FINAL REPORT

Development of a Best Management Practice for Passively Removing Nitrogen from Onsite Septic Systems

Project 17-03/319

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Executive Summary

Nearly every marine estuarine habitat in the United States is challenged by the threat of excessive eutrophication caused by anthropogenic nitrogen inputs from onsite septic systems. As such, determination of Best Management Practices (BMPs) is essential for reducing pollution and improving water quality to better the ecological health of environmentally sensitive areas. This project endeavored to develop BMPs for the use of non-proprietary “passive” nitrogen removal strategies for onsite septic systems that include technical, economic, social and institutional considerations of implementation.

The three basic designs piloted under this grant were applied to three systems that maintained saturated conditions via containment of the denitrification component, and two systems in which the denitrification component had no containment. For system designs that utilized containment to achieve saturated conditions, the mean effluent Total Nitrogen (TN) levels were <8 mg/L throughout the study period reflecting >80% removal for all three systems in this design class. Although these saturated designs were successful at removing nitrogen, a design omitting the containment element was tested due to its simpler design and lower costs. The first of this simpler design included an uncontained sand-sawdust (1:1 by volume) denitrification layer beneath an 18-inch layer of standard-fill sand. This profile was positioned beneath a typical shallow pressure-time-dosed distribution system and showed a mean TN of 11.7 mg/L (10.5–12.8 mg/L, p=.05, n=97) or 73% TN removal. The second variant of this uncontained design was similar but additionally incorporated silt into the denitrification matrix (10% by volume) to maintain additional moisture, occlude oxygen transfer and encourage anoxia, which is a prerequisite condition for denitrification. This silt amended system, monitored since July 2015, showed a mean TN concentration of 7.1 mg/L (6.6–7.4 mg/L, p=.05, n=140) which equates to >80% TN removal.

Following performance comparisons, the relative benefits and detriments of each system’s design focused on two main areas; 1) long-term viability of the denitrifying substrate and 2) land area requirements due to recommended loading rates. Foremost, uncertainty regarding longevity of the cellulosic material used as a carbon source within the denitrification component was considered. In unsaturated conditions, where the cellulose might aerobically decompose, the lifespan and/or long-term effectiveness of the substrate could not be determined. In saturated conditions, there was data to support that the lifespan of the substrate would be substantially longer than in the unsaturated substrate; potentially decades.

The second chief aspect of comparison was land area requirements. Data suggest that a hydraulic loading rate of 0.6 gal/sq. ft/day provides optimal residence time for complete nitrification and denitrification in the 18-inch depth of treatment areas common to all designs tested. This is inherently 20–25% larger than a standard system constructed in sandy soil, bringing into consideration its use in space-restricted settings. Further, the contained designs required an additional disposal component to achieve saturation, which increases the areal requirement of this design-class further. We therefore propose herein the allowance of a small footprint leaching pit, due to the quality of measured discharge (>80% TN, TSS and BOD removal) from the contained components.

Despite the aspects of BMPs described herein that promote the use of the investigated systems, it should be noted that some technical and institutional aspects remain unresolved. The matter of final disposal, which significantly drives space and cost requirements, will need review by the Commonwealth’s regulatory departments. Also, contaminant constituents not examined in our study,

such as viruses and contaminants of emerging concern (CEC), will likely require further investigation to ensure protection of the public health and environment.

The sum of estimated costs for construction, operation and maintenance of the observed systems were found to be highly competitive with many proprietary units. Further, we were able to definitively conclude that the addition of cellulosic material to the denitrification component can successfully lower TN in a sustainable and economical manner, particularly in areas where adequate lot size allows for the larger footprint of these systems.

Introduction

The recent decade has witnessed substantial increase in efforts to research and develop technologies to reduce nitrogen from onsite septic systems. These efforts respond to the increasing evidence that onsite septic systems result in accelerated eutrophication and degradation of water quality, particularly in nearshore marine settings where their use predominates. While there are a number of proprietary technologies in the marketplace to address this problem, less research has been done on non-proprietary strategies which might prove as effective in reducing nitrogen inputs from onsite septic systems and may offer greater sustainability at lower cost. Efforts described herein were inspired by a comprehensive study in the State of Florida to find a "passive[1]" non-proprietary nitrogen removal system using a cellulosic (wood or wood by-product) source of carbon for denitrification. In addition, the present study drew from previous research conducted at various universities; chief among them the work by Dr. William Robertson at the University of Waterloo. By collaboration with principle investigators involved in the Florida studies, and more recent efforts by Stony Brook University on Long Island New York and others, we sought to:

- Validate some of the techniques and principles that have shown promise for reducing nitrogen in onsite septic systems in the Florida Onsite Sewage Nitrogen Reduction Strategies Project (and associated research);
- Install and test prototype systems at the Massachusetts Alternative Septic System Test Center (MASSTC);
- Determine the relative effectiveness of at least three different configurations of systems using lignocellulosic materials as a carbon source for denitrification.

Supplementing information from systems installed at MASSTC, this project also benefitted from installations at residences in southeastern Massachusetts, the selected results of which are also reported herein.

Since the use of lignocellulosic material in septic systems is somewhat new, a description of the nitrogen chemistry as it relates to the aforementioned strategies is described below.

Nitrogen cycle in onsite wastewater treatment systems

Nitrogen removal in onsite septic systems involves manipulating the natural nitrogen cycle in which we introduce organic nitrogen in our wastewater. Absent technologies that recover and reuse the nitrogen as a fertilizer, the goal of onsite wastewater treatment relative to nitrogen is to return this element to its innocuous gaseous state – $N_{2(gas)}$. This process expressed in simple terms involves the sequence of ammonification, nitrification and denitrification, during which combined nitrogen passes from a reduced organic state (raw wastewater) to a reduced inorganic state (ammonia from the septic tank) to an oxidized state (nitrate beneath the soil absorption system) and finally is reduced to nitrogen gas. This is schematically represented below:

[organic $N_{(reduced)}$ in wastewater]→[inorganic $N_{(reduced)}$ -ammonia]→[nitrite-nitrate$_{(oxidized)}$]→Nitrogen gas$_{(reduced)}$

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[1] Passive is defined as requiring the use of only one liquid conveyance pump such as would be required in any standard system that required elevating the wastewater due to vertically limiting conditions.

Where there is incomplete or limited denitrification, as occurs in a standard septic tank-soil absorption system, the nitrogen is released to the groundwater in its inorganic form (primarily nitrate) and may cause the accelerated eutrophication observed in many marine receptor sites.

To complete denitrification of wastewater prior to release, many proprietary treatment technologies strive to complete the transformation of nitrogen to nitrogen gas within a contained unit designed to enhance/accelerate the transformation. The treatment units generally are positioned between a primary settling portion of the system and the soil treatment area (STA). These contained systems are usually challenged by the fact that during initial oxidation of ammonium to nitrate mediated by autotrophic bacteria (a necessary pre-requisite process for the major denitrification pathways), cohabiting heterotrophic bacteria consume much of the organic carbon used subsequently by heterotrophic bacteria during denitrification. It is generally believed that in order to achieve an efficiency of 80+% removal of nitrogen, manufactured units designed for denitrification require a supplemental source of carbon to supply the denitrifying bacteria carbon for the biological pathways leading to denitrification and the release of nitrogen as nitrogen gas.

The present project follows upon the work of Robertson et. al., the Florida Department of Health and others that have examined the potential of designing the STA in such a manner as to allow for the inorganic nitrogen in the percolating wastewater to be reduced to nitrogen gas. Layering a matrix of a carbon source beneath the nitrification area and facilitating anoxic conditions can set the conditions for denitrification to occur. This process is schematically represented in figure 1.

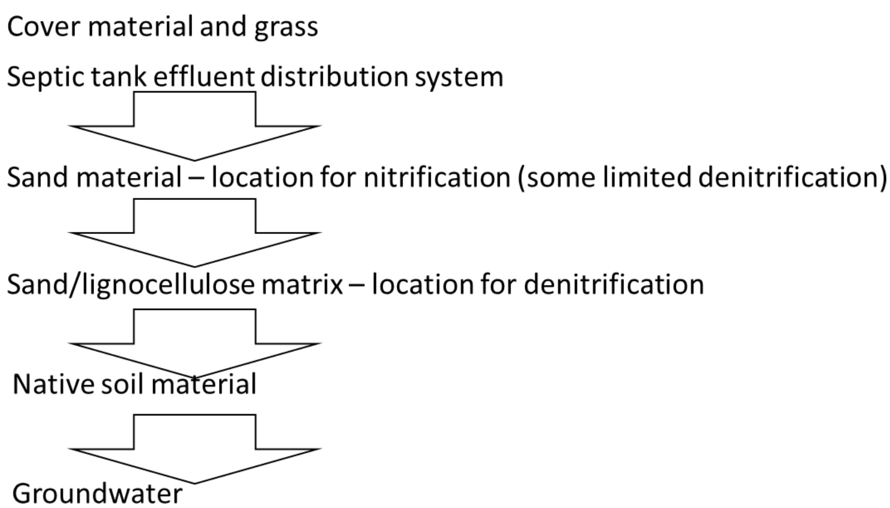

Figure 1 Conceptual representation of the soil treatment area modified to enhance nitrogen removal.

In theory, as septic tank effluent percolates through the uppermost sand/soil layer, the ammonia is biologically transformed to nitrate. The nitrate-laden percolate then passes through the sand/lignocellulosic matrix encountering the cellulose, which is used by denitrifying bacteria as a food source (electron donor in the biological pathway). This reduces the nitrogen in the nitrate to nitrogen gas that is released into the environment.

The efficiency of the above described process depends on a number of factors that must be controlled in order to ensure maximum efficiency and these factors have been the subject of experiments and demonstrations reported herein. The objective of this project was to identify the simplest way to achieve >90% reduction of nitrogen by more passive means, however being guided by the wisdom of Albert Einstein who is credited with saying “Everything should be made as simple as possible, but not simpler”.

Review of foundational work.

In 1995, Robertson and Cherry[1] reported on field trials of in-situ denitrification using various cellulosic materials layered beneath a nitrifying soil profile. This work presumably followed upon the column studies by Vogan[2] cited in Robertson and Cherry[1], who experimented with a reactive mixture containing and organic carbon derived from sawdust eluted with simulated wastewater containing approximately 70 mg/L $N0_3$-N. The longer term performance of the initial field try was confirmed with visual inspection that noted a “substantial portion” of the original carbon was still in place and suggested that this type of design could allow for denitrification for a decade or more[3].

In 2009, the State of Florida initiated the Florida Onsite Sewage Nitrogen Reduction Strategies (FOSNRS) Project[4]. Following numerous soil column and large bench-scale studies, in 2010 the Florida researchers began installing full scale two stage bioreactor treatment systems under the FOSNRS Program[4]. These systems had the common elements in their first stage (nitrification step) or either media or sand filters. The second-stage components experimented with both heterotrophic denitrification (with wood or cellulose-based carbon sources for denitrification) and/or autotrophic denitrification (using sulfur-based denitrification). After discussions with selected principle investigators of that project, we decided to experiment with three basic designs which predicted lower costs and simplicity compared with the Florida demonstrations, again in attempt to determine whether simpler, less expensive designs would work to reduce nitrogen.

Three Basic Designs.

Design 1 Layered system with saturated denitrification layer

One attempt by the Florida investigators to design a simple low-cost passive denitrification system was to construct a sand nitrification layer positioned above a lined/contained layer of sawdust/mulch. The schematic representation is provided in figure 2 below.

Following an assessment of the Florida design and discussions with principle investigators, it was determined that percolate from the nitrifying layer, encountering the textural break with the underlying woodchips in their instance, might be bypassing the denitrification zone of the system, escaping over the rim of the containment area. To address this possibly we mixed sawdust with sand in a mixture at a ratio of 1:1 by volume (FOSNRS simply positioned woodchips beneath the nitrifying layer) to lessen the textural break and included a central collection drain which allowed the liner-collected percolate a means of lessening the opposing head pressure that would resist the percolate direction through the denitrification media. One detriment to the design however is the added requirement of a final discharge element (soil treatment area 2 – figure 3). The full conceptual design for these modifications is presented in figure 3 below.

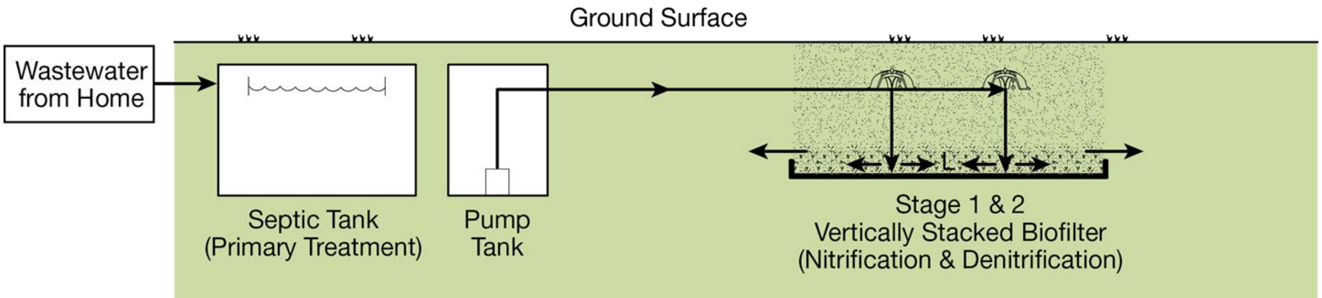

Figure 2 Conceptual design of a simple low cost layered system installed under the Florida Onsite Sewage Nitrogen Reduction Strategies (FOSNRS) Project in Marion County, FL. Source: National Onsite Wastewater and Recycling Association annual conference, 2016.

