
FAIRFIELD WPCF	735	453	417	383	530	408	488	431	325	388	338	296	273	296	299	310	381	308	285	317
WESTPORT WPCF	140	133	152	148	153	70	44	38	41	35	25	27	28	20	24	29	39	34	31	31
End of Pipe Total	3748	3508	2186	2565	2296	1895	2047	1789	1989	1816	1694	1686	1626	1702	2003	1829	2452	2180	1810	2055
ZONE:6																				
GREENWICH WPCF	410	459	443	556	520	697	479	461	458	572	430	443	475	441	443	482	569	508	418	484
NEW CANAAN WPCF	21	24	20	30	30	38	29	30	29	39	21	25	26	17	14	16	26	22	15	19
NORWALK WPCF	605	888	784	818	755	1043	766	881	600	742	640	702	738	583	625	551	752	567	499	599
RIDGEFIELD SOUTH ST.	23	27	28	35	28	32	34	38	42	39	38	47	43	43	45	41	52	44	44	45
STAMFORD WPCF	1652	1645	1523	1418	1029	726	550	510	497	592	506	440	408	278	265	261	293	302	278	280
End of Pipe Total	2711	3044	2798	2857	2362	2536	1858	1920	1626	1984	1635	1657	1690	1362	1392	1351	1692	1443	1254	1426
State End of Pipe Total	36664	37708	33966	33182	34974	30842	30702	27345	27345	26736	20109	21501	21654	20833	17489	18128	22268	21429	16606	19283

Attachment F

2019 LIS Total Nitrogen Credit Exchange
Under the Self-Sufficient Program
FINAL

SELLING Credits

Facility Name	Equalized Credits	2019 at $6.453466
STAMFORD WPCF	624.00	$1,469,841
NORWALK WPCF	151.00	$355,683
MERIDEN WPCF	102.90	$242,383
BRIDGEPORT EAST WPCF	96.05	$226,247
FAIRFIELD WPCF	83.30	$196,214
STRATFORD WPCF	71.02	$167,289
BRANFORD WPCF	63.60	$149,811
MATTABASSETT WPCF	61.97	$145,971
WEST HAVEN WPCF	53.40	$125,785
WESTPORT WPCF	45.05	$106,116
NEW CANAAN WPCF	42.00	$98,932
ANSONIA WPCF	41.54	$97,848
DANBURY WPCF	40.02	$94,268
TORRINGTON WCPF	34.20	$80,559
SOUTHINGTON WPCF	26.95	$63,481
MILFORD BEAVER BROOK WPCF	16.08	$37,877
NEW LONDON WPCF	15.30	$36,039
SIMSBURY WPCF	12.06	$28,408
NEWTOWN WPCF	11.96	$28,172
THOMASTON WPCF	11.40	$26,853
MONTVILLE WPCF	9.18	$21,624
ROCKY HILL WPCF	8.20	$19,315
GLASTONBURY WPCF	7.20	$16,960
CHESHIRE WPCF	5.88	$13,850
MILFORD HOUSATONIC WPCF	5.36	$12,626
SUFFIELD WPCF	5.32	$12,531
ENFIELD WPCF	4.75	$11,189
SHELTON WPCF	4.02	$9,469
GROTON CITY WPCF	3.96	$9,328
WINDHAM WPCF	2.70	$6,360
SOUTH WINDSOR WPCF	2.47	$5,818
EAST WINDSOR WPCF	1.52	$3,580
STONINGTON BOROUGH WPCF	1.44	$3,392
NEW MILFORD WPCF	1.38	$3,251
PUTNAM WPCF	1.26	$2,968
PORTLAND WPCF	1.20	$2,827
LEDYARD WPCF	0.54	$1,272
JEWETT CITY WPCF	0.51	$1,201
NEW HARTFORD WPCF	0.36	$848
GROTON TOWN WPCF	0.18	$424
STONINGTON MYSTIC WPCF	0.18	$424
STONINGTON PAWCATUCK WPCF	0.17	$400
Total	**1671.58**	**$3,937,432**

BUYING Credits

Facility Name	Equalized Credits	2019 at $5.81
BRIDGEPORT WEST WPCF	413.95	$877,843
HARTFORD WPCF	368.20	$780,823
NEW HAVEN EAST WPCF	229.20	$486,053
WATERBURY WPCF	165.60	$351,180
WINDSOR POQUONOCK WPCF	90.44	$191,792
WALLINGFORD WPCF	86.40	$183,224
NAUGATUCK TREATMENT Co.	66.00	$139,963
VERNON WPCF	61.94	$131,353
NORWICH WPCF	60.12	$127,493
MIDDLETOWN WPCF	49.99	$106,011
BRISTOL WPCF	41.76	$88,558
BEACON FALLS WPCF	38.86	$82,408
GREENWICH WPCF	29.00	$61,499
NORTH HAVEN WPCF	25.20	$53,440
EAST HARTFORD WPCF	20.33	$43,113
RIDGEFIELD SOUTH ST. WPCF	15.00	$31,810
FARMINGTON WPCF	13.86	$29,392
PLYMOUTH WPCF	13.14	$27,865
EAST HAMPTON WPCF	9.60	$20,358
NORTH CANAAN WPCF	8.05	$17,071
WINSTED WPCF	7.02	$14,887
CANTON WPCF	4.86	$10,306
DERBY WPCF	4.69	$9,946
THOMPSON WPCF	3.96	$8,398
SPRAGUE WPCF	3.68	$7,804
WINDSOR LOCKS WPCF	3.61	$7,656
KILLINGLY WPCF	3.08	$6,532
STAFFORD SPRINGS WPCF	2.85	$6,044
NORFOLK WPCF	2.80	$5,938
UCONN WPCF	2.70	$5,726
SEYMOUR WPCF	2.68	$5,683
PLAINFIELD NORTH WPCF	2.52	$5,344
LITCHFIELD WPCF	1.75	$3,711
PLAINVILLE WPCF	1.44	$3,054
SALISBURY WPCF	1.40	$2,969
PLAINFIELD VILLAGE WPCF	0.84	$1,781
MANCHESTER WPCF	0.19	$403
Total	**1856.71**	**$3,937,432**

The self-sufficient program was approved under Public Act 15-38 in 2016. The program consists of buyers purchasing the credits (1856.71 credits at $5.81) they need to meet their Nitrogen General Permit (NGP) limits, with those payments ($3,937,432) being shared proportionally amongst the facilities (1,671.58 credits at $6.453466) that met their NGP limits and are selling their excess allowance for the year. The State no longer purchases excess credits. The calendar year 2019 credits are traded in 2020.

Attachment G

2020 LIS Total Nitrogen Credit Exchange
Under the Self-Sufficient Program
FINAL

SELLING Credits

Facility Name	Equalized Credits	2020 at $1.361491
STAMFORD WPCF	648.00	$322,020
NEW HAVEN EAST WPCF	438.00	$217,662
NORWALK WPCF	219.00	$108,831
MERIDEN WPCF	151.90	$75,486
WATERBURY WPCF	132.60	$65,895
BRIDGEPORT EAST WPCF	120.70	$59,981
FAIRFIELD WPCF	102.85	$51,111
DANBURY WPCF	75.90	$37,718
GREENWICH WPCF	61.00	$30,314
MATTABASSETT WPCF	59.60	$29,618
ANSONIA WPCF	52.26	$25,970
MILFORD HOUSATONIC WPCF	51.59	$25,637
BRANFORD WPCF	48.60	$24,152
WEST HAVEN WPCF	48.00	$23,853
WESTPORT WPCF	47.60	$23,655
NEW CANAAN WPCF	49.00	$24,350
SOUTHINGTON WPCF	34.79	$17,289
NEW LONDON WPCF	20.88	$10,376
SHELTON WPCF	20.77	$10,322
CHESHIRE WPCF	17.64	$8,766
MILFORD BEAVER BROOK WPCF	17.42	$8,657
NEWTOWN WPCF	13.80	$6,858
ENFIELD WPCF	13.30	$6,609
NAUGATUCK TREATMENT Co.	12.60	$6,262
NORTH HAVEN WPCF	12.00	$5,963
THOMASTON WPCF	12.00	$5,963
MONTVILLE WPCF	11.88	$5,904
MANCHESTER WPCF	11.78	$5,854
SIMSBURY WPCF	11.34	$5,635
WINDHAM WPCF	6.75	$3,354
SUFFIELD WPCF	5.13	$2,549
GROTON CITY WPCF	4.86	$2,415
GROTON TOWN WPCF	4.50	$2,236
LITCHFIELD WPCF	3.85	$1,913
EAST WINDSOR WPCF	3.61	$1,794
ROCKY HILL WPCF	3.60	$1,789
GLASTONBURY WPCF	2.60	$1,292
TORRINGTON WCPF	2.40	$1,193
UCONN WPCF	2.40	$1,193
PUTNAM WPCF	1.96	$974
SOUTH WINDSOR WPCF	1.90	$944
NEW MILFORD WPCF	1.84	$914
JEWETT CITY WPCF	1.70	$845
DERBY WPCF	1.34	$666
PORTLAND WPCF	1.00	$497
STONINGTON BOROUGH WPCF	0.90	$447
LEDYARD WPCF	0.72	$358
PLAINFIELD VILLAGE WPCF	0.70	$348
STONINGTON PAWCATUCK WPCF	0.68	$338
WINDSOR LOCKS WPCF	0.38	$189
NEW HARTFORD WPCF	0.36	$179
STONINGTON MYSTIC WPCF	0.00	$0
STRATFORD WPCF	0.00	$0
Total Sum	**2569.98**	**$1,277,137**

BUYING Credits

Facility Name	Equalized Credits	2020 at $4.92
BRIDGEPORT WEST WPCF	198.05	$355,658
HARTFORD WPCF	101.00	$181,376
WALLINGFORD WPCF	78.00	$140,072
NORWICH WPCF	62.10	$111,519
WINDSOR POQUONOCK WPCF	59.85	$107,479
VERNON WPCF	45.60	$81,888
BEACON FALLS WPCF	38.19	$68,582
BRISTOL WPCF	26.28	$47,194
PLYMOUTH WPCF	18.90	$33,941
SEYMOUR WPCF	16.08	$28,876
RIDGEFIELD SOUTH ST. WPCF	15.00	$26,937
KILLINGLY WPCF	9.24	$16,593
EAST HAMPTON WPCF	7.00	$12,571
NORTH CANAAN WPCF	4.55	$8,171
CANTON WPCF	4.32	$7,758
WINSTED WPCF	4.14	$7,435
STAFFORD SPRINGS WPCF	4.05	$7,273
EAST HARTFORD WPCF	3.99	$7,165
SALISBURY WPCF	3.85	$6,914
FARMINGTON WPCF	2.52	$4,525
PLAINFIELD NORTH WPCF	2.24	$4,023
THOMPSON WPCF	1.80	$3,232
NORFOLK WPCF	1.75	$3,143
SPRAGUE WPCF	1.60	$2,873
PLAINVILLE WPCF	1.08	$1,939
Total Sum	**711.18**	**$1,277,137**

The self-sufficient program was approved under Public Act 15-38 in 2016. The program consists of buyers purchasing the credits (711.18 credits at $4.92) they need to meet their Nitrogen General Permit (NGP) limits, with those payments ($1,277,137) being shared proportionally amongst the facilities (2,569.98 credits at $1.361491) that met their NGP limits and are selling their excess allowance for the year. The State no longer purchases excess credits. The calendar year 2020 credits are traded in 2021.

Attachment H

Nitrogen Load Reductions by Project Facilities – 2019

Project Facilities	Baseline Load (lbs./day)	2019 Average TN (lbs./day)	EOP Reduced (lbs./day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs./day)
ANSONIA WPCF	314	53	261	0.67	174.87
BRANFORD WPCF	526	86	440	0.6	264
BRIDGEPORT EAST WPCF	991	249	742	0.85	630.7
BRIDGEPORT WEST WPCF	2852	1528	1324	0.85	1125.40
BRISTOL WPCF	1091	630	461	0.18	82.98
CHESHIRE WPCF	281	91	190	0.49	93.1
DANBURY WPCF	1211	355	856	0.46	393.76
DERBY WPCF	195	78	117	0.67	78.39
EAST HAMPTON WPCF	148	102	46	0.2	9.2
EAST HARTFORD WPCF	801	399	402	0.19	76.38
EAST WINDSOR WPCF	163	51	112	0.19	21.28
ENFIELD WPCF	763	253	510	0.19	96.9
FAIRFIELD WPCF	1113	308	805	0.85	684.25
GLASTONBURY WPCF	268	62	206	0.2	41.2
GREENWICH WPCF	1313	508	805	1	805
GROTON CITY WPCF	272	77	195	0.18	35.1
GROTON TOWN WPCF	420	152	268	0.18	48.24
HARTFORD WPCF	6512	4218	2294	0.2	458.8
JEWETT CITY WPCF	42	12	30	0.17	5.1
LEDYARD WPCF	20	4	16	0.18	2.88
LITCHFIELD WPCF	64	29	35	0.35	12.25
MANCHESTER WPCF	855	313	542	0.19	102.98
MATTABASSETT WPCF	2315.68	538	1777.68	0.2	355.536
MERIDEN WPCF	1230	239	991	0.49	485.59
MILFORD BEAVER BROOK WPCF	258	70	188	0.67	125.96
MILFORD HOUSATONIC WPCF	844	299	545	0.67	365.15
MONTVILLE WPCF	323	67	256	0.18	46.08
NEW CANAAN WPCF	175	22	153	1	153
NEW HARTFORD WPCF	12	1	11	0.18	1.98
NEW HAVEN EAST WPCF	4294	1950	2344	0.6	1406.4
NEW LONDON WPCF	1057	301	756	0.18	136.08
NEW MILFORD WPCF	66	25	41	0.46	18.86
NEWTOWN WPCF	45	16	29	0.46	13.34
NORTH HAVEN WPCF	433	200	233	0.6	139.8
NORWALK WPCF	1967	567	1400	1	1400
PLAINVILLE WPCF	277	109	168	0.18	30.24
PLYMOUTH WPCF	114	115	-1	0.18	-0.18
PORTLAND WPCF	86	25	61	0.2	12.2
PUTNAM WPCF	145	44	101	0.14	14.14