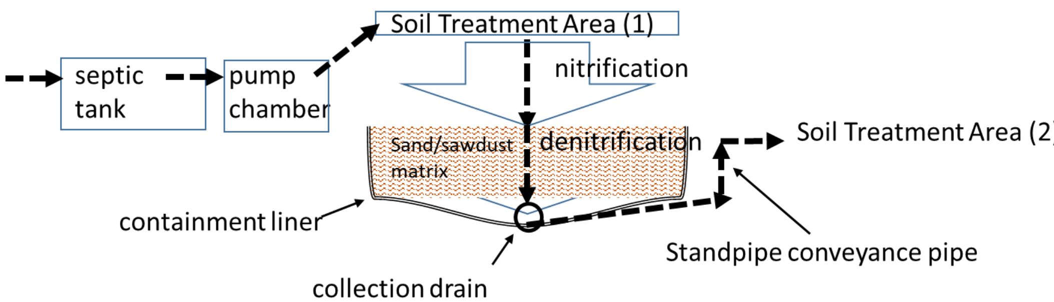

Figure 3 Conceptual representation of Design 1 - a lined saturated system modification installed at the Massachusetts Alternative Septic System Test Center

Design 2 Layered system with no containment liner

To negate the need for an additional soil treatment area, the second design investigated here assumed that a containment liner might not be necessary to achieve saturation and oxygen occlusion since the sand-sawdust might retain enough moisture to occlude enough oxygen and facilitate denitrification. The first system of this type followed closely the design of Dr. Robertson and others[1] by mixing 10% silt in with standard ASTM C33 sand/sawdust layer (figure 4). The exception in this design from their work is the use of a low-pressure septic tank effluent distribution (his study used a gravity feed system). This feature, used in all of the designs discussed herein, was used to both optimize nitrification and reduce contaminants of emerging concern.

Anticipating questions from contractors and regulators regarding the ability to obtain and ensure soil matrix consistency, a second modification of this simple layered approach was the use of a standard ASTM C33 sand mixed with sawdust in a ratio of 1:1 by volume in the denitrification layer. Since this specification is already in the design/construction regulations, the question of consistency of the sand in the matrix is addressed by familiarity of present practice. Similar to Robertson's design, this layered design is situated above the native soil does not require a second soil absorption system (figure 5).

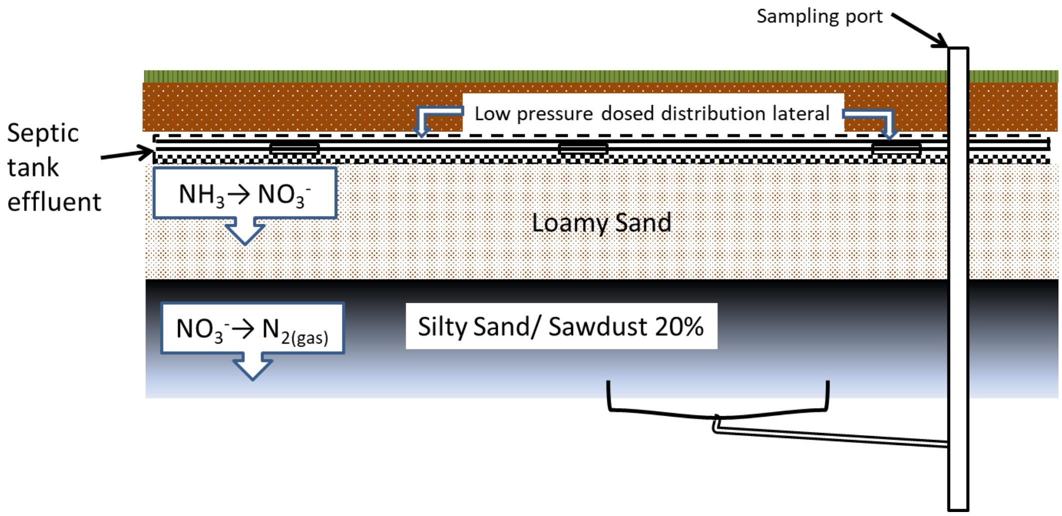

Figure 4 Schemata of an unlined saturated system modification installed at the Massachusetts Alternative Septic System Test Center (after Robertson and Cherry 1995).

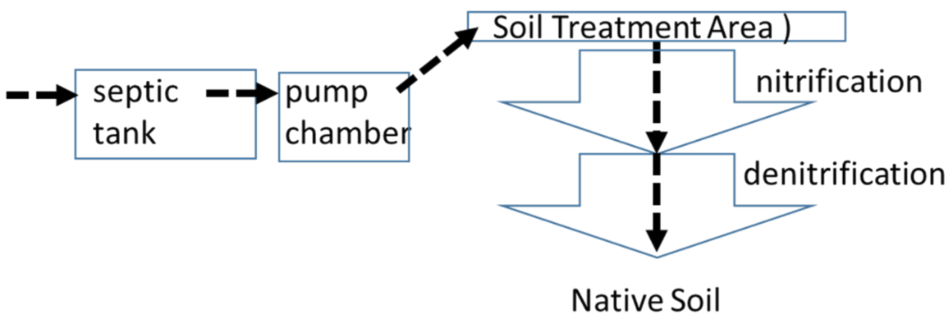

Figure 5 Conceptual representation of an unlined saturated system modification installed at the Massachusetts Alternative Septic System Test Center.

Design 3 Contained nitrification bed followed by a contained woodchip bioreactor

The third design tested follows closely the principles of the commercially available Nitrex™ system and incorporates the contained woodchip component of that technology following a contained soil treatment area which facilitates the nitrification step (Figure 6). As with Design 1, this design requires an addition disposal option following the denitrification process. Since numerous analyses of discharge water quality have been taken over the time period, we recommend strategy below that would limit the need for an extensive soil treatment area following this denitrification step thus balancing some of the extra costs of construction.

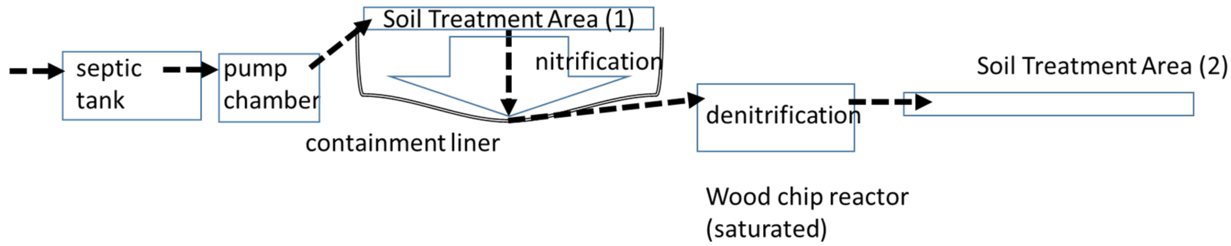

Figure 6 Conceptual representation of a lined unsaturated system followed by a contained woodchip bioreactor installed at the Massachusetts Alternative Septic System Test Center.

Sampling Methodology

To enhance the data collection at systems at MASSTC, we were able to compliment sampling resources provided under this grant with sampling resources provided under cooperative efforts with Stony Brook University and elsewhere. Although the sampling parameters differed in some instances and changed over time, the common analytes of Total Kjeldahl Nitrogen (TKN), nitrate-nitrite nitrogen, and ammonia nitrogen were assayed in all sampling periods. Grab samples were collected as indicated in the following Results Section at various intervals in influent wastewater, septic tank effluent, system effluent and pan lysimeters. Samples were transported on ice to Barnstable County Department of Health and Environment Laboratory an assayed according the methods in table 1. Total nitrogen was calculated by summing TKN + nitrite + nitrate. All raw data are presented in the appendixes. Since only selected parameters were taken under each program, some analytes (other than nitrogen-containing) were not taken during every event.

Results

Results - Design 1 Layered system with saturated denitrification layer

Two systems were installed at MASSTC in this configuration. The first, sourced with sand and sawdust obtained locally, was installed to closely parallel the second installation that was constructed using the sand and sawdust sourced from Long Island New York.

Locally sourced material system

This system was completed in December 2016 and was first sampled in January 2017. The hydraulic loading rate to the system was approximately 0.6 gal/sq. ft./day. Over 81 samples were taken in the period of 960 days. The mean Total Nitrogen (TN) in the influent over this period was 43.1 mg/L (42.2 – 44.1 mg/L, p=.05). The mean TN in the effluent was 7.3 mg/L (6.0 – 8.6 mg/L, p= .05). The maximum N levels observed were during the first winter (figure 7). Using these means to estimate removal efficiency, this represents an 83.4% removal.

With the exception of the first winter-spring time period when high TN levels (>20 mg/L) persisted through the spring, highest TN levels (>10 mg/L but < 20 mg/L) were observed during the latter winter and early spring months of successive years. This first set of results (winter 2017) was expected since data suggest that the nitrification process (a prerequisite of denitrification) was not yet established due to the low initial temperatures (figure 8). Temperature data suggest a strong correlation with effluent

Parameter	Unit of Measure	Minimum Detection Limit	Standard Method
pH	pH Units	N/A	EPA 150.1
Temperature (oC)	Degrees Celcius	N/A	
Dissolved Oxygen	mg/l	0.1	SM 4500-O G
BOD (5-day)	mg/l	1	SM 5210 B
CBOD (5-day)	mg/l	1	SM 5210 B
Suspended Solids	mg/l	1	SM 2540 D
Alkalinity	mg/l of CaCO 3	1	SM 2320
TKN (as N)	mg/l	0.5	EPA 351.2
Ammonia (as N)	mg/l	0.1	EPA 350.1
Total Nitrite (as N)	mg/l	0.1	EPA 300.0
Total Nitrate (as N)	mg/l	0.05	EPA 300.0
Ortho-Phoshphate	mg/l	0.1	SM 4500-P F
Total Phosphorus	mg/l	0.1	EPA 365.41
Fecal Coliform	colony forming units/100 ml sample	1	SM 922D

Table 1. List of parameters and analytical methods used in the evaluation of technologies at MASSTC during the present study.

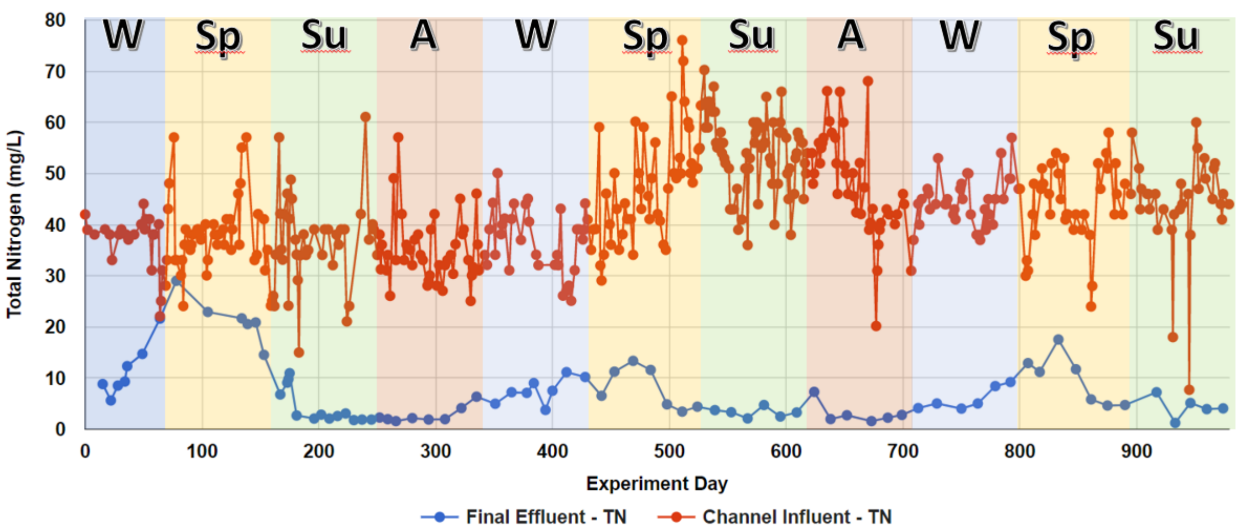

Figure 7 Total nitrogen levels in influent wastewater and discharge from the lined saturated system comprised of locally sourced materials and installed at the Massachusetts Alternative Septic System Test Center in December 2016. W=Winter, Sp= Spring, Su= Summer, A = Autumn. Channel influent is raw wastewater influent supplied to the septic tank.

temperature – a surrogate measurement of the temperature in the reactor portions of the system. Two patterns were observed. At temperatures below 10° C, although there is abundant nitrate, the denitrification process is diminished. With few exceptions, when temperatures are above 15° C adequate denitrification occurs to maintain TN levels below 10 mg/L. However, when temperatures are below 5°C, nitrification is also diminished and, coupled with the diminished denitrification of nitrate, the total nitrogen levels approach or exceed 15 mg/L.

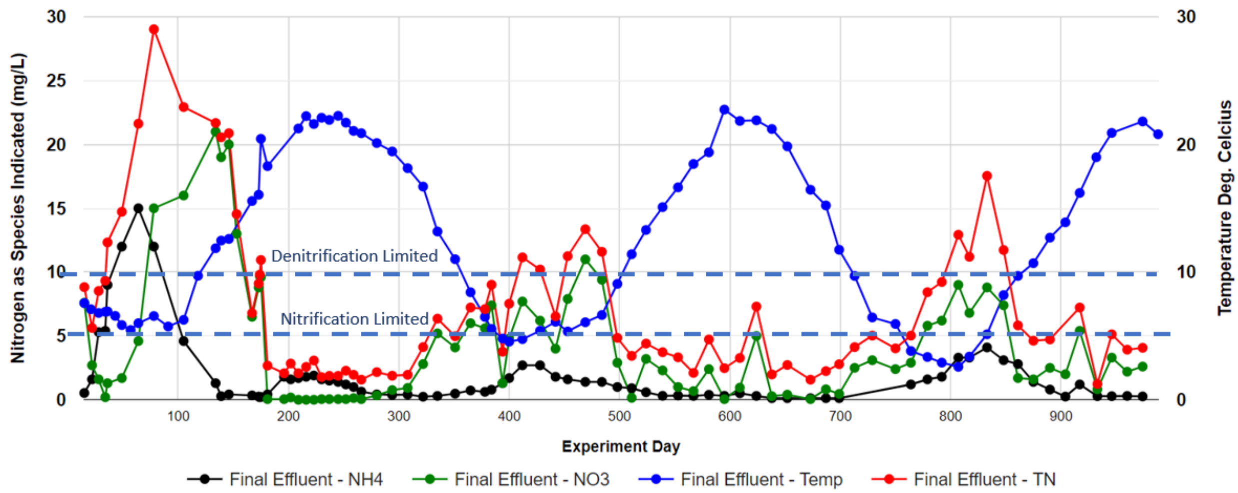

Figure 8 Nitrogen levels by species in discharge from the lined saturated system comprised of locally sourced materials and installed at the Massachusetts Alternative Septic System Test Center in December 2016.