Nitrogen Load Reductions by Project Facilities – 2019

Project Facilities	Baseline Load (lbs./day)	2019 Average TN (lbs./day)	EOP Reduced (lbs./day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs./day)
RIDGEFIELD SOUTH ST. WPCF	80	44	36	1	36
ROCKY HILL WPCF	789	247	542	0.2	108.4
SEYMOUR WPCF	167	65	102	0.67	68.34
SHELTON WPCF	290	100	190	0.67	127.3
SIMSBURY WPCF	293	40	253	0.18	45.54
SOUTH WINDSOR WPCF	289	93	196	0.19	37.24
SOUTHINGTON WPCF	557	149	408	0.49	199.92
STAFFORD WPCF	164	79	85	0.15	12.75
STAMFORD WPCF	2536	302	2234	1	2234
STONINGTON MYSTIC WPCF	74	26	48	0.18	8.64
STRATFORD WPCF	974	250	724	0.67	485.08
SUFFIELD WPCF	122	17	105	0.19	19.95
THOMASTON WPCF	114	23	91	0.6	54.6
TORRINGTON WPCF	680	191	489	0.6	293.4
UCONN WPCF	120	62	58	0.15	8.7
WALLINGFORD WPCF	737	413	324	0.6	194.4
WATERBURY WPCF	2766	1286	1480	0.6	888
WEST HAVEN WPCF	967	264	703	0.6	421.8
WESTPORT WPCF	238	34	204	0.85	173.4
WINDHAM WPCF	344	107	237	0.15	35.55
WINDSOR LOCKS WPCF	180	85	95	0.19	18.05
WINSTED WPCF	175	103	72	0.18	12.96
Average daily reduction in equalized pounds:					**15430.956**
Annual reduction in equalized pounds:					**5,632,298.94**
Project Cost:					**$ 32,748,062**
Buyer's Cost of a Credit:					**$ 5.81**
Seller's Cost of a Credit:					**$ 6.453466**

Bold = Became a Project Facility in 2019

Attachment I

Nitrogen Load Reductions by Project Facilities – 2020

Project Facilities	Baseline Load (lbs./day)	2020 Average TN (lbs./day)	EOP Reduced (lbs./day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs./day)
ANSONIA WPCF	314	37	277	0.67	185.59
BRANFORD WPCF	526	111	415	0.6	249
BRIDGEPORT EAST WPCF	991	220	771	0.85	655.35
BRIDGEPORT WEST WPCF	2852	1274	1578	0.85	1341.30
BRISTOL WPCF	1091	544	547	0.18	98.46
CHESHIRE WPCF	281	67	214	0.49	104.86
DANBURY WPCF	1211	277	934	0.46	429.64
DERBY WPCF	195	69	126	0.67	84.42
EAST HAMPTON WPCF	148	89	59	0.2	11.8
EAST HARTFORD WPCF	801	313	488	0.19	92.72
EAST WINDSOR WPCF	163	40	123	0.19	23.37
ENFIELD WPCF	763	208	555	0.19	105.45
FAIRFIELD WPCF	1113	285	828	0.85	703.8
FARMINGTON WPCF	486	192	294	0.18	52.92
GLASTONBURY WPCF	268	85	183	0.2	36.6
GREENWICH WPCF	1313	418	895	1	895
GROTON CITY WPCF	272	72	200	0.18	36
GROTON TOWN WPCF	420	128	292	0.18	52.56
HARTFORD WPCF	6512	2882	3630	0.2	726
JEWETT CITY WPCF	42	5	37	0.17	6.29
LEDYARD WPCF	20	3	17	0.18	3.06
LITCHFIELD WPCF	64	13	51	0.35	17.85
MANCHESTER WPCF	855	250	605	0.19	114.95
MATTABASSETT WPCF	2854	758	2096	0.2	419.2
MERIDEN WPCF	1230	139	1091	0.49	534.59
MILFORD BEAVER BROOK WPCF	258	68	190	0.67	127.3
MILFORD HOUSATONIC WPCF	844	230	614	0.67	411.38
MONTVILLE WPCF	323	52	271	0.18	48.78
NAUGATUCK WPCF	675	225	450	0.6	270
NEW CANAAN WPCF	175	15	160	1	160
NEW HARTFORD WPCF	12	1	11	0.18	1.98
NEW HAVEN EAST WPCF	4294	838	3456	0.6	2073.6
NEW LONDON WPCF	1057	270	787	0.18	141.66
NEW MILFORD WPCF	66	24	42	0.46	19.32
NEWTOWN WPCF	45	12	33	0.46	15.18
NORTH HAVEN WPCF	433	138	295	0.6	177
NORWALK WPCF	1967	499	1468	1	1468
PLAINVILLE WPCF	277	107	170	0.18	30.6
PLYMOUTH WPCF	114	147	-33	0.18	-5.94

Nitrogen Load Reductions by Project Facilities – 2020

Project Facilities	Baseline Load (lbs./day)	2020 Average TN (lbs./day)	EOP Reduced (lbs./day)	Eq. Factor	Eq. Lbs Reduced (eq. lbs./day)
PORTLAND WPCF	86	26	60	0.2	12
PUTNAM WPCF	145	39	106	0.14	14.84
RIDGEFIELD SOUTH ST. WPCF	80	44	36	1	36
ROCKY HILL WPCF	789	270	519	0.2	103.8
SEYMOUR WPCF	167	85	82	0.67	54.94
SHELTON WPCF	290	75	215	0.67	144.05
SIMSBURY WPCF	293	44	249	0.18	44.82
SOUTH WINDSOR WPCF	289	96	193	0.19	36.67
SOUTHINGTON WPCF	557	133	424	0.49	207.76
STAFFORD WPCF	164	87	77	0.15	11.55
STAMFORD WPCF	2536	278	2258	1	2258
STONINGTON MYSTIC WPCF	74	27	47	0.18	8.46
STRATFORD WPCF	974	356	618	0.67	414.06
SUFFIELD WPCF	122	18	104	0.19	19.76
THOMASTON WPCF	114	22	92	0.6	55.2
TORRINGTON WPCF	680	244	436	0.6	261.6
UCONN WPCF	120	28	92	0.15	13.8
WALLINGFORD WPCF	737	399	338	0.6	202.8
WATERBURY WPCF	2766	789	1977	0.6	1186.2
WEST HAVEN WPCF	967	273	694	0.6	416.4
WESTPORT WPCF	238	31	207	0.85	175.95
WINDHAM WPCF	344	80	264	0.15	39.6
WINDSOR LOCKS WPCF	180	64	116	0.19	22.04
WINSTED WPCF	175	87	88	0.18	15.84
Average daily reduction in equalized pounds					**17675.78**
Annual reduction in equalized pounds					**6,451,659.70**
Project Cost					**$ 31,722,749**
Buyer's Cost of a Credit					**$ 4.92**
Seller's Cost of a Credit					**$ 1.361491**

Bold = Became a Project Facility in 2020

Attachment J

Total Annual Project Cost – 2019

Project Facilities	Total Annual Capital Cost from Nitrogen Removal Projects	Total Annual O&M Cost from Project Facilities	Total Annual Project Cost
ANSONIA WPCF	$465,697	$170,107	$635,804
BRANFORD WPCF	$168,661	$145,606	$314,267
BRIDGEPORT EAST WPCF	95,092	$753,918	$849,010
BRIDGEPORT WEST WPCF	$107,232	$835,950	$943,182
BRISTOL WPCF	$28,545	$373,372	$401,917
CHESHIRE WPCF	$314,127	$387,475	$701,602
DANBURY WPCF	$155,057	$762,874	$917,931
DERBY WPCF	$31,785	$165,767	$197,552
EAST HAMPTON WPCF	$30,169	$91,887	$122,056
EAST HARTFORD WPCF	$73,978	$187,822	$261,800
EAST WINDSOR WPCF	$0	$181,566	$181,566
ENFIELD WPCF	$0	$385,382	$385,382
FAIRFIELD WPCF	$514,885	$536,971	$1,051,856
GLASTONBURY WPCF	$272,568	$302,575	$575,143
GREENWICH WPCF	$0	$166,615	$166,615
GROTON CITY WPCF	$0	$114,957	$114,957
GROTON TOWN WPCF	$242,100	$205,986	$448,086
HARTFORD WPCF	$1,752,285	$1,081,052	$2,833,337
JEWETT CITY WPCF	$65,659	$123,602	$189,261
LEDYARD WPCF	$0	$20,750	$20,750
LITCHFIELD WPCF	$45,829	$42,788	$88,617
MANCHESTER WPCF	$333,911	$105,829	$439,740
MATTABASSETT WPCF	$1,235,054	$535,631	$1,770,685
MERIDEN WPCF	$1,381,784	$651,862	$2,033,646
MILFORD BEAVER BROOK WPCF	$68,543	$118,975	$187,518
MILFORD HOUSATONIC WPCF	$399,082	$222,246	$621,328
MONTVILLE WPCF	$0	$140,883	$140,883
NEW CANAAN WPCF	$56,656	$110,280	$166,936
NEW HARTFORD WPCF	$0	$63,560	$63,560
NEW HAVEN EAST WPCF	$478,591	$744,228	$1,222,819
NEW LONDON WPCF	$113,417	$275,209	$388,626
NEW MILFORD WPCF	$299,782	$43,838	$343,620
NEWTOWN WPCF	$0	$148,913	$148,913
NORTH HAVEN WPCF	$52,930	$118,955	$171,885
NORWALK WPCF	$276,853	$282,411	$559,264
PLAINVILLE WPCF	$253,448	$91,804	$345,252

Total Annual Project Cost – 2019

Project Facilities	Total Annual Capital Cost from Nitrogen Removal Projects	Total Annual O&M Cost from Project Facilities	Total Annual Project Cost
PLYMOUTH WPCF	$30,972	$48,391	$79,363
PORTLAND WPCF	$44,740	$58,734	$103,474
PUTNAM WPCF	$0	$98,531	$98,531
RIDGEFIELD SOUTH ST. WPCF	$0	$34,137	$34,137
ROCKY HILL WPCF	$406,463	$188,416	$594,879
SEYMOUR WPCF	$0	$95,780	$95,780
SHELTON WPCF	$182,428	$360,444	$542,872
SIMSBURY WPCF	$211,063	$78,597	$289,660
SOUTH WINDSOR WPCF	$303,783	$184,718	$488,501
SOUTHINGTON WPCF	$663,190	$427,644	$1,090,834
STAFFORD WPCF	$0	$68,930	$68,930
STAMFORD WPCF	$2,238,236	$1,044,906	$3,283,142
STONINGTON MYSTIC WPCF	$0	$72,432	$72,432
STRATFORD WPCF	$429,871	$429,100	$858,971
SUFFIELD WPCF	$0	$100,108	$100,108
THOMASTON WPCF	$56,408	$133,373	$189,781
TORRINGTON WPCF	$0	$242,709	$242,709
UCONN WPCF	$0	$237,667	$237,667
WALLINGFORD WPCF	$120,828	$85,593	$206,421
WATERBURY WCPF	$737,935	$927,228	$1,665,163
WEST HAVEN WPCF	$560,923	$703,696	$1,264,619
WESTPORT WPCF	$350,705	$138,344	$489,049
WINDHAM WPCF	$69,630	$318,053	$387,683
WINDSOR LOCKS WPCF	$84,200	$78,308	$162,508
WINSTED WPCF	$38,596	$56,887	$95,483
TOTAL	$15,843,691	$16,904,371	$32,748,063

Project Facility: defined as any facility with a fully operational nitrogen removal system of any scale as of January 1st of the trading year.

Nitrogen Removal Project: defined as any alteration to the physical structure of a WPCF specifically constructed to remove nitrogen and financed by Connecticut's Clean Water Fund (CWF) program.

Rocky Hill became a Project Facility in 2019 after completing a Nitrogen Removal Project the previous year.

Attachment K

Total Annual Project Cost – 2020

Project Facilities	Total Annual Capital Cost from Nitrogen Removal Projects	Total Annual O&M Cost from Project Facilities	Total Annual Project Cost
ANSONIA WPCF	$465,697	$106,162	$571,859
BRANFORD WPCF	$168,661	$113,165	$281,826
BRIDGEPORT EAST WPCF	95,092	$222,737	$317,829
BRIDGEPORT WEST WPCF	$107,232	$466,503	$573,735
BRISTOL WPCF	$28,545	$393,789	$422,334
CHESHIRE WPCF	$314,127	$284,904	$599,031
DANBURY WPCF	$155,057	$573,628	$728,685
DERBY WPCF	$31,785	$82,101	$113,886
EAST HAMPTON WPCF	$30,169	$87,193	$117,362
EAST HARTFORD WPCF	$73,978	$297,603	$371,581
EAST WINDSOR WPCF	$0	$74,655	$74,655
ENFIELD WPCF	$0	$374,878	$374,878
FAIRFIELD WPCF	$514,885	$484,469	$999,354
FARMINGTON WPCF	$195,484	$137,201	$332,685
GLASTONBURY WPCF	$272,568	$239,600	$512,168
GREENWICH WPCF	$0	$206,845	$206,845
GROTON CITY WPCF	$0	$85,828	$85,828
GROTON TOWN WPCF	$242,100	$189,899	$431,999
HARTFORD WPCF	$1,752,285	$813,180	$2,565,465
JEWETT CITY WPCF	$65,659	$106,080	$171,739
LEDYARD WPCF	$0	$6,500	$6,500
LITCHFIELD WPCF	$45,829	$46,305	$92,134
MANCHESTER WPCF	$333,911	$336,569	$670,480
MATTABASSETT WPCF	$1,235,054	$535,394	$1,770,448
MERIDEN WPCF	$1,381,784	$676,450	$2,058,234
MILFORD BEAVER BROOK WPCF	$68,543	$146,067	$214,610
MILFORD HOUSATONIC WPCF	$399,082	$287,664	$686,746
MONTVILLE WPCF	$0	$152,904	$152,904
NAUGATUCK WPCF	$0	$47,793	$47,793
NEW CANAAN WPCF	$56,656	$112,454	$169,110
NEW HARTFORD WPCF	$0	$42,635	$42,635
NEW HAVEN EAST WPCF	$478,591	$775,445	$1,254,036
NEW LONDON WPCF	$113,417	$254,233	$367,650
NEW MILFORD WPCF	$299,782	$55,665	$355,447
NEWTOWN WPCF	$0	$93,773	$93,773
NORTH HAVEN WPCF	$52,930	$174,636	$227,566