Despite the apparent shortcomings of this configuration, the mean nitrogen level was again 7.3 mg/L including startup levels and following mid-May 2017, levels exceeding 15 mg/L TN were only observed once.

Long Island sourced material system

Following the transport of materials from Long Island, New York, we constructed a lined saturated bed system with initially the same hydraulic loading rate applied as above. In July 2018, the researchers at Stony Brook University requested that the loading rate be increased to approximately 1.2 gal/sq. ft./day, the possible implications of which are discussed below. Over 97 samples were taken over the operational period of 1044 days. The mean TN of the influent wastewater was 43.1 mg/L (42.3 – 44.1 mg/L , p= .05) and the effluent mean concentration of the treatment unit was 8.2 mg/L (6.7 – 9.7 mg/L, p= .05) (figure 9). Similar seasonal and temperature patterns to the previously referenced system were observed. Again, below the 10°C temperature the denitrification process is diminished, and below 5°C, nitrification is diminished (figure 10). Although the data are limited, it does appear that the increased loading rate, which was initiated on this system in July 2018, did result in higher levels of total nitrogen in this system compared with the previous and similar system where hydraulic loading rates were not increased. These data suggest that residence time, as altered by hydraulic loading rate, may be an important design feature that controls performance, particularly in the colder weather. In September 2019 we will be again increasing the hydraulic loading rate on this system and data gathered during this winter will be important in determining the importance of this design feature.

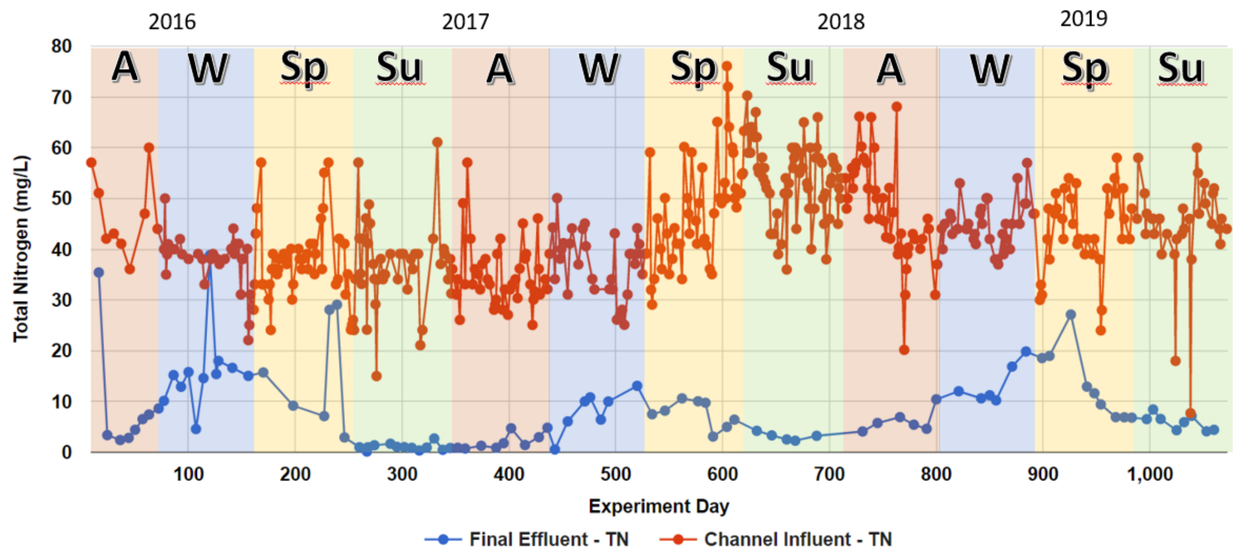

Figure 9 Total nitrogen levels in influent wastewater and discharge from the lined saturated system comprised of Long Island, New York sourced materials and installed at the Massachusetts Alternative Septic System Test Center in September 2016. W=Winter, Sp= Spring, Su= Summer, A = Autumn. Channel influent is raw wastewater influent supplied to the septic tank.

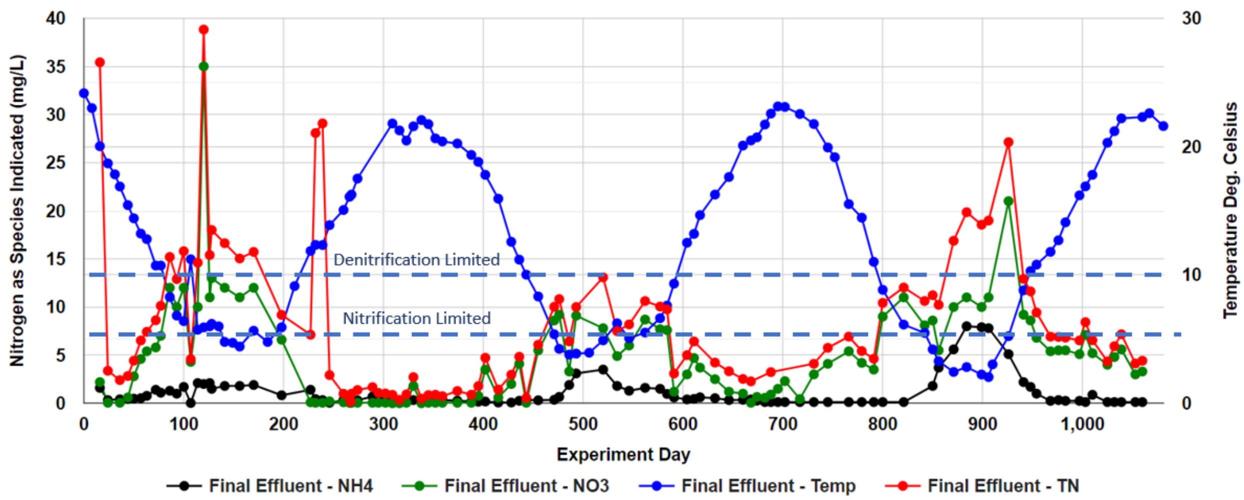

Figure 10 Nitrogen levels by species in discharge with temperature from the lined saturated system comprised of Long Island, New York sourced materials and installed at the Massachusetts Alternative Septic System Test Center in September 2016.

Experiments with soil columns spanning over five year (July 2014 – August 2019) and having a matrix of sand/sawdust maintained under saturated conditions suggest that the media under these conditions will continue to provide the needed carbon for decades. Over the five years, the mean TN from these three saturated soil columns (data from all three combined) was 2.2 mg/L (1.8 – 2.4 mg/L, p=.05, n=212). Final experiments on these also indicate that after a simulated seasonal use, the denitrification resumed to near-optimal levels in three weeks having not exceeded 7.0 mg/L upon initial post hiatus sampling. Raw data from these experiments is provided in the appendix.

Results - Design 2 Layered system with no containment liner

Two variants of this design were installed at MASSTC. The first system was installed in July 2015 and incorporates 10% silt by volume into the denitrification layer of the systems. This system used locally sourced materials including sawdust, silt (from a local gravel pit washing area), and standard ASTM C33 sand. The second system was installed in September 2016 and used Long Island, New York sourced materials including sand and sawdust/mulch.

Layered system incorporating silt

This system has been in continuous use and monitored since July 2015 (over 1500 days). The mean TN concentration of the influent was 43.9 mg/L (43.1 – 44.7 mg/L, p=.05). The mean TN of the effluent as collected beneath the system from the collection sump was 7.1 mg/L (6.6 – 7.4 mg/L, p=.05). As with the lined saturated systems above, there was a trend of higher nitrogen levels in the percolate during the late winter through early spring of each year (figure 11).

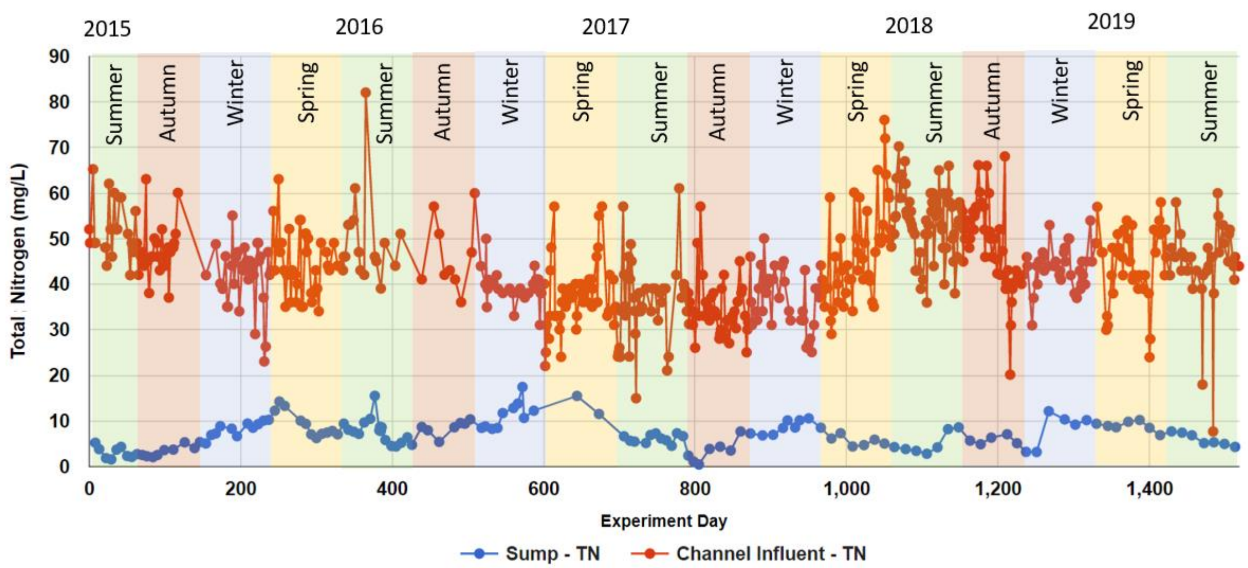

Figure 11 Total nitrogen levels in influent wastewater and discharge from the unlined saturated system comprised of locally sourced materials and installed at the Massachusetts Alternative Septic System Test Center in July 2015. Channel influent is raw wastewater influent supplied to the septic tank.

Two pan lysimeters beneath the system were also monitored and reflected lower levels. Port 1 with 112 observations (lysimeters do not always yield samples) had a mean TN of 4.8 mg/L (4.1 – 5.6 mg/L, p=.05) and Port 2 with 80 observations had a mean TN of 5.8 mg/L (4.9 – 6.7 mg/L, p=.05). The reason for the disparity between the sump samples, which are a collection of percolate under the entire system and the lysimeters, which are a collection of percolate directly under the denitrification area, is not known. Accordingly, the higher levels noted in the sump samples are used to estimate performance. Using the simple means calculated for this system, the removal efficiency for TN is 83.8%.

Layered system with Long Island New York sourced material

This system was installed in September 2016 and monitoring began in October of that year. Hydraulic loading rate of 0.6 gal/sq. ft/day was applied continuously until July of 2018 when Stony Brook University researchers requested the increase to 1.2 gal/sq. ft/day. Through August 15, 2019 the TN in the percolate determined beneath the entire system averaged 11.7 mg/L (10.5 – 12.8 mg/L, p=.05, n=97). The concurrent influent concentration was 43.1 mg/L (42.2 – 44.0 mg/L, p=.05). Seasonal differences were again observed similar to all systems previously reported (figure 12), however following the increased loading rate, the typical (observed in 2016 – 2017) summer-autumn minima, where levels were below 10 mg/L, were not as prominent. Comparing data from before the “ramp up” to the higher hydraulic loading with the post period, reveals a notable difference. Before ramp up, the TN averaged 9.6 mg/L (8.4 – 10.8 mg/L, p=.05, n=64) and after the increased hydraulic loading the average TN was 15.6 mg/L (13.7 – 17.5 mg/L, p=.05, n=33). Whether the change was caused by the increased loading or the age of the system (or a combination of both) is not known.

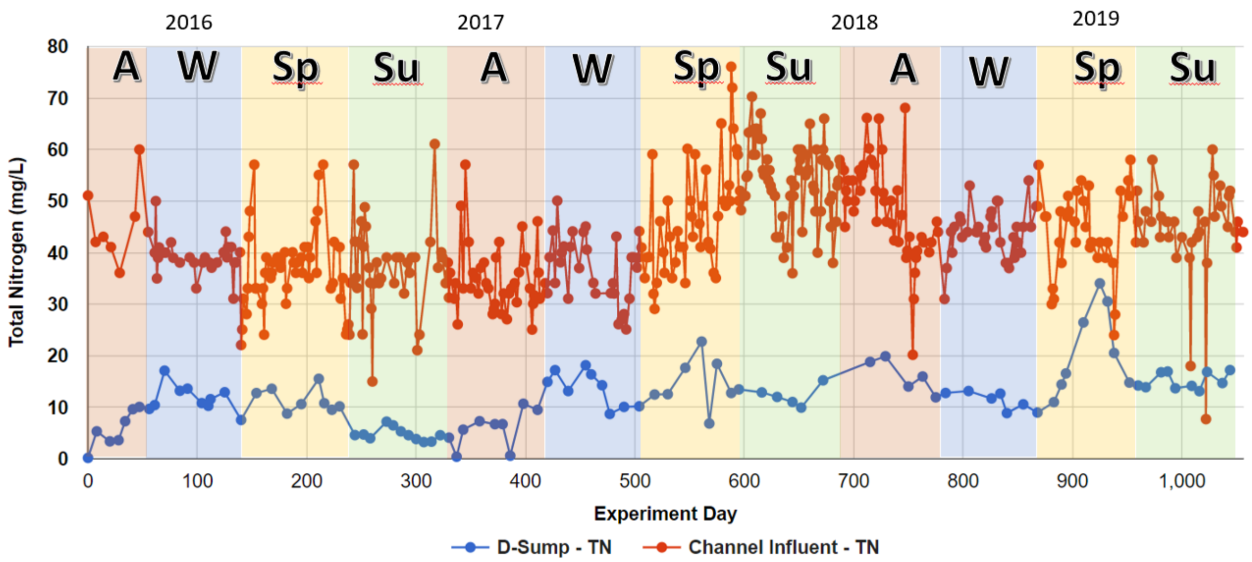

Figure 12 Total nitrogen levels in influent wastewater and discharge from the unlined layered system comprised of Long Island, New York sourced materials and installed at the Massachusetts Alternative Septic System Test Center in September 2016. W=Winter, Sp= Spring, Su= Summer, A = Autumn. D-Sump is the percolate collected beneath the entire system area. Channel influent is raw wastewater influent supplied to the septic tank.