Total Annual Project Cost – 2020

Project Facilities	Total Annual Capital Cost from Nitrogen Removal Projects	Total Annual O&M Cost from Project Facilities	Total Annual Project Cost
NORWALK WPCF	$276,853	$867,072	$1,143,925
PLAINVILLE WPCF	$253,448	$151,223	$404,671
PLYMOUTH WPCF	$30,972	$48,208	$79,180
PORTLAND WPCF	$44,740	$79,143	$123,883
PUTNAM WPCF	$0	$69,991	$69,991
RIDGEFIELD SOUTH ST. WPCF	$0	$41,354	$41,354
ROCKY HILL WPCF	$406,463	$168,284	$574,747
SEYMOUR WPCF	$0	$63,302	$63,302
SHELTON WPCF	$182,428	$177,427	$359,855
SIMSBURY WPCF	$211,063	$98,137	$309,200
SOUTH WINDSOR WPCF	$303,783	$129,384	$433,167
SOUTHINGTON WPCF	$663,190	$265,445	$928,635
STAFFORD WPCF	$0	$178,679	$178,679
STAMFORD WPCF	$2,238,236	$943,594	$3,181,830
STONINGTON MYSTIC WPCF	$0	$83,377	$83,377
STRATFORD WPCF	$429,871	$292,923	$722,794
SUFFIELD WPCF	$0	$190,578	$190,578
THOMASTON WPCF	$56,408	$143,496	$199,904
TORRINGTON WPCF	$0	$239,529	$239,529
UCONN WPCF	$0	$206,272	$206,272
WALLINGFORD WPCF	$120,828	$249,170	$369,998
WATERBURY WCPF	$737,935	$874,945	$1,612,880
WEST HAVEN WPCF	$560,923	$524,766	$1,085,689
WESTPORT WPCF	$350,705	$167,335	$518,040
WINDHAM WPCF	$69,630	$219,839	$289,469
WINDSOR LOCKS WPCF	$84,200	$68,123	$152,323
WINSTED WPCF	$38,596	$57,071	$95,667
TOTAL	$16,039,175	$15,683,574	$31,722,749

Project Facility: defined as any facility with a fully operational nitrogen removal system of any scale as of January 1st of the trading year.

Nitrogen Removal Project: defined as any alteration to the physical structure of a WPCF specifically constructed to remove nitrogen and financed by Connecticut's Clean Water Fund (CWF) program.

Farmington became a Project Facility in 2020 after completing a Nitrogen Removal Project the previous year.

Attachment L

Nitrogen Removal Projects Funded by the CWF through 2020				
City or Town	**Total Project Cost**	**Nitrogen Portion Cost**	**First Year on Project Facility List**	**Final Payment Year**
Seymour	$12,045,531	$250,000	1993	2012
East Windsor	$12,287,080	$1,000,000	1996	2015
Fairfield (1)	$1,922,569	$1,922,569	1996	2015
Greenwich	$450,478	$450,478	1996	2015
Milford Beaver Brook (1)	$1,000,000	$1,000,000	1996	2015
Milford Housatonic (1)	$461,173	$461,173	1996	2015
Norwalk (1)	$1,051,989	$1,051,989	1996	2015
Ridgefield	$210,000	$210,000	1996	2015
Stratford (1)	$783,638	$783,638	1996	2015
Univ. of Conn	$12,000,000	$1,058,500	1996	2015
West Haven (1)	$800,845	$800,845	1996	2015
Westport (1)	$553,500	$553,500	1996	2015
Ledyard	$3,607,344	$350,000	1997	2016
New Haven (1)	$7,560,267	$7,560,267	1997	2016
Newtown	$38,758,885	$1,058,000	1997	2016
Stamford (1)	$1,949,000	$1,949,000	1997	2016
Derby	$3,022,053	$747,984	2000	2019
New Canaan	$15,080,040	$1,333,264	2000	2019
Norwalk (2)	$61,446,916	$5,538,000	2000	2019
Waterbury	$119,004,779	$17,365,546	2000	2019
East Hampton	$709,963	$709,963	2001	2020
Thomaston	$10,979,359	$1,327,428	2001	2020
New London	$2,715,937	$2,669,000	2002	2021
Portland	$5,105,240	$1,052,850	2002	2021
Branford	$26,008,587	$3,969,036	2003	2022
Fairfield (2)	$40,492,560	$12,116,595	2003	2022
Windsor Locks	$2,350,805	$1,841,000	2003	2022
Bridgeport East	$2,237,773	$2,237,773	2004	2023
Bridgeport West	$2,523,446	$2,523,446	2004	2023
Bristol	$671,750	$671,750	2004	2023
Enfield	$2,800,000	$2,800,000	2004	2023
Litchfield	$5,740,425	$1,078,477	2004	2023
Jewett City	$14,891,045	$1,545,129	2005	2024
North Haven	$1,245,589	$1,245,589	2006	2025
Stamford (2)	$101,179,065	$59,500,000	2006	2025

Nitrogen Removal Projects Funded by the CWF through 2020				
City or Town	**Total Project Cost**	**Nitrogen Portion Cost**	**First Year on Project Facility List**	**Final Payment Year**
Wallingford	$2,843,389	$2,843,389	2006	2025
Cheshire	$7,392,226	$7,392,226	2007	2026
East Hartford	$1,740,891	$1,740,891	2007	2026
Simsbury	$26,799,491	$4,044,000	2007	2026
Suffield	$1,157,875	$3,370,000	2007	2026
Winsted	$908,270	$908,270	2007	2026
Shelton	$21,104,165	$4,293,000	2008	2027
Westport (2)	$36,295,720	$8,253,000	2008	2027
Hartford (1)	$6,900,000	$6,900,000	2009	2028
Plainville	$24,952,504	$5,964,296	2009	2028
Milford Beaver Brook (2)	$13,504,201	$1,613,000	2010	2029
Milford Housatonic (2)	$40,512,605	$9,391,446	2010	2029
Stratford (2)	$59,019,249	$10,116,000	2010	2029
Danbury	$3,648,894	$3,648,894	2011	2030
Groton Town	$18,309,882	$5,697,248	2011	2030
Meriden	$46,578,035	$32,517,000	2011	2030
New Hartford	$1,003,670	$1,000,000	2011	2030
Southington	$15,606,597	$15,606,597	2011	2030
Glastonbury	$25,230,975	$6,414,240	2012	2031
Ansonia	$45,761,682	$10,959,072	2013	2032
New Milford	$28,391,718	$7,054,657	2013	2032
South Windsor	$35,001,533	$7,148,811	2013	2032
West Haven (2)	$39,951,086	$13,200,000	2013	2032
Windham	$20,100,805	$1,638,583	2013	2032
Hartford (2)	$547,000,000	$74,688,881	2015	2034
Mattabassett	$108,699,555	$29,064,061	2015	2034
Manchester	$48,112,562	$7,857,802	2016	2035
New Haven (2)	$49,132,144	$11,262,508	2016	2035
Plymouth	$1,672,154	$728,845	2016	2035
Rocky Hill	$44,717,763	$9,565,130	2019	2038
Farmington	$57,513,126	$10,986,461	2020	2039
Totals	**$1,893,210,398**	**$456,601,097**		

Attachment M

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

Energy and Technology Policy

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

To: Connecticut Municipalities with Sewage Treatment Facilities
Covered under the General Permit for Nitrogen Discharges

From: Betsey Wingfield, Deputy Commissioner BCW
Jennifer Perry, Chair, Nitrogen Credit Advisory Board

Date: August 26, 2020

Subject: Revised Value of an Equivalent Nitrogen Credit and Revised Invoice Notification
Purchase or Sale of Equivalent Nitrogen Credits for 2019

The Connecticut Department of Energy and Environmental Protection (Department), working with the Nitrogen Credit Advisory Board, have established a Nitrogen Credit Exchange Program and General Permit to comply with Sections 22a-521 through 22a-527 of the Connecticut General Statutes (The Nitrogen Reduction Program in Connecticut for Long Island Sound).