Results - Design 3 Contained nitrification bed followed by a contained woodchip bioreactor

Only one of this third design was installed at MASSTC, however since the project began one vendor has incorporated this strategy into a system with their proprietary wastewater dispersal product and has begun testing with support from a grant under the Massachusetts Clean Energy Center. From October 2016 – August 2019 (1024 days) the mean TN for the effluent of the system installed under the present grant was 6.1 mg/L (5.0 – 7.2 mg/L, p=.05, n=96). In March – April 2017, a diversion of stormwater runoff into the pump chamber went undetected accounting for, what we believe to be unusually high TN levels (circa days 525 – 550 figure 13). This diversion increased the discharge volume to the nitrifying bed and woodchip bioreactor which in turn decreased retention/treatment times. The situation correction after day 550 resulted in an immediate resumption of treatment levels to below 10 mg/L TN.

In July 2018, similar to the other projects installed with support from Stony Brook University, we increased the hydraulic loading to the system from 220 gal/day to 330 gal/day. To estimate the effect of this increased hydraulic loading, we compare the subsequent autumn-winter discharge levels in 2017-2018 prior to the increase in loading with that of 2018-2019 after the increased hydraulic loading. During autumn-winter 2017-2018, the mean TN was 5.3 mg/L (3.0 – 7.7 mg/L, p=.05, n=14). During autumn-winter 2018-2019, the mean TN was 11.5 mg/L (10.0 – 13.0 mg/L, p=.05, n=13). A review of the discharge temperature differences between the two years (figure 14) revealed no significant difference in the temperature regimes. The data suggest that the increased loading, which would translate to decreased residence time in the reactor vessel, had a significant impact on the system performance. A further increase in hydraulic loading scheduled for September 2019 will assist in further clarifying the role of this design parameter.

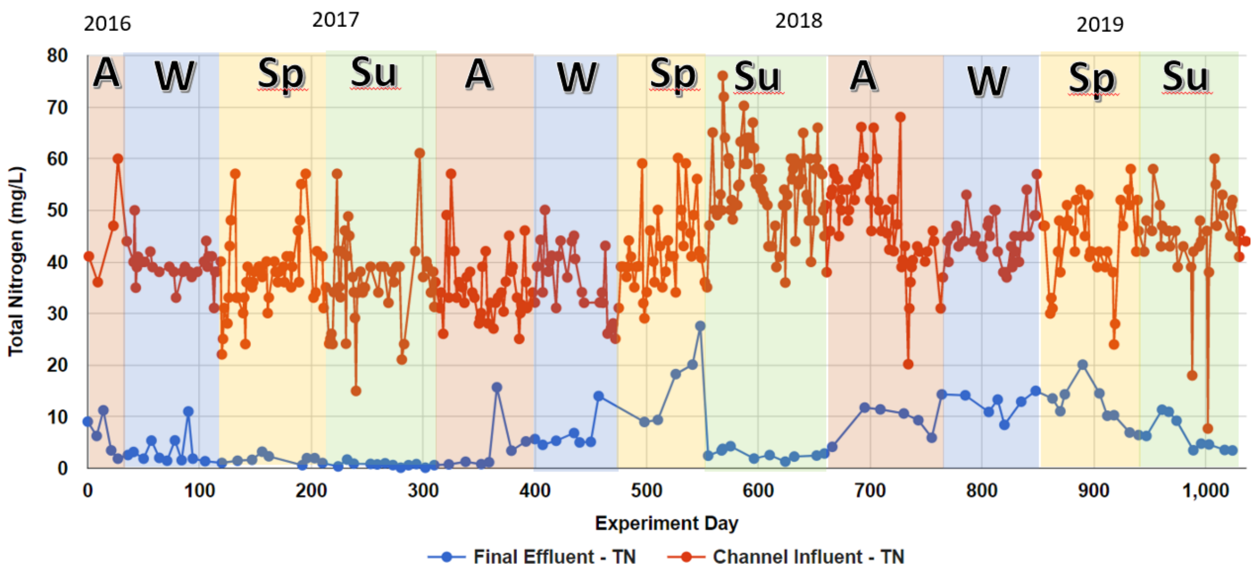

Figure 13 Total nitrogen levels in influent wastewater and discharge from the contained woodchip bioreactor system installed at the Massachusetts Alternative Septic System Test Center in October 2016. W=Winter, Sp= Spring, Su= Summer, A = Autumn. Channel influent is raw wastewater influent supplied to the septic tank.

An examination of the total nitrogen and nitrogen species in the woodchip bioreactor shows a similar trend as the layered systems previously discussed. The predominance of nitrate at temperatures below 10^{o}C again suggest that below this temperature denitrification is reduced (nitrate is not being reduced to nitrogen gas). Below 5^{o}C, nitrification is reduced, and ammonia appears in the effluent. The source of the ammonia is undoubtedly the nitrifying bed that precedes the woodchip bioreactor (figure 6 – Soil Treatment Area 1) which again demonstrates the temperature dependency of nitrification; particularly its reduction at temperatures below 5^{o}C (figure 16) .

Notwithstanding both the high TN values during the stormwater infiltration in spring of 2017 and the increased loading rate effects following July 2018, this system has one of the lowest overall mean TN.

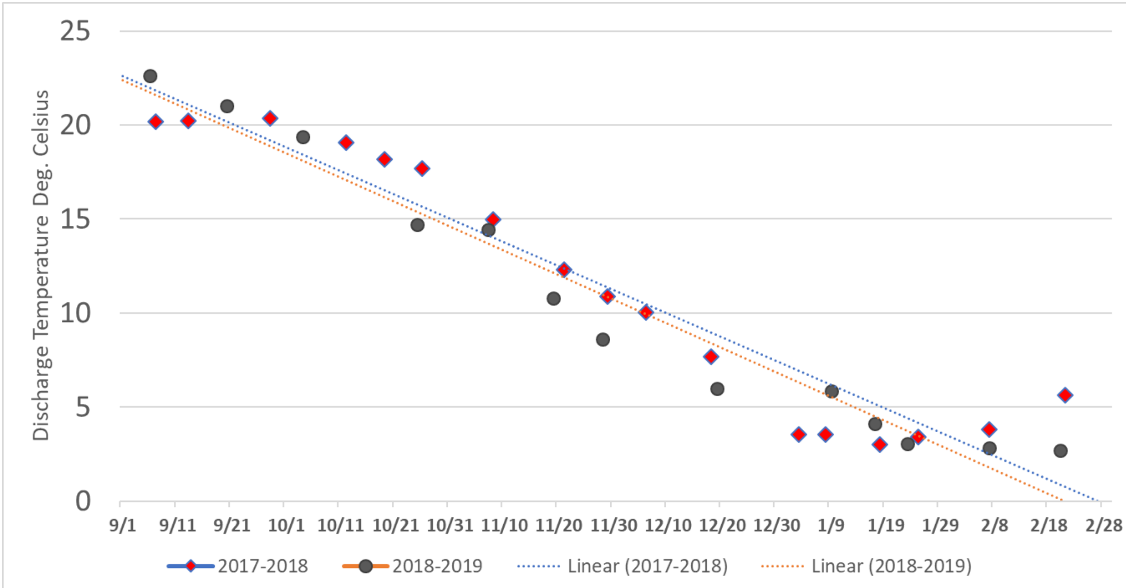

Figure 14 A comparison of temperatures between autumn-winter seasons of 2017-2018 and 2018-2019 at the discharge of the woodchip bioreactor installed at the Massachusetts alternative Septic System Test Center.

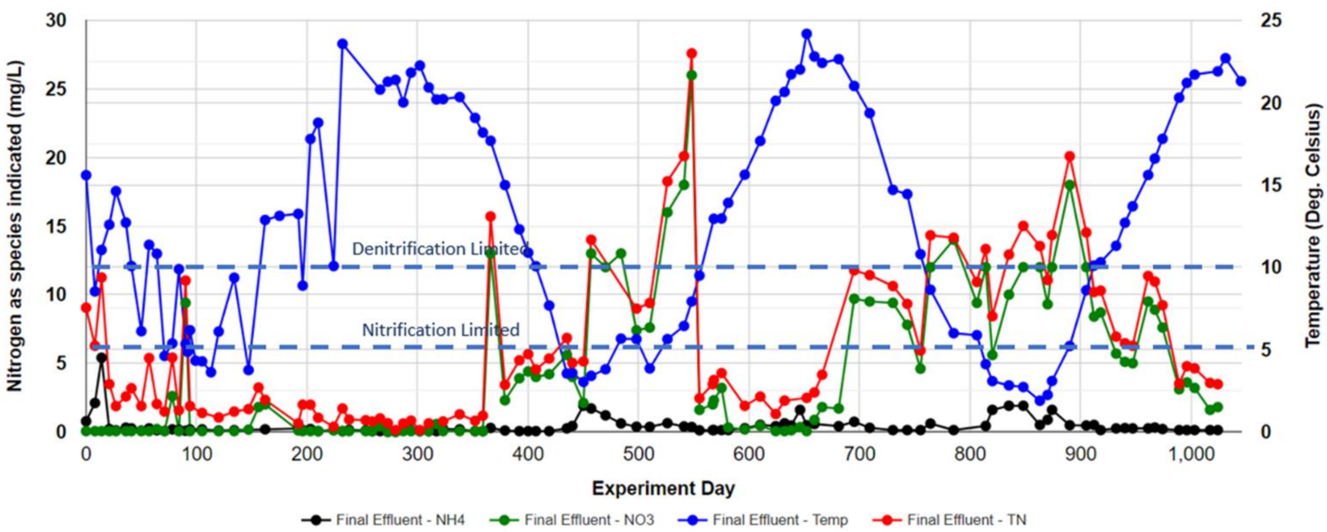

Figure 15 Nitrogen levels by species in discharge with temperature from the woodchip bioreactor system installed at the Massachusetts Alternative Septic System Test Center in September 2016.

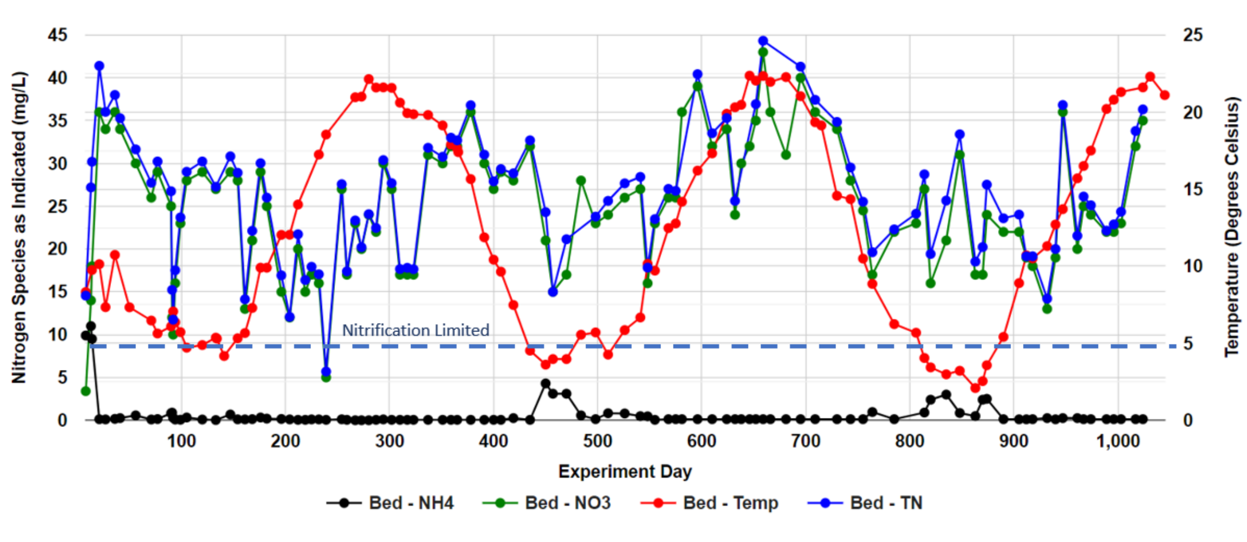

Figure 16 Nitrogen species in the nitrification bed supplying the woodchip bioreactor installed at the Massachusetts Alternative Septic System Test Center.

Comparison of systems and determination of Best Management Practice

As of August 2019, all systems installed at MASSTC described above exhibited mean TN levels less than 10 mg/L (figure 17).

While each system tested had mean levels of TN < 10 mg/L, other factors need consideration prior to determining which technology offers the best available technology. In brief these factors include:

- Ease of installation;
- Costs;
- Stability of the performance data, and;
- Uncertainty factors relating to longevity of performance.

Evaluation of System Configurations

All the systems tested are in the class of "pilot" systems that have not been installed wholesale in any area of the country that these authors are aware of. The exception to this is the woodchip bioreactor which closely parallels the reactor in the commercially available Nitrex™ system. In that system, the woodchip bioreactor usually follows a proprietary treatment system that nitrifies (and to some extent denitrifies) the ammonia in the wastewater prior to the introduction into the woodchip bioreactor.

Common to each of the technologies tested in this study is the question of longevity of the cellulosic media. While research by Robertson and others suggests that saturated cellulosic media under saturated conditions can serve as a carbon source for decades, less is known about the effect of the less-saturated conditions of the simple unlined layered system. Two of the system designs tested, Design 1 (figure 3) and Design 3 (figure 6) maintain saturated conditions in the denitrification media and accordingly there would be general agreement that these systems would not require media replacement for more than 20 years. In Design 2 (figures 4 and 5), there is less certainty on media longevity, however the design employing a silt mixture closely parallels a system that is still in place and functioning after seven years[3].

The following sections review the advantages and disadvantages of each system and provides approximate costs for construction.

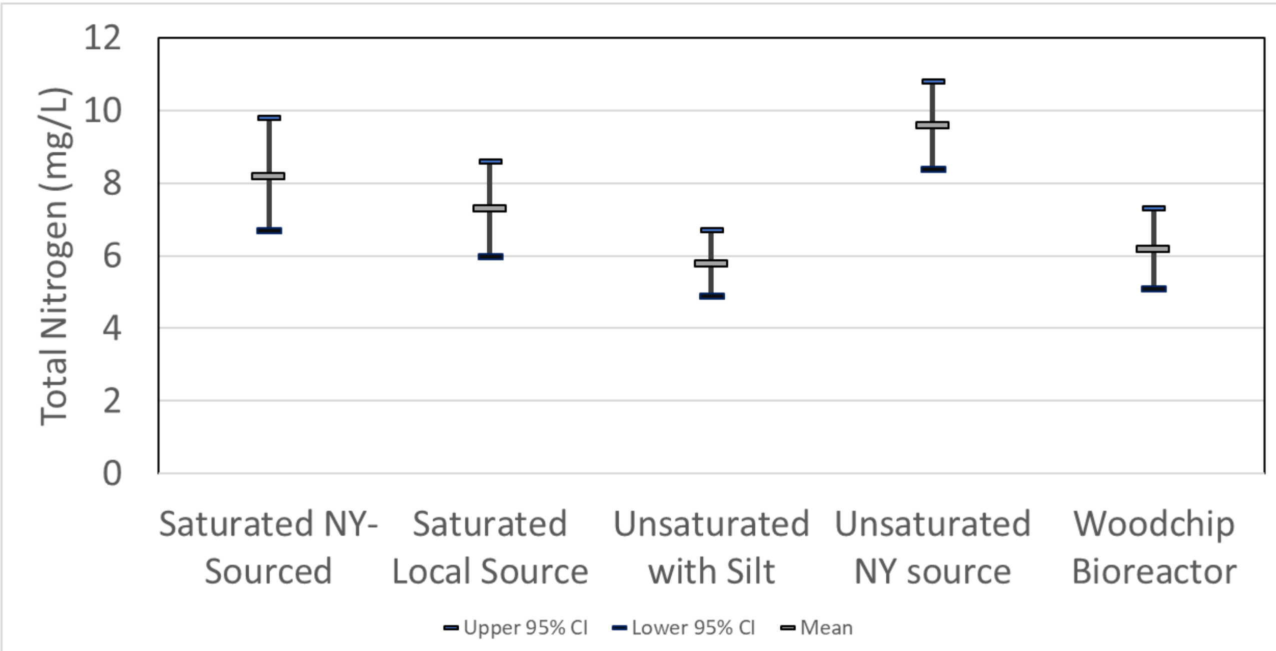

Figure 17 Comparison of Total Nitrogen Concentrations from each of the units tested at MASSTC from July 2015 - August 2019. Influent TN had a mean of 43.9 mg/L (43-1 – 44.6 mg/L, p=.05, n=599)

Evaluation of System Configurations - Design 1 Layered system with saturated denitrification layer

Construction of this Design 1 systems requires moderate skill and attention to detail, particularly in the construction of the containment liner and associated underdrain. The data suggests that a hydraulic loading rate of 0.6 gal/sq. ft/day in the first STA (soil treatment area 1 – figure 3) will achieve desired results as those reported herein. Higher hydraulic loading rates are shown to negatively impact nitrogen removal particularly during the colder seasons (figure 9). Accordingly, the areal area of the soil treatment area 1 (figure 3) within the liner is approximately 20-25% larger than that which would be required in a standard system using sand fill specified in 310 CMR 15.00. In addition, a second soil treatment area would be required, adding further significant cost and size to this unit. To reduce these costs, consideration might be given to significantly downsizing this second STA since $BOD_{5\text{-day}}$, Total Suspended Solids, and fecal coliform were at levels that would indicate such. The unit using locally sources materials showed an average of 3.6 mg/L (0.6 – 7.0, p=.05, n=10) for $cBOD_{5\text{-day}}$, and the second unit using Long Island sourced materials showed an average of 7.0 mg/L (1.0 – 13.0 mg/L, p=.05, n= 35). Reductions up to 50% have been considered for technologies achieving levels < 30 mg/L. Regarding Total Suspended Solids (TSS), the first unit showed a mean TSS of 7.6 mg/L (2.5 – 12.7 mg/L, p=.05, n=7) and the second system showed a mean TSS of 12.1 mg/L (5.7 – 18.5 mg/L, p=.05, n=14). Similarly, reductions in soil treatment areas of up to 50% have been considered for treatment units achieving < 30 mg/L TSS. Fecal coliform, a surrogate measure of public health risk, is also a concern and the historical bathing beach standard of 200 Colony Forming Units (CFU) per 100 ml of sample has been considered a standard to suggest a diminishment of risk. The first unit tested showed a geometric mean of 3.1 CFU/100 ml (n=14), and the second unit following 35 samples showed a geometric mean of 10 CFU/100 ml.

Considering both the level of treatment for the standard contaminants of $cBOD_{5\text{-day}}$ and TSS, as well as reductions in nitrogen and fecal coliform, consideration might be given to allow the final disposal of effluent into a previously allowed (pre-1995 310 CMR 15.00 code revision) disposal structure of the leaching pit to reduce the areal area requirement. As an example, a 6 ft x 6 ft concrete pit with 2 ft of surrounding stone would have approximately 267 sq. ft of infiltrative surface which could dispose of flow from a four-bedroom house (440 gal/day) at a hydraulic loading rate of 1.65 gal/sq. sf/day. An estimated cost of this second soil treatment area is $3500, which is less than the cost of a standard soil absorption system and would require less areal area.

Although the liner placement adds a complication to the design, the advantage of this feature is the lessening of the uncertainty regarding system longevity, particularly that of the denitrification matrix/media. Since the denitrification media remains 100% saturated, there is general agreement that denitrification can be sustained for decades. The State of Florida is experimenting with and adaptation of this design which merely allows the final effluent to disperse over the sides of the liner, however for reasons previously discussed, we decided not to adopt Florida's simple design in this project.

Evaluation of System Configurations - Design 2 Layered system with no containment liner

Design 2 is the simplest of the three designs tested and discussions with the contractor who has installed a number of these systems at residences suggest that the only increased costs to the construction of the soil treatment area is that of the sawdust mixture and labor to mix it. Since the inception of this project, at least two states, Connecticut and Florida, make allowances for the design. The State of Florida recently incorporated this design into their onsite code "STATE OF FLORIDA DEPARTMENT OF HEALTH CHAPTER 64E-6, FLORIDA ADMINISTRATIVE CODESTANDARDS FOR ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS"(figure 18).

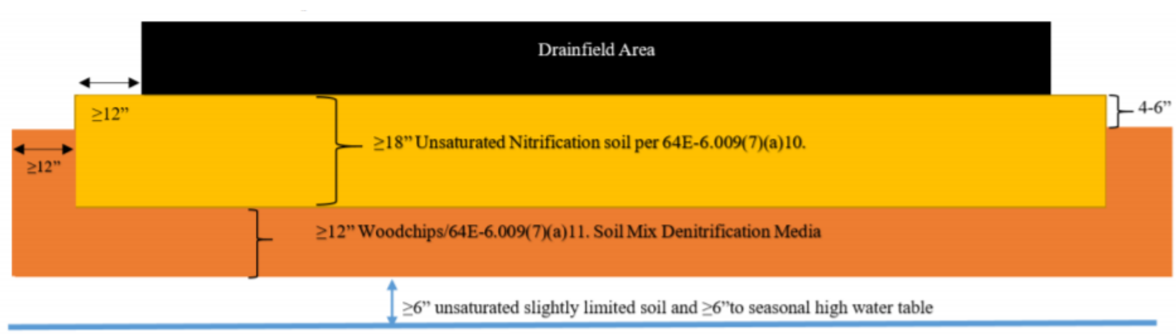

Figure 18 Schemata of simple unlined layered system permitted in Florida. Source: STATE OF FLORIDA DEPARTMENT OF HEALTH CHAPTER 64E-6, FLORIDA ADMINISTRATIVE CODESTANDARDS FOR ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS.

Although this is the simplest design, the data suggest that, in instances where sand is the matrix mixed with sawdust, the results are variable.

In a single family 3-person year-round residence, this system produced a mean TN concentration of 16.2 mg/L (11.1 – 21.2 mg/L, p=.05, n=17). The influent wastewater had a TN concentration of 55.5 mg/L (50.4 – 59.9 mg/L, p=.05, n=17) which equates to a 70.1% reduction. This is less than the approximate 75-80% reduction in the MASSTC systems. In all field installations as in the MASSTC systems, the winter TN levels are higher in response to the lower influent wastewater temperatures.

When silt was incorporated into this design in an effort to facilitate more saturation and oxygen occlusion, the results at MASSTC were improved over the simpler mixture with ASTM C33 sand, however this further complicates widespread use of this strategy due to the ability to ensure consistency of mixture with the fines (silt) fractions.

Evaluation of System Configurations - Design 3 Contained nitrification bed followed by a contained woodchip bioreactor

This configuration has a number of features which lend to its appeal for widespread use. Foremost, the denitrifying element, the tank of woodchips, allows for the replacement of the media should that need to occur, without excavating the system soil treatment area. The lined nitrification bed (figure 6) requires a relatively shallow excavation (~24-30") which reduces costs compared to a standard soil treatment area. In addition, the woodchip bioreactor box concept has been in use in the form of the commercially available Nitrex™ system which has been installed in a few locations in our area and has been shown to have similar performance.

The disadvantage of this system is the fact that, similar to Design 1, a second soil treatment area is required to dispose of the treated wastewater. This is complicated by the fact that the effluent from this design has an initial discharge $cBOD_{5\text{-day}}$-$BOD_{5\text{-day}}$ that is higher than a standard septic tank and that persists for a period of two months. During this interval, the mean $BOD_{5\text{-day}}$ was 440 mg/L. During months 3 – 5, the $cBOD_{5\text{-day}}$ was 40.7 mg/L, and subsequent to that for months 5-30 the mean $cBOD_{5\text{-day}}$ was 12.0mg/L. The Total Suspended Solids (TSS) was measured 19 times during our study and the maximum value observed was 11 mg/L. Fecal coliform levels exceeded 200 CFU/100mls on only one occasion and the geometric mean of 47 samples taken during the study was 7 CFU/100 mls.

As with Design 1 the discharge water quality from this system might be considered for an alternative soil disposal means that has a smaller areal footprint and would be more economical to install.

Comparison of Costs

Perhaps the most difficult task of estimating costs of these systems is caused by the number of variables present at each site. Below, we attempt to compare costs for each system based on a simple installation involving minimal complexities. The estimates are based on discussions with contractors over the years by the author and in particular a more comprehensive more recent discussion with the contractor who installed the nitrogen removal systems at MASSTC and a number in the field. The reader is cautioned here that, in order to estimate installation costs in your particular area, similar conversations with local contractors would be useful. Regionally, for instance, the costs of excavation and removal of material per yard/ton varies widely depending on locality of disposal sites. Similarly, costs of acceptable fill will vary widely depending on the locality relative to the construction site. The costs below do not include design, engineering, permitting, and inspection costs which vary regionally, and finish landscaping , which costs are highly variable and dependent on the wishes of the landowner.

Certain elements such as the septic tank, pump chamber and attendant control panel and wiring are common to all the denitrification systems as well as in standard system situations where a pump system is required to overcome vertical separation to groundwater or other limiting condition. In repair situation where only the soil treatment areas need replacement, the construction costs will be reduced in accordance with the infrastructure present that can be reused (such as an existing septic tank and/or pump chamber). Life cycle costs for the systems are not calculated since there remains some uncertainty, particularly with the simple layered unsaturated system, regarding the life of the denitrification media. Of the systems tested, Design 3 would be the most unobtrusive to replace the media, since it could be pumped out of the containment structure and replaced without excavating the soil treatment area.

All systems tested have comparable costs for operation (< $2/month in electricity assuming $0.18/kWh) and an estimated $150 service contract. This assumes the pump operates seven times per day and has a run time of 1.5 minutes. During the study the pumps were observed to run five times/day and had a run time of 1.5 minutes.

A review of costs for proprietary units from various demonstration projects including Suffolk County New York indicates that the passive units' construction costs are competitive. Average costs of proprietary units including $2500 engineering costs in Long Island was $21,950. Costs for equipment alone in the Chesapeake Bay Restoration Project ranged from $12,000 - $17,000 excluding the soil treatment area and installation of unit.

*Table 2 Estimated summary of construction costs for the three technologies tested at MASSTC. Costs based on conversations with septic system contractors and suppliers. **Cost based on a theoretical approval to use a leaching pit of the specified size for final disposal of effluent.*

	Design 1 Layered system with saturated denitrification layer	**Design 2** Layered system with no containment liner	**Design 3** Contained nitrification bed followed by a contained woodchip bioreactor	Standard Gravity System	Standard system requiring a pump
Septic Tank, pump chamber and Installation	$8,500	$8,500	$8,500	$3,500	$8,500
Pressure distribution means/piping	$1,500	$1,500	$1,500	$500	$500
Excavation leachfield	$2,600	$3,600	$1,500	$1,750	$1,750
Sand	$1,500	$1,500	$950	$1,700	$1,700
Gravel	$250	$200	$250	$1,000	$1,000
Miscellaneous	$1,000	$1,000	$1,000	$1,000	$1,000
Pump and wiring	$600	$600	$600		$600
Control Panel and wiring	$900	$900	$900		$900
Containment Liner and piping	$600		$600		
Containment tank and piping			$2,500		
Sawdust	$400	$400			
Woodchips			$300		
Soil Treatment Area 2**	$3,500		$3,500		
Total Costs	$21,350	$18,200	$22,100	$9,450	$15,950

Comparison of System Space Requirements.