Under the Nitrogen Credit Exchange Program, on May 12, 2020, the Nitrogen Credit Advisory Board established a value for an equivalent nitrogen credit of $5.83 for buyers and $6.67115 for sellers for calendar year 2020. On June 16, 2020 the Department issued a draft ruling accepting the values for equivalent nitrogen credits and sent draft invoices to all municipalities that are included in the nitrogen credit exchange program. The Department received comments from one facility during the fifteen days provided for review of the proposed value of equivalent nitrogen credits. Upon review of those comments, it was determined that DEEP staff had incorrectly entered data which was subsequently used to determine credit cost and generate draft invoices. On August 12, 2020, the DEEP in conjunction with Nitrogen Credit Advisory Board approved revised values of nitrogen credits of $5.81 for buyers and $6.453466 for sellers.

Attached to this email you will find a final invoice for the 2019 Nitrogen Credit Exchange Program. If your facility discharged more nitrogen than allowed by the 2020 General Permit limit, the invoice enclosed itemizes the total credits that must be purchased. ***Payment must be made on or before on October 29, 2020*** by check stating on its face: "Nitrogen Credit Purchase". Payment should be mailed to:

Office of the State Treasurer
State of Connecticut
165 Capitol Ave – 2nd Floor
Hartford, CT 06106

If payment of the invoice is not received by October 29, 2020, the municipality's sewage treatment facility will be considered out of compliance with the General Permit and subject to the enforcement provisions of Chapter 446k of the Connecticut General Statutes.

If your facility removed more nitrogen than was required by the 2019 General Permit, the enclosed invoice itemizes the total credits to be sold. The Nitrogen Credit Exchange Program will issue a check in the amount shown on the invoice to the Water Pollution Control Authority of the municipality on or before November 12, 2020. No further action is required by the municipality to receive this payment.

The errors made in data entry were caused by the commenting facility utilizing an incorrect form to submit data. In 2012 DEEP provided a new NAR form to each WPCF that participates in the nitrogen trading program with the purpose of submitting the data electronically to the DEEP and the information to be transferred directly into the database that automatically calculates the price of nitrogen credit. The form was set up to standardize the calculations of TN in mg/l and lbs per day rounding the final numbers up or down. Unfortunately, the facility mentioned above continued to mail the 2019 data to the DEEP in an old NAR form, requiring additional work on DEEP's staff to manually enter data. Unfortunately this resulted in data entry errors which were not identified during earlier opportunities for data review provided to all facilities.

Please be aware that DEEP will no longer accept data unless it is provided on the correct forms and in a timely manner.

Should you have any questions or believe there is an error on the invoice, please contact Iliana Raffa of the Department's Water Protection and Land Reuse Bureau at (860) 424-3758 or e-mail at (Iliana.Raffa@ct.gov).

Sincerely,

Jennifer L. Perry, P.E.
Chair, Nitrogen Credit Advisory Board

Sincerely,

Betsey Wingfield
Deputy Commissioner

cc: Eric Lindquist, Office of Policy and Management
Kimberly Masson, Office of the State Treasurer
Joseph Michelangelo
William Norton, Fairfield
Thomas Tyler, Metropolitan District Commission

Attachment N

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Emplc

To: Connecticut Municipalities with Sewage Treatment Facilities
Covered under the General Permit for Nitrogen Discharges

From: Betsey Wingfield, Deputy Commissioner BCW
Jennifer Perry, Chair Nitrogen Credit Advisory Board JLP

Date: April 26, 2021

Subject: Purchase or Sale of Equivalent Nitrogen Credits for 2020
Final Invoice.

The Connecticut Department of Energy and Environmental Protection (Department), working with the Nitrogen Credit Advisory Board, has established a Nitrogen Credit Exchange Program and General Permit to comply with Sections 22a-521 through 22a-527 of the Connecticut General Statutes (The Nitrogen Reduction Program in Connecticut for Long Island Sound).

Under the Nitrogen Credit Exchange Program, on March 30, 2021, the Department proposed a buyer's annual value for an equivalent nitrogen credit of $4.92 and a value of $1.361491 for sellers for an equivalent nitrogen credit for calendar year 2020. Pursuant to CGS Section 22a-527(c), the proposed value became final, since no municipality or group of municipalities' petitioned for a review of the proposed value of an equivalent nitrogen credit within fifteen (15) business days after the issuance date of the Commissioner's draft ruling.

Attached to this email you will find a final invoice for the 2020 Nitrogen Credit Exchange Program. If your facility discharged more nitrogen than allowed by the 2020 General Permit limit, the enclosed invoice itemizes the total credits that must be purchased. ***Payment must be made on or before July 31, 2021*** by check stating on its face: "Nitrogen Credit Purchase". Payment should be mailed to:

Office of the State Treasurer
State of Connecticut
165 Capitol Ave – 2nd Floor
Hartford, CT 06106

If payment of the invoice is not received by July 31, 2021, the municipality's sewage treatment facility will be considered out of compliance with the General Permit and subject to the enforcement provisions of Chapter 446k of the Connecticut General Statutes.

If your facility removed more nitrogen than was required by the 2020 General Permit, the enclosed invoice itemizes the total credits to be sold. The Nitrogen Credit Exchange Program will issue a check in the amount shown on the invoice to the Water Pollution Control Authority of the municipality on or before August 15, 2021. No further action is required by the municipality to receive this payment from the State of Connecticut, Office of the Treasurer.

Should you have any questions or believe there is an error on the invoice, please contact Iliana Raffa of the Department's Water Protection and Land Reuse Bureau at (860) 424-3758 or e-mail at (Iliana.Raffa@ct.gov).

cc: Nitrogen Credit Advisory Board Members
Enclosures
2020 Nitrogen Invoice Notification

Attachment O

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

General Permit for Nitrogen Discharges

Effective Date: January 1, 2019
Expiration Date: December 31, 2023

Bureau of Water Protection and Land Reuse
Water Planning and Management Division
860-424-3704

General Permit for Nitrogen Discharges

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General Permit for Nitrogen Discharges

Section 1. Authority

This general permit is issued under the authority of *Sections 22a-521 through 527 and Chapter 446k* of the Connecticut General Statutes (CGS).

Section 2. Definitions

As used in this general permit, and as defined or modified from Section *22a-521 of the CGS:*

"Annual mass loading of total nitrogen" (expressed in pounds per day) means the sum of monthly mass loading of total nitrogen for each month from January through December divided by 12 and rounded to the nearest whole number.