The following illustrations (figure 19) show the comparison of the approximate areal area required for the tank components and soil treatment areas of the systems tested. The schemata show a reduced soil treatment area for area 2 which does not yet have an approval for use. These designs are based on data used to optimize the performance of the systems in our area. The hydraulic loading rate to the nitrification portion of system is 0.6 gal./sq. ft./day which makes that portion of the system larger than the standard approved system by approximately 20 - 35%. Present experiments by Stony Brook University with systems reported herein are showing that reducing the size of the soil treatment areas has a negative effect on the total nitrogen removal, particularly when influent temperatures are below 15°C. Sizes shown are conservative since they assume and were tested at the full design loading per day continuously for at least three years.

As previously stated, the two systems using saturated conditions in which to denitrify, are the least controversial relative to questions of longevity. They do however both have the requirement for a second soil treatment area which adds both a cost and a space requirement. In response to this concern, more recently one manufacturer has proposed and installed a second soil absorption system beneath the first one, obviating the need for more space. This system is under testing as part of a Clean Energy Center grant and will be reported under a different cover.

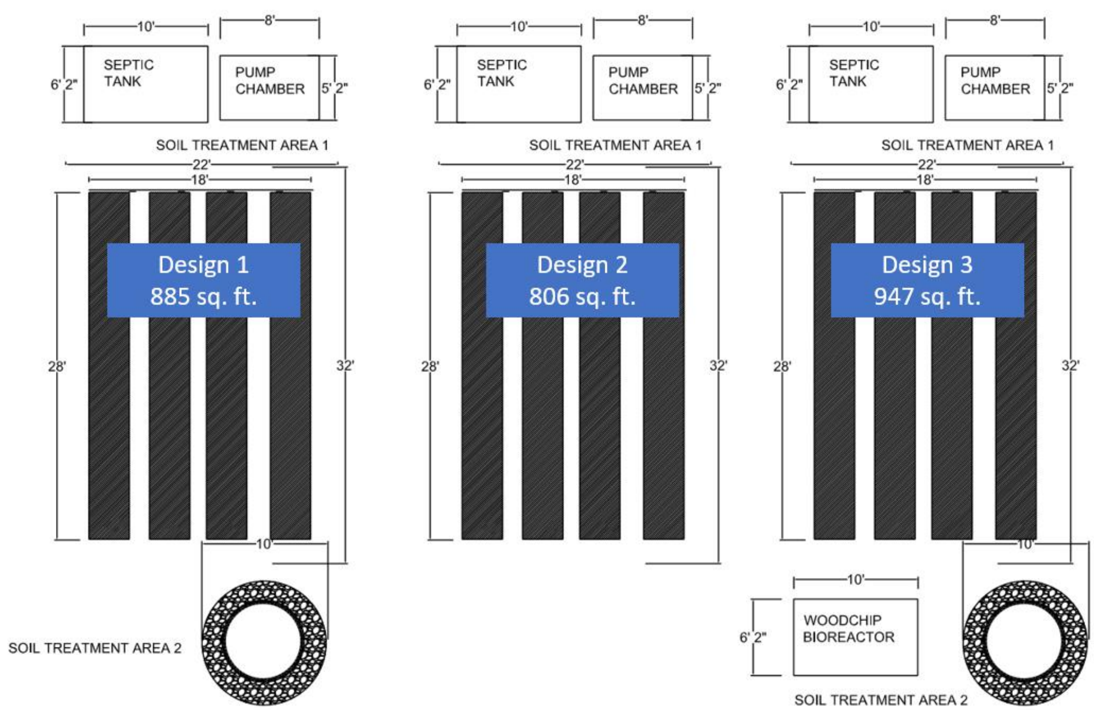

Figure 19 Comparison of areal areas required for the three designs tested under Project 17-03/319 Best Management Practices for Passively Removing Nitrogen from Onsite Septic Systems at the Massachusetts Alternative Septic System Test Center 2015 – 1019.

Conclusions

Cellulose in the form of woodchips, sawdust or ground wood, can serve as a long-term low-maintenance sustainable source of carbon to support denitrification of wastewater in the onsite treatment setting. We report here on three means to configure wood by-products within the process train of the onsite septic system which can reduce nitrogen by an average of > 80% . The low pressure-dosed shallow drainfield, which was previously shown to optimize for contaminant of emerging concern removal, is used in all the designs we tested and serves in the present designs to optimize distribution over a bed of sand to nitrify percolating wastewater (the necessary precursor for denitrification). The two optimal designs for denitrification (Designs 1 and 3 – figures 3 and 6), maintain saturated conditions in the area of denitrification and hold the best promise of long-term sustainability. This is due to the generally accepted understanding that anoxia prevents the faster degrading of the wood by decomposition. Unfortunately, these two designs necessitate the use of a second soil treatment area that adds to the costs and area required for construction. Design 2, which is the simplest design (figure 5), exhibited substantial removal compared to many manufactured units having approval in the Commonwealth of Massachusetts for such, however there are still questions relating to longevity of the sawdust that serves for the carbon source due to the concern that the wood will compost in the presence of atmospheric oxygen. A modification of this design which uses silt to maintain moisture (and hence occlude oxygen) performed impressively since July 2015 and shows no substantial reduction in denitrification potential (figure 11). This later design should be further investigated.

The two saturated designs require an additional means of disposal. Since this aspect could significantly increase the cost and area requirements, we believe that they require further research to determine whether this component could be reduced in size without compromising the public health and the environment. This study showed that the traditional indicators of Biochemical Oxygen Demand ($BOD_{5\text{-}day}$ – $cBOD_{5day}$), Total Suspended Solids (TSS), and fecal indicator bacteria are substantially removed (99%+) after a brief start-up period, suggesting that the infiltrative capacity requirements could be significantly reduced. This should be the subject of discussion with Commonwealth regulators. Contaminant constituents not examined in our study, such as viruses and contaminants of emerging concern (CEC), will likely require further investigation to satisfy the Commonwealth's anticipated and legitimate concerns.

References

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Appendix – Raw Data

Key

Alkalinity – Alkalinity mg/L
NH4 – ammonia nitrogen (mg/L)
BOD5 – 5-day Biochemical Oxygen Demand (mg/L)
CBOD5 – 5-day Carbonaceous Biochemical Oxygen Demand (mg/L)
Fecal Coli – Fecal coliform in colony forming units per 100 ml of sample
NO3 – nitrate-nitrogen (mg/L)
NO2 – nitrite-nitrogen (mg/L)
pH – pH units (negative log of hydrogen ion concentration)
Temp – Temperature in degrees Celsius
TKN - Total Kjeldahl Nitrogen (mg/L)
TN – Total Nitrogen (nitrate-nitrogen + nitrite-nitrogen + TKN)
TOC – Total Organic Carbon (mg/L
TP – Total Phosphorus (mg/L)
TSS – Total Suspended Solids (mg/L)

Layered System with Saturated Denitrification Layer – Locally Soured Material

Final Effluent - effluent at discharge pipe
Pan D – pan lysimeter positioned at the nitrification – denitrification interface

Layered System with Saturated Denitrification Layer – Long Island Sourced Materials

Final Effluent - effluent at discharge pipe
Port 1 – pan lysimeter positioned at the nitrification – denitrification interface
Port 2 – pan lysimeter positioned in the nitrification layer 12” below the wastewater-soil interface
Septic Tank Effluent – Septic tank effluent collected in pump chamber

Wood Chip Box following Bed

Final Effluent - effluent at discharge pipe
Bed – Percolate from nitrification bed
Port 2 – pan lysimeter positioned in the nitrification layer 12” below the wastewater-soil interface.
Septic Tank Effluent – Septic tank effluent collected in pump chamber

Unlined System with Silt Mix

Silt Sump – Percolate collected in large sump draining containment of soil treatment area
Port 1 – Pan lysimeter positioned directly beneath denitrifying layer
Port 2 – Pan lysimeter positioned directly beneath denitrifying layer

Unlined System using Long Island Sourced Materials

D-Sump - Percolate collected in large sump draining containment of soil treatment area
Port 1 & 1a pan lysimeters positioned at the nitrification – denitrification interface (duplicate)
Port 2 & 2a Pan lysimeters positioned directly beneath denitrifying layer (duplicate)
Septic Tank Effluent – Septic tank effluent collected in pump chamber

Columns 1, 2 and 3 Saturated soil columns – supplied with nitrified percolate.

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2016-09-19	NY-1 Final Effluent					0.1				6.6	24.2					
2016-09-27	NY-1 Final Effluent					0.1				6.7	23.0					
2016-10-05	NY-1 Final Effluent		1.60	92		0.1		2.2	0.03	6.4	20.0	33.2	35.4			
2016-10-13	NY-1 Final Effluent		0.33	26		0.1		0.1	0.03	6.7	18.7	3.3	3.4			
2016-10-20	NY-1 Final Effluent					0.1				6.6	17.8					
2016-10-25	NY-1 Final Effluent		0.41	28		0.1		0.1	0.03	6.5	16.9	2.3	2.4			
2016-11-02	NY-1 Final Effluent		0.44	15		0.1		0.6	0.43	7.0	15.4	1.8	2.8			
2016-11-08	NY-1 Final Effluent		0.48	12		0.2		2.8	0.03	6.3	14.4	1.6	4.4			
2016-11-15	NY-1 Final Effluent		0.53	1		0.1		4.6	0.03	6.4	13.2	1.9	6.5			
2016-11-21	NY-1 Final Effluent		0.77	4.8		0.1		5.4	0.03	6.4	12.8	2.0	7.4			
2016-11-30	NY-1 Final Effluent		1.40	11		0.1		5.8	0.03	6.4	10.7	2.8	8.6			
2016-12-05	NY-1 Final Effluent		1.10	1		0.1		7.0	0.03	6.5	10.7	3.1	10.1			
2016-12-14	NY-1 Final Effluent					0.2				6.4	8.3					
2016-12-14	NY-1 Final Effluent		1.30	4.1		0.2		12.0	0.03	6.4	8.3	3.2	15.2			
2016-12-21	NY-1 Final Effluent					0.3				6.1	6.8					
2016-12-21	NY-1 Final Effluent		1.00	4.4		0.3		10.0	0.40	6.1	6.8	2.5	12.9			
2016-12-28	NY-1 Final Effluent		1.70	1.5		0.3		12.0	0.46	6.4	6.4	3.3	15.8			
2017-01-04	NY-1 Final Effluent		0.03	1		7.7		4.3	0.03	5.6	11.2	0.3	4.6			
2017-01-11	NY-1 Final Effluent	0	2.10	1		0.3		10.0	0.80	5.9	5.7	3.8	14.6			
2017-01-17	NY-1 Final Effluent	140	2.00			0.9		35.0	0.03	6.1	5.9	3.8	38.8			
2017-01-23	NY-1 Final Effluent		2.10	1		0.3		11.0	1.00	6.0	6.0	3.4	15.4			
2017-01-25	NY-1 Final Effluent		1.50			0.3		13.0	1.00	6.3	6.2	4.0	18.0			
2017-02-01	NY-1 Final Effluent					0.3				6.1	6.0					
2017-02-07	NY-1 Final Effluent		1.80	1		0.2		12.0	0.33	6.7	4.8	4.3	16.6			
2017-02-15	NY-1 Final Effluent					0.0				6.9	4.7					
2017-02-22	NY-1 Final Effluent		1.80	11		0.2	9	11.0	0.24	6.1	4.4	3.8	15.0			
2017-03-08	NY-1 Final Effluent		1.90	3		0.2	4	12.0	0.03	5.9	5.7	3.7	15.7			
2017-03-22	NY-1 Final Effluent					0.3				6.0	4.8					
2017-04-05	NY-1 Final Effluent		0.83			0.2		6.6	0.38	6.0	5.9	2.2	9.2			
2017-04-18	NY-1 Final Effluent					0.2				6.2	9.1					
2017-05-04	NY-1 Final Effluent		1.40		74	0.2		0.1	0.42	5.9	11.9	6.6	7.1			
2017-05-09	NY-1 Final Effluent		0.43			0.3		0.1	0.03	6.1	12.3	28.0	28.1			
2017-05-16	NY-1 Final Effluent		0.33		82	0.2		0.1	0.03	6.2	12.3	29.0	29.1			
2017-05-23	NY-1 Final Effluent		0.05			0.2		0.2	0.03	6.4	13.9	2.7	2.9			
2017-06-06	NY-1 Final Effluent		0.36	14	14	1.0		0.1	0.05	6.3	15.1	0.8	1.0			
2017-06-12	NY-1 Final Effluent		0.26			1.1		0.1	0.05	5.9	16.1	0.6	0.7			
2017-06-13	NY-1 Final Effluent		0.22					0.1	0.05			0.1	0.2			
2017-06-14	NY-1 Final Effluent	220	0.40			0.4		0.1	0.05	6.5	16.3	0.9	1.0			
2017-06-20	NY-1 Final Effluent	220	0.31		4.7	0.0		0.1	0.03	6.6	17.5	1.3	1.4			
2017-07-05	NY-1 Final Effluent	250	0.69					0.1	0.03			1.6	1.7			
2017-07-11	NY-1 Final Effluent	220	0.29					0.1	0.03			1.0	1.1			
2017-07-18	NY-1 Final Effluent	240	0.23					0.1	0.03			0.9	1.0			
2017-07-25	NY-1 Final Effluent	250	0.27			0.0	0	0.0	0.00	6.5	21.8	0.8	0.9			
2017-08-01	NY-1 Final Effluent	240	0.24			0.0		0.0	0.00	6.1	21.3	0.3	0.4			
2017-08-08	NY-1 Final Effluent	250	0.43			0.0	0	0.1	0.03	6.3	20.5	0.9	0.9			
2017-08-15	NY-1 Final Effluent	230	0.33		4.3	0.0	5	1.8	0.03	6.2	21.6	0.9	2.7			
2017-08-23	NY-1 Final Effluent	190	0.16		3.6	0.1		0.0	0.00	6.1	22.1	0.4	0.5			
2017-08-30	NY-1 Final Effluent	210	0.23		3.4	0.1		0.1	0.03	6.2	21.8	0.8	0.9			50
2017-09-06	NY-1 Final Effluent	200	0.18		12	0.1		0.1	0.03	6.0	20.6	0.8	0.9			
2017-09-13	NY-1 Final Effluent	190	0.33		2.5	0.2	4	0.1	0.03	6.4	20.4	0.7	0.7			
2017-09-28	NY-1 Final Effluent	180	0.27			0.0	5	0.1	0.03	6.2	20.2	1.2	1.3			9
2017-10-12	NY-1 Final Effluent	220	0.18		4.5	0.0	58	0.1	0.03	6.4	19.4	0.8	0.9		4.1	18
2017-10-19	NY-1 Final Effluent	210	0.16		1	0.1	12	0.8	0.03	6.4	18.8	1.0	1.8	12		7
2017-10-26	NY-1 Final Effluent	170	0.18			0.1	140	3.5	0.03	6.3	17.8	1.2	4.7			
2017-11-08	NY-1 Final Effluent	180	0.07			0.1	5	0.6	0.03	6.6	15.9	0.8	1.4			
2017-11-21	NY-1 Final Effluent	150	0.08			0.5	0	2.0	0.07	6.6	12.6	0.9	3.0			

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2017-11-29	NY-1 Final Effluent	150	0.26		1	0.0	2	4.1	0.15	6.5	11.2	0.6	4.8	9.4		5
2017-12-06	NY-1 Final Effluent	160	0.36			0.0	2	0.1	0.15	6.4	10.0	0.4	0.6			
2017-12-18	NY-1 Final Effluent	130	0.31		1	0.1	2	5.5	0.25	6.6	8.3	0.3	6.1	8.8		6
2018-01-03	NY-1 Final Effluent	120	0.36			0.1	9	8.6	0.22	6.3	5.4	1.2	10.0			
2018-01-08	NY-1 Final Effluent		0.66			0.0		9.2	0.22	6.7	4.2	1.4	10.8			
2018-01-18	NY-1 Final Effluent	120	1.90			0.0	370	3.3	0.13	6.4	3.8	3.0	6.4			
2018-01-25	NY-1 Final Effluent	110	3.10		2.2	0.1	240	9.1	0.21	6.5	3.9	3.8	10.0	17		4
2018-02-07	NY-1 Final Effluent					0.0				6.2	3.9					
2018-02-21	NY-1 Final Effluent	120	3.50		2.7	0.0	8	7.8	0.28	6.2	4.9	5.0	13.1	20		3
2018-03-07	NY-1 Final Effluent	130	1.80			0.0		4.9	0.19	6.4	6.2	2.4	7.5			
2018-03-19	NY-1 Final Effluent	140	1.30		12	0.2	20	6.0	0.19	6.5	5.1	2.0	8.2	15		5
2018-04-04	NY-1 Final Effluent	140	1.60			0.1		8.7	0.22	6.3	5.5	1.7	10.6			
2018-04-19	NY-1 Final Effluent	160	1.50			0.3		7.7	0.25	6.3	6.6	2.1	10.1			
2018-04-26	NY-1 Final Effluent	180	0.97		1	0.3	0	7.6	0.15	6.1	7.6	2.0	9.8	11		6
2018-05-03	NY-1 Final Effluent	200	0.60			0.1		1.2	0.29	6.3	9.3	1.6	3.1			
2018-05-16	NY-1 Final Effluent	220	0.40			0.2		3.0	0.20	6.2	12.5	1.8	5.0			
2018-05-23	NY-1 Final Effluent	200	0.45		1	0.3	5	4.7	0.03	6.3	13.2	1.7	6.4	13		17
2018-05-29	NY-1 Final Effluent	210	0.62			0.4		3.7	0.00	6.2	14.7	1.7	5.4			
2018-06-13	NY-1 Final Effluent	210	0.53		1	0.2	5	2.5	0.03	6.2	16.3	1.7	4.2	15		12
2018-06-27	NY-1 Final Effluent	210	0.33			0.2		1.2	0.03	6.2	17.6	2.1	3.3			
2018-07-11	NY-1 Final Effluent	210	0.36			0.0		1.0	0.03	6.0	20.1	1.5	2.5			
2018-07-19	NY-1 Final Effluent	200	0.40		1	0.4	5	0.1	0.03	6.1	20.5	2.2	2.3	18		20
2018-07-25	NY-1 Final Effluent		0.27		1	0.0	5	0.7	0.03	6.0	20.7	1.9	2.6			
2018-08-02	NY-1 Final Effluent		0.13		1	0.0	5	0.6	0.03	6.2	21.7	1.8	2.4			
2018-08-08	NY-1 Final Effluent		0.13		1	0.1	5	0.9	0.03	6.1	22.6	2.3	3.2			
2018-08-15	NY-1 Final Effluent		0.13		1	0.3	10	1.5	0.03	6.3	23.1	2.0	3.5			
2018-08-22	NY-1 Final Effluent		0.13			0.1		2.3	0.03	6.1	23.1	1.3	3.6			
2018-09-06	NY-1 Final Effluent		0.13			0.1		0.4	0.03	6.1	22.5	1.3	1.8			
2018-09-20	NY-1 Final Effluent	150	0.13		1	0.1	5	3.0	0.00	6.2	21.8	1.1	4.1	14		7
2018-10-04	NY-1 Final Effluent		0.13			0.1		4.1	0.06	6.4	19.9	1.6	5.8			
2018-10-11	NY-1 Final Effluent					0.1				6.1	19.2					
2018-10-25	NY-1 Final Effluent		0.13		1	0.1	5	5.4	0.03	5.9	15.5	1.5	6.9			
2018-11-07	NY-1 Final Effluent		0.13			0.1		4.2	0.03	6.3	14.5	1.2	5.4			
2018-11-19	NY-1 Final Effluent		0.13			0.5		3.5	0.03	5.8	11.0	1.1	4.6			
2018-11-28	NY-1 Final Effluent		0.13		2	0.1	9	9.0	0.03	5.8	8.8	1.4	10.4			
2018-12-19	NY-1 Final Effluent		0.13		1	0.1	37	11.0	0.03	6.3	6.1	1.0	12.0			
2019-01-09	NY-1 Final Effluent					0.8		8.1	0.03	6.3	5.5	2.5	10.6			
2019-01-17	NY-1 Final Effluent		1.80		1	2.4	9	8.6	0.03	6.3	4.2	2.6	11.2			
2019-01-23	NY-1 Final Effluent		3.70			1.4		5.5	0.03	6.4	3.3	4.7	10.2			
2019-02-07	NY-1 Final Effluent		5.60			3.2		10.0	0.08	6.3	2.4	6.8	16.9			
2019-02-20	NY-1 Final Effluent		8.00		1	3.7	55	11.0	0.25	6.5	2.8	8.6	19.9			
2019-03-07	NY-1 Final Effluent		7.90			0.2		10.0	0.15	6.3	2.2	8.4	18.6			
2019-03-14	NY-1 Final Effluent		7.80		1	0.3	130	11.0	0.18	6.5	2.0	7.8	19.0			
2019-03-18	NY-1 Final Effluent					0.2				6.6	3.0					
2019-04-03	NY-1 Final Effluent		5.10			0.2		21.0	0.13	6.3	5.2	6.0	27.1			
2019-04-18	NY-1 Final Effluent		2.20			0.0		9.2	0.03	6.3	8.8	3.7	12.9			
2019-04-25	NY-1 Final Effluent		1.70		1	0.1	15	8.6	0.03	6.3	10.3	3.0	11.6			
2019-05-01	NY-1 Final Effluent		1.00			0.0		6.8	0.03	6.3	10.8	2.6	9.4			
2019-05-15	NY-1 Final Effluent		0.25			0.1		5.4	0.02	6.3	11.8	1.5	6.9			
2019-05-23	NY-1 Final Effluent		0.33		1	0.1	4	5.5	0.29	6.2	12.7	1.1	6.9			
2019-05-30	NY-1 Final Effluent		0.25			0.1		5.5	0.12	6.3	14.1	1.2	6.8			
2019-06-13	NY-1 Final Effluent		0.25			0.1		5.1	0.03	6.2	16.2	1.4	6.5			
2019-06-19	NY-1 Final Effluent		0.13		1	0.2	5	7.1	0.03	6.1	16.9	1.3	8.4			
2019-06-26	NY-1 Final Effluent		0.88			0.0		5.2	0.15	6.1	17.8	1.2	6.6			
2019-07-11	NY-1 Final Effluent		0.13			0.1		4.0	0.22	6.2	20.3	0.1	4.3			
2019-07-18	NY-1 Final Effluent		0.13		1	0.1	5	4.8	0.03	6.2	21.2	1.1	5.9			