"*Authorized activity"* means any activity authorized by this general permit.

"CFR" means Code of Federal Regulations.

"*Commissioner"* means Commissioner of the Department of Energy and Environmental Protection as defined by Section 22a-2(b) of the CGS.

"Daily composite" means a composite sample taken over a full operating day consisting of grab samples collected at equal intervals of no more than sixty (60) minutes and combined proportionally to flow; or, a composite sample continuously collected over a full operating day proportional to flow.

"Daily mass loading of total nitrogen" (expressed in pounds per day) means the total nitrogen concentration (expressed in mg/L to the nearest 0.1 mg/L) multiplied by the daily flow volume (expressed as MGD, to the nearest 0.1 MGD for facilities with a design capacity of 1.0 MGD or greater and to the nearest 0.01 MGD for facilities with a design capacity of less than 1.0 MGD) multiplied by 8.34 and rounded to the nearest whole number to convert to pounds per day units.

"Department" means the Department of Energy and Environmental Protection.

"Discharge Monitoring Report" or *"DMR"* means a report form provided or approved by the Commissioner for use by a permittee to submit discharge monitoring data to the Department relating to compliance with limits and conditions established in the individual permit for a facility.

"Equivalency factor" means a ratio of the unit response of dissolved oxygen to nitrogen in Long Island Sound for each POTW based on the geographic location of the specific POTW's discharge point divided by the unit response of the geographic area with the highest impact.

"Equivalent nitrogen credit" means a nitrogen credit multiplied by the equivalency factor.

"Individual permit" means a permit issued to a named permittee under Section 22a-430-4 of the Regulations of Connecticut State Agencies (RCSA).

"Monthly mass loading of total nitrogen" (expressed in pounds per day) means the sum of the daily mass loading of total nitrogen for each monitored day during the month divided by the number of monitoring days during the month and rounded to the nearest whole number.

"Monthly Operating Report" or *"MOR"* means a report form provided or approved by the Commissioner for use by a permittee in submitting data to the Department related to the operation of a facility.

"Municipality" means municipality as defined by Section 22a-423 of the CGS.

"Nitrogen Analysis Report" or *"NAR"* means a report form provided or approved by the Commissioner for use by a permittee in submitting monitoring data to the Department related to the discharge of nitrogen from a facility.

"Nitrogen credit" means the difference between the annual mass loading of total nitrogen specified for a POTW in the general permit for treated nitrogen discharges and the monitored annual mass loading of total nitrogen discharged by that POTW expressed as pounds of nitrogen per day.

"Nitrogen credit exchange program" means the program within the Department established pursuant to *Section 22a-524 of the CGS.*.

"Nitrogen Wasteload Allocation" means a total load of nitrogen assigned to a discharger expressed in pounds per day of total nitrogen discharged.

"Permittee" means a municipality or person discharging nitrogen as authorized by the general permit.

"Person" means person as defined by Section 22a-423 of the CGS.

"Publicly Owned Treatment Works" or *"POTW"* means a system used for the collection, treatment or disposal of sewage from one or more parcels of land and that discharges to the waters of the state and is owned by a municipality of the state.

"TMDL" means the Total Maximum Daily Load analysis to achieve water quality standards for dissolved oxygen in Long Island Sound as established by the Department and as approved by the United States Environmental Protection Agency on April 3, 2001.

"Total nitrogen" means the total of the concentrations of ammonia nitrogen, organic nitrogen, nitrite nitrogen, and nitrate nitrogen expressed as milligrams of nitrogen per liter.

Section 3. Authorization Under This General Permit

(a) Eligible Activities or Discharges

This general permit authorizes the discharge of total nitrogen from the POTWs listed in Appendix 1, provided the activities are conducted in accordance with this general permit.

This general permit does not authorize any discharge of water, substance or material into the waters of the state other than the one specified in this section. Any person or municipality which initiates, creates, originates or maintains such a discharge must first apply for and obtain authorization under Section 22a-430 of the CGS.

(b) Geographic Area

This general permit applies throughout the State of Connecticut.

(c) Effective Date and Expiration Date of this General Permit

This general permit is effective on *January 1, 2019 and expires on December 31, 2023.*

(d) Effective Date of Authorization

An activity is authorized by this general permit on the date the general permit is issued.

Section 4. Conditions of this General Permit

A permittee shall conduct activities authorized by this general permit in accordance with the following conditions:

(a) *Discharge Limits*

(1) Annual discharge limit applicable to each POTW are set forth in Appendix 1, which is incorporated herein in its entirety, as part of this general permit.

(2) Each permittee shall limit the discharge of nitrogen to the annual discharge limits set forth in Appendix 1, except as set forth in paragraph (b)(1)(b) of this Section.

(b) *Compliance During Term of Permit*

(1) A permittee shall be in compliance with this general permit if:

(a) the POTW's annual mass loading of total nitrogen is less than or equal to the discharge limit set forth in Appendix 1; or,

(b) the permittee has secured state-owned equivalent nitrogen credits equal to the amount the POTW exceeded the annual discharge limit set forth in Appendix 1 in accordance with the Nitrogen Credit Exchange Program and Sections 22a-521 through 527 of the CGS.

(2) A permittee shall be out of compliance with the general permit and subject to the enforcement provisions of Chapter 446k of the CGS if:

(a) the POTW's annual mass loading of total nitrogen is greater than the discharge limit set forth in Appendix 1; and

(b) the permittee fails to secure sufficient state-owned equivalent nitrogen credits in a timely manner in accordance with the Nitrogen Credit Exchange Program and Sections 22a-521 through 527 of the CGS.

(c) Operation of Nitrogen Removal Process Equipment

The permittee shall not bypass or fail to operate any of the approved nitrogen removal equipment or processes without the written approval of the Commissioner. The permittee shall operate all necessary equipment to optimize nitrogen removal so as to reduce nitrogen discharges to the maximum extent practicable. This includes but is not limited to all recycle pumping systems, aeration equipment, aeration tank cycling, mixing equipment, anoxic basins, chemical feed systems or any other process equipment necessary for the optimal removal of nitrogen.

(d) Monitoring Requirements

(1) Effective upon issuance of this general permit, the permittee shall monitor total nitrogen in the final effluent in accordance with the following frequency:

(a) POTWs with a design flow rate specified in the individual permit for the facility of less than 10 MGD shall monitor the final effluent at a minimum frequency of weekly.

(b) POTWs with a design flow rate specified in the individual permit for the facility equal to or greater than 10 MGD shall monitor the final effluent at a minimum frequency of twice per week.

(2) Monitoring requirements shall commence on *January 1st 2019.*

(3) Final effluent and monitoring location shall be identical to that used to determine compliance with final effluent limitations and monitoring conditions established in the individual permit for the facility.

(4) All samples analyzed to determine compliance with limits on total nitrogen shall be daily composite samples unless otherwise approved in writing by the Commissioner.

(5) Chemical analyses to determine compliance with effluent limits and conditions established in this general permit shall be performed using the methods approved in or pursuant to 40 CFR 136 unless an alternative method has been approved in writing pursuant to 40 CFR 136.4.

(6) The permittee shall measure the total daily flow of wastewater received by the facility at the main flow meter as set forth in the individual permit for the facility.

(7) In the event of a flow meter malfunction on a day when a sample for total nitrogen analysis is collected, the permittee shall utilize the arithmetic average of the 7 highest daily flows measured during the previous 30-day period to calculate the total daily nitrogen loading unless an alternative procedure has been agreed to by the Commissioner.

(e) Reporting Requirements

The results of chemical analyses for the total nitrogen in all samples collected during the month and the total daily flow effluent for each day during the month shall be entered on the MOR and NAR and reported to the Department. Results must also be entered in the DMR as a calculated monthly mass loading of total nitrogen. The MOR, NAR and DMR must be received at the following address by the 15th day of the month following the month samples are collected.

ATTN: Municipal Wastewater Unit
Connecticut Department of Energy and Environmental Protection
Bureau of Water Protection and Land Reuse
79 Elm Street
Hartford, CT 06106-5127

(f) *Record Keeping Requirements*

The permittee shall retain copies of all reports required by this general permit, and records of all data used to compile these reports for a period of at least five years from the date of the report submission to the Department.

(g) *Duty to Correct and Report Violations*

Upon learning of a violation of a condition of this general permit, including any failure of flow monitoring equipment, the permittee shall immediately take all reasonable action to determine the cause of such violation, correct such violation and mitigate its results, prevent further such violation, and report in writing such violation and such corrective action to the Commissioner within five (5) days of the permittee learning of such violation. Such report shall be certified in accordance with subsection 4(i) of this general permit.

(h) Duty to Provide Information

If the Commissioner requests any information pertinent to the authorized activity or to ensure compliance with this general permit, the permittee shall provide such information in writing within thirty (30) days of such request. Such information shall be certified in accordance with subsection 4(i) of this general permit.

(i) Certification of Documents

Any document, including but not limited to any notice, which is submitted to the Commissioner under this general permit shall be signed by, as applicable, the permittee in accordance with Section 22a-430-3(b)(2) of the RCSA, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

(j) Date of Filing

For purposes of this general permit, the date of filing with the Commissioner of any document is the date such document is received by the Commissioner. The word "day" as used in this general permit means the calendar day; if any date specified in the general permit falls on a Saturday, Sunday, or legal holiday, such deadline shall be the next business day thereafter.

(k) False Statements

(k) False Statements

Any false statement in any information submitted pursuant to this general permit may be punishable as a criminal offense, in accordance with Section 22a-6 and under Section 53a-157b of the CGS.

(l) Correction of Inaccuracies

Within fifteen days after the date a permittee becomes aware of a change in any information in any material submitted pursuant to this general permit, or becomes aware that any such information is inaccurate or misleading or that any relevant information has been omitted, such permittee shall correct the inaccurate or misleading information or supply the omitted information in writing to the Commissioner. Such information shall be certified in accordance with subsection 4(i) of this general permit.

(m) *Other Applicable Law*

Nothing in this general permit shall relieve the permittee of the obligation to comply with any applicable federal, state and local law, including but not limited to the obligation to obtain and comply with any authorizations required by such law. In the event a POTW is subject to a more stringent nitrogen limitation than set forth in this general permit, the Permittee shall comply with that more stringent limitation and may not purchase or transfer nitrogen credits to comply with that additional limitation.

(n) *Other Rights*

This general permit is subject to and does not derogate any present or future rights or powers of the State of Connecticut and conveys no rights in real or personal property nor any exclusive privileges, and is subject to all public and private rights and to any federal, state, and local laws pertinent to the property or activity affected by such general permit. In conducting any discharge authorized hereunder, the permittee may not cause pollution, impairment, or destruction of the air, water, or other natural resources of the state.

Section 5. Commissioner's Powers

(a) Abatement of Violations

The Commissioner may take any action provided by law to abate a violation of this general permit, including the commencement of proceedings to collect penalties for such violation. The Commissioner may, by summary proceedings or otherwise and for any reason provided by law, including violation of this general permit, revoke a permittee's authorization hereunder in accordance with Sections 22a-3a-2 through 22a-3a-6, inclusive, of the RCSA. Nothing herein shall be construed to affect any remedy available to the Commissioner by law.

(b) General Permit Revocation, Suspension, or Modification

The Commissioner may, for any reason provided by law, by summary proceedings or otherwise, revoke or suspend this general permit or modify it to establish any appropriate conditions, schedules of compliance, or other provisions which may be necessary to protect human health or the environment or to implement the TMDL.

Issued: October 5, 2018

Robert E. Kaliszewski
Deputy Commissioner

APPENDIX 1

ANNUAL DISCHARGE LIMITS FOR TOTAL NITROGEN

Zone	Publicly Owned Treatment Works	Equivalency Factor	Total Nitrogen (Pounds/Day) 2019-2023
1	JEWETT CITY WPCF	0.17	15
1	GROTON CITY WPCF	0.18	99
1	GROTON TOWN WPCF	0.18	153
1	KILLINGLY WPCF	0.14	131
1	LEDYARD WPC	0.18	7
1	MONTVILLE WPCF	0.18	118
1	NEW LONDON WPCF	0.18	386
1	NORWICH WPCF	0.18	201
1	STONINGTON PAWCATUCK WPCF	0.17	24
1	PLAINFIELD NORTH WPCF	0.14	34
1	PLAINFIELD VILLAGE WPCF	0.14	24
1	PUTNAM WPCF	0.14	53
1	SPRAGUE WPCF	0.16	7
1	STAFFORD SPRINGS WPCF	0.15	60
1	STONINGTON BOROUGH WPCF	0.18	14
1	STONINGTON MYSTIC WPCF	0.18	27
1	THOMPSON WPCF	0.14	10
1	UCONN WPCF	0.15	44
1	WINDHAM WPCF	0.15	125
2	BRISTOL WPCF	0.18	398
2	CANTON WPCF	0.18	24
2	EAST HAMPTON WPCF	0.20	54
2	EAST HARTFORD WPCF	0.19	292
2	EAST WINDSOR WPCF	0.19	59
2	ENFIELD WPCF	0.19	278
2	FARMINGTON WPCF	0.18	178
2	GLASTONBURY WPCF	0.20	98
2	HARTFORD WPCF	0.20	2377
2	MANCHESTER WPCF	0.19	312
2	MATTABASSET WPCF[1]	0.20	834
2	MIDDLETOWN WPCF[1]	0.20	222
2	NEW HARTFORD	0.18	3
2	PLAINVILLE WPCF	0.18	101
2	PLYMOUTH WPCF	0.18	42
2	WINDSOR POQUONOCK WPCF	0.19	98
2	PORTLAND WPCF	0.20	31

Zone	Publicly Owned Treatment Works	Equivalency Factor	Total Nitrogen (Pounds/Day) 2019-2023
5	WESTPORT WPCF	0.85	87
6	GREENWICH WPCF	1.00	479
6	NEW CANAAN WPCF	1.00	64
6	NORWALK WPCF	1.00	718
6	RIDGEFIELD SOUTH ST. WPCF	1.00	29
6	STAMFORD WPCF	1.00	926

(1) The annual discharge limit for total nitrogen for the Mattabasset WPCF will be increased from 834 pounds/day to 1056 pounds/day. This increase will occur when the Middletown WPCF is abandoned and all of Middletown's flow is conveyed to the Mattabasset WPCF.