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2019-07-25	NY-1 Final Effluent		0.13			0.2		5.6	0.17	6.2	22.2	1.4	7.2			
2019-08-08	NY-1 Final Effluent		0.13					3.0	0.13			1.0	4.1			
2019-08-15	NY-1 Final Effluent		0.13		1	0.1	5	3.3	0.12	6.3	22.3	1.0	4.4			
2019-08-22	NY-1 Final Effluent		0.13			0.3		4.0	0.15	6.2	22.6	1.0	5.2			
2019-09-05	NY-1 Final Effluent					0.1				6.3	21.6					
2019-09-12	NY-1 Final Effluent					0.1				6.4	20.8					
2019-09-16	NY-1 Final Effluent					0.0				6.3	20.5					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	
2016-09-27	NY-1 Port 1		0.70					18.0	5.60			3.6	27.2			
2016-10-05	NY-1 Port 1		0.52			1.0		0.1	0.50	6.2	20.0	2.0	2.6			
2016-10-13	NY-1 Port 1		1.50			0.2		18.0	9.90	6.1	17.8	4.8	32.7			
2016-10-20	NY-1 Port 1					0.2				6.0	17.5					
2016-10-25	NY-1 Port 1		0.40			1.4		35.0	5.30	5.8	16.7	2.2	42.5			
2016-11-02	NY-1 Port 1		0.14			1.1		40.0	2.00	6.3	14.4	2.0	44.0			
2016-11-08	NY-1 Port 1		0.11			1.2		42.0	2.20	6.1	13.4	1.5	45.7			
2016-11-15	NY-1 Port 1		0.61			1.2		39.0	1.70	5.7	12.0	2.4	43.1			
2016-11-21	NY-1 Port 1		0.12			1.4		40.0	0.52	5.6	12.1	1.5	42.0			
2016-11-30	NY-1 Port 1		2.80			1.8		18.0	0.03	6.1	9.4	5.4	23.4			
2017-01-11	NY-1 Port 1		2.60			6.7		21.0	1.50	5.7	4.6	4.2	26.7			
2017-01-23	NY-1 Port 1		0.43			3.8		37.0	1.00	5.5	5.5	1.6	39.6			
2017-01-25	NY-1 Port 1		0.42			4.0		23.0	0.71	5.6	5.8	2.6	26.3			
2017-02-01	NY-1 Port 1					4.9				5.5	5.1					
2017-02-07	NY-1 Port 1		0.32			5.5		38.0	0.03	6.0	4.2	2.0	40.0			
2017-02-15	NY-1 Port 1					5.4				6.5	3.9					
2017-02-22	NY-1 Port 1		0.08			5.1		34.0	0.05	5.5	4.5	1.5	35.6			
2017-03-08	NY-1 Port 1		4.30			5.1		35.0	0.03	5.5	4.5	1.5	36.5			
2017-05-04	NY-1 Port 1		0.38			3.3		39.0	0.08	5.5	12.5	1.0	40.1			
2017-05-23	NY-1 Port 1					2.1				6.1	14.7					
2017-07-05	NY-1 Port 1	100	5.30					32.0	0.03			5.4	37.4			
2017-08-15	NY-1 Port 1	78	3.30			2.9	9	40.0	0.03	6.2	23.3	4.4	44.4			
2017-08-23	NY-1 Port 1	31	0.60					36.0	0.45	5.9		1.1	37.6			
2017-10-19	NY-1 Port 1	48	0.05		1	5.6		48.0	0.03	6.2	18.2	1.1	49.1	6.5		
2017-11-08	NY-1 Port 1	1	0.24			6.0	54			6.2	15.4	1.2	1.2			
2017-11-29	NY-1 Port 1	38	0.08		5.6	9.8		31.0	0.08	6.0	9.9	1.0	32.1	6.8		
2017-12-18	NY-1 Port 1	31	0.31		1	9.7		32.0	0.08	6.3	7.2	0.3	32.4	6.6		
2018-01-22	NY-1 Port 1					6.2				5.7	3.6					
2018-01-25	NY-1 Port 1	44	2.90		2.8	8.6		37.0	0.52	6.2	4.2	3.8	24.0	9.6		
2018-02-21	NY-1 Port 1	40	0.05		1	9.6		25.0	0.13	5.8	5.2	1.6	26.7	7.9		
2018-03-19	NY-1 Port 1	50	0.05		1	9.4		27.0	0.07	6.2	4.7	0.9	28.0	6		
2018-04-26	NY-1 Port 1	65	0.05		1	7.2		25.0	0.03	5.0	8.7	1.6	26.6	14		
2018-05-23	NY-1 Port 1	36	5.00		1	3.7		48.0	0.12	5.3	13.9	5.7	53.8	12		
2018-06-13	NY-1 Port 1	22	0.13		2.5	5.7		52.0	0.03	5.2	16.7	9.6	61.6	1.8		
2018-07-19	NY-1 Port 1	28	0.13		1	5.6		35.0	0.03	5.7	20.8	2.1	37.1	7		
2018-09-20	NY-1 Port 1	40	1.20		1	1.9		43.0	0.00	6.1	21.8	3.5	46.5	7.8		
2018-10-11	NY-1 Port 1					4.0				5.9	19.0					
2019-01-09	NY-1 Port 1					0.9		23.0	0.03	5.8	4.7	1.2	24.2			
2019-01-23	NY-1 Port 1		3.30		2	6.7	27	20.0	0.03	6.1	3.0	4.7	24.7			
2019-02-20	NY-1 Port 1		18.00		1	9.3	5	17.0	0.14	6.4	2.2	17.0	34.1			
2019-03-14	NY-1 Port 1		14.00		1	10.2	65	16.0	0.12	6.4	2.1	14.0	30.1			
2019-04-25	NY-1 Port 1		0.34		1	6.0	99	27.0	0.03	5.9	10.7	0.1	27.2			
2019-05-23	NY-1 Port 1		0.18		1	6.3	9	16.0	0.01	6.2	13.4	0.4	16.4			
2019-06-19	NY-1 Port 1		0.13		1	7.2	5	28.0	0.14	6.1	17.8	1.4	29.5			
2019-07-18	NY-1 Port 1		0.13		5.2	4.6	9	34.0	0.27	5.9	21.8	1.1	35.4			
2019-08-15	NY-1 Port 1		0.48		3.7	3.2	3600	38.0	0.49	6.0	22.3	1.5	40.0			
2019-09-16	NY-1 Port 1					5.1				5.9	20.3					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2016-09-19	NY-1 Port 2					3.9				6.9	24.2					
2016-09-27	NY-1 Port 2		15.00					39.0	5.10			18.0	62.1			
2016-10-05	NY-1 Port 2		19.00			0.8		43.0	8.70	6.5	19.5	15.0	66.7			
2016-10-13	NY-1 Port 2		11.00			0.3		10.0	8.40	6.5	16.9	18.0	36.4			
2016-10-20	NY-1 Port 2					0.3				6.2	17.2					
2016-10-25	NY-1 Port 2		5.50			1.1		9.1	24.00	5.9	16.3	8.5	41.6			
2016-11-02	NY-1 Port 2		8.70			1.8		8.3	18.00	6.6	13.4	11.0	37.3			
2016-11-08	NY-1 Port 2		6.00			1.2		9.0	20.00	6.0	12.4	6.6	35.6			
2016-11-15	NY-1 Port 2		4.50			1.9		11.0	21.00	5.8	10.9	7.5	39.5			
2016-11-21	NY-1 Port 2		4.20			0.8		16.0	18.00	6.5	11.3	5.8	39.8			
2016-11-30	NY-1 Port 2		13.00			4.2		8.3	4.90	6.2	8.5	15.0	28.2			
2017-01-23	NY-1 Port 2		12.00			2.8		16.0	2.00	5.9	5.7	15.0	33.0			
2017-02-15	NY-1 Port 2					4.2				6.7	3.5					
2017-02-22	NY-1 Port 2		6.20			3.6	130	24.0	2.10	5.7	3.4	7.9	34.0			
2017-03-08	NY-1 Port 2		0.06			1.7	23	23.0	1.50	5.8	4.3	6.9	31.4			
2017-05-04	NY-1 Port 2		2.40			0.8		33.0	0.57	5.5	13.4	2.0	35.6			
2017-07-05	NY-1 Port 2	150	26.00					12.0	0.03			22.0	34.0			
2017-08-15	NY-1 Port 2	54	5.20			2.7	210	34.0	0.03	5.9	24.0	5.4	39.4			
2017-08-23	NY-1 Port 2	15	2.10					43.0	0.03	5.6		2.4	45.4			
2017-10-19	NY-1 Port 2					5.0				6.2	18.0					
2017-11-08	NY-1 Port 2	27	0.05			8.8	240	40.0	0.03	6.1	15.2	1.1	41.1			
2017-12-20	NY-1 Port 2	35	0.48			5.7	300	30.0	0.18	5.8	5.5	1.7	31.9			
2018-01-22	NY-1 Port 2					6.4				5.5	2.2					
2018-10-11	NY-1 Port 2					4.9				5.9	19.1					
2019-09-16	NY-1 Port 2					1.9				5.6	20.3					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2017-10-19	Septic Tank Effluent	290	35.00	34		0.0	140000			7.4	17.9	40.0	40.0	34		21
2017-11-29	Septic Tank Effluent	230	34.00	74		0.0	320000			7.1	11.3	36.0	36.0	62		23
2017-12-18	Septic Tank Effluent	210	37.00	180		0.0	600000			7.1	8.2	42.0	42.0	91		41
2018-01-25	Septic Tank Effluent	160	33.00	0		0.0	740000			6.9	4.9	36.0	36.0	77		23
2018-02-21	Septic Tank Effluent	180	29.00	94		0.0	380000			6.7	5.5	37.0	37.0	53		22
2018-03-19	Septic Tank Effluent	210	37.00	140		0.1	470000			6.8	4.6	39.0	39.0	86		25
2018-04-26	Septic Tank Effluent	230	40.00	170		0.1	180000			6.6	8.1	40.0	40.0	91		42
2018-05-23	Septic Tank Effluent	280	55.00	100		0.1	780000			6.9	12.6	55.0	55.0	85		23
2018-06-13	Septic Tank Effluent	300	53.00	83		0.1	940000			7.1	15.7	61.0	61.0	80		36
2018-07-19	Septic Tank Effluent	240	43.00	1		0.3	120000			6.9	20.2	58.0	58.0	35		20
2018-07-25	Septic Tank Effluent		44.00	38		0.1	280000			6.7	20.5	56.0	56.0			
2018-08-02	Septic Tank Effluent		45.00	43		0.0	240000			7.0	21.2	56.0	56.0			
2018-08-08	Septic Tank Effluent		43.00	46		0.3	490000			6.9	22.3	46.0	46.0			
2018-08-15	Septic Tank Effluent		49.00	110		0.1	620000			6.9	22.4	57.0	57.0			
2018-09-20	Septic Tank Effluent	270	51.00	47		0.0	580000			6.9	21.1	55.0	55.0	61		39
2018-10-11	Septic Tank Effluent					0.1				6.5	19.0					
2018-10-25	Septic Tank Effluent		40.00	120		0.2	120000			6.8	14.9	45.0	45.0			
2018-11-28	Septic Tank Effluent		32.00	76		0.3	380000			6.3	9.1	41.0	41.0			
2018-12-19	Septic Tank Effluent		34.00	90		0.4	740000			6.9	6.6	44.0	44.0			
2019-01-17	Septic Tank Effluent		40.00	57		2.0	560000			7.0	4.9	42.0	42.0			
2019-02-20	Septic Tank Effluent		42.00	65		2.5	2700000			7.0	3.7	44.0	44.0			
2019-03-14	Septic Tank Effluent		32.00	1		0.6	1200000			6.8	3.5	37.0	37.0			
2019-04-25	Septic Tank Effluent		36.00	1		0.0	330000			6.8	0.1	45.0	45.0			
2019-05-23	Septic Tank Effluent		41.00	88		0.1	330000			7.0	12.6	48.0	48.0			
2019-06-19	Septic Tank Effluent		41.00	39		0.1	320000			6.9	16.3	46.0	46.0			
2019-07-18	Septic Tank Effluent		41.00	26		0.1	73000			7.0	20.3	44.0	44.0			

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2019-08-15	Septic Tank Effluent		48.00	37		0.0	400000			7.1	21.4	52.0	52.0			
2019-09-16	Septic Tank Effluent					0.1				6.9	20.0					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2016-11-02	Bed		9.90	4			9.8	27	3.4	0.16	7.2	8.3	11.0	14.6			
2016-11-07	Bed		11.00						14.0	1.20			12.0	27.2			
2016-11-08	Bed	140	9.50	1			9.3	11	18.0	2.20	7.1	9.8	10.0	30.2			
2016-11-15	Bed	44	0.12	1			8.3	33	36.0	3.60	6.4	10.1	1.8	41.4			
2016-11-21	Bed		0.10		1		8.3	23	34.0	1.10	7.0	7.3	0.9	36.0			9
2016-11-30	Bed	42	0.16	1			9.2	33	36.0	0.60	6.4	10.7	1.4	38.0			
2016-12-05	Bed	53	0.25	1					34.0	0.48			0.8	35.3			
2016-12-14	Bed						12.0				6.4	7.3					
2016-12-20	Bed	41	0.57	1				33	30.0	0.34			1.3	31.6		2.9	24
2017-01-04	Bed	42	0.09	1			10.8	56	26.0	0.14	5.8	6.5	1.6	27.7		2.2	3
2017-01-10	Bed	40	0.14	1			10.8	7	29.0	0.03	6.3	5.6	1.2	30.2		2.4	4
2017-01-23	Bed		0.82		1		9.8		25.0	0.25	6.3	6.1	1.5	26.8		1.9	8
2017-01-24	Bed	48	0.89	5.5				5600	12.0	0.53			2.7	15.2		2.7	21
2017-01-25	Bed		0.28	2			0.6	1200	10.0	0.25	6.3	7.1	1.5	11.8		2.6	12
2017-01-27	Bed		0.08	1			8.7	20	16.0	0.03	6.2	6.4	1.5	17.5		2.2	9
2017-02-01	Bed		0.06		2.1		8.2	880	23.0	0.03	6.1	5.7	0.7	23.7		1.6	6
2017-02-07	Bed	40	0.32	1			10.0	11	28.0	0.03	6.6	4.7	1.0	29.0		1.8	5
2017-02-22	Bed		0.09		1		10.9	1	29.0	0.03	5.1	4.9	1.2	30.2		2.3	4
2017-03-07	Bed	30	0.03	1			10.9	5	27.0	0.03	5.7	5.4	0.3	27.3		2.3	1
2017-03-08	Bed						10.6	2000			5.8	5.3					
2017-03-15	Bed						12.5	3			5.9	4.2					
2017-03-21	Bed	16	0.67		1			15	29.0	0.03			1.8	30.8			4
2017-03-28	Bed	26	0.11	1			11.5	3	28.0	0.03	6.1	5.3	0.9	28.9		2	1
2017-04-04	Bed	40	0.10	1			10.6	140	13.0	0.29	5.9	5.7	0.8	14.1		2.2	12
2017-04-11	Bed	46	0.13	1			10.7	5	21.0	0.03	5.8	7.3	1.1	22.1		1.6	4
2017-04-19	Bed	40	0.32	1			11.2	1	29.0	0.03	5.9	9.9	1.0	30.0		2.1	4
2017-04-25	Bed	42	0.19	1			8.9	7	25.0	0.03	5.9	9.9	1.0	26.0		2.3	14
2017-05-09	Bed	67	0.15		1		8.7	20	15.0	0.03	6.0	12.0	1.9	16.9		1.9	9
2017-05-17	Bed	60	0.10		1		7.9	140	12.0	0.03	5.8	12.0	0.1	12.1		2.8	5
2017-05-25	Bed	53	0.05		1		9.7	12	20.0	0.03	6.3	14.0	1.7	21.7		2.5	2
2017-06-01	Bed	76	0.05		1			15	15.0	0.09			1.3	16.4		2.6	5
2017-06-07	Bed	76	0.10		1			360	17.0	0.03			0.9	17.9		2.8	18
2017-06-14	Bed	77	0.10	1	1		8.8	6	16.0	0.05	6.5	17.2	1.0	17.1		2.4	14
2017-06-21	Bed	64	0.05		1		7.1	27	5.0	0.14	6.6	18.5	0.6	5.7		2.6	19
2017-07-06	Bed	49	0.11		1			6	27.0	0.03			0.6	27.6		3	13
2017-07-11	Bed	57	0.05		1			31	17.0	0.03			0.4	17.4		2.4	7
2017-07-19	Bed	47	0.00		2.6		7.2	0	23.0	0.00	6.4	21.0	0.3	23.3		2.6	16
2017-07-25	Bed	39	0.00		2.9		8.1	0	20.0	0.00	6.6	21.0	0.2	20.2		4.2	9
2017-08-01	Bed	37	0.00		0		6.0	4	24.0	0.00	6.2	22.1	0.0	24.1		3.1	7
2017-08-08	Bed	49	0.05		1		6.2	2	22.0	0.03	6.7	21.6	0.4	22.5		3.3	6
2017-08-15	Bed	37	0.10		6.4		6.4	6	30.0	0.03	6.5	21.6	0.4	30.4		2.9	73
2017-08-23	Bed	47	0.05		1.5		8.7	10	27.0	0.03	6.2	21.6	0.7	27.7		2.3	
2017-08-31	Bed	42	0.05		4.7		8.0	26	17.0	0.03	6.5	20.6	0.6	17.7		2.6	9
2017-09-07	Bed	53	0.05		1		7.0	510	17.0	0.03	6.4	19.9	0.8	17.8		2.7	6
2017-09-13	Bed	51	0.05		2.2		6.7	18	17.0	0.03	6.8	19.9	0.6	17.6		2.8	33
2017-09-27	Bed	50	0.05		1		7.4	7	31.0	0.03	5.8	19.8	0.8	31.8		2.4	6
2017-10-11	Bed	58	0.05		3.6		8.7	22	30.0	0.03	6.7	19.1	0.8	30.8		3.3	7
2017-10-19	Bed	76	0.05		1		6.3	5	32.0	0.03	6.8	17.9	1.0	33.0	6.4		22

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2017-10-25	Bed	66	0.05		1		7.5	1	32.0	0.03	6.7	17.6	0.7	32.7		2.8	8
2017-10-26	Bed						7.3	2200			6.6	17.4					
2017-11-07	Bed	52	0.05		1		7.7	9	36.0	0.03	6.8	15.7	0.8	36.8		3.7	9
2017-11-20	Bed	45	0.05				9.7	5	30.0	0.03	6.7	11.9	1.0	31.0		3	7
2017-11-29	Bed	43	0.05		2.6		10.8	5	27.0	0.03	6.8	10.4	0.9	27.9	8.4		4
2017-12-06	Bed	44	0.05		1		10.2	5	29.0	0.06	6.5	9.6	0.3	29.3		2.5	10
2017-12-18	Bed	36	0.25		1		11.1	3	28.0	0.03	6.8	7.5	0.8	28.8	6.9		8
2018-01-03	Bed	37	0.05		2.6		10.5	12	32.0	0.03	6.8	4.5	0.7	32.7		2.9	6.2
2018-01-18	Bed	46	4.30		2.4		9.7	100	21.0	0.11	6.4	3.6	3.2	24.3		2.1	8
2018-01-25	Bed	50	3.10		1		11.5	420	15.0	0.05	6.5	4.0	2.8	15.0	14		3
2018-02-07	Bed	76	3.10		1		10.9	55	17.0	0.14	5.9	4.0	4.0	21.1		3.2	5
2018-02-21	Bed	35	0.57		1		10.2	10	28.0	0.03	6.0	5.6	1.5		7.5		6
2018-03-07	Bed	37	0.13		1		9.5	420	23.0	0.03	6.1	5.7	0.8	23.8		2.2	5
2018-03-19	Bed	52	0.82		1		9.2	230	24.0	0.03	6.3	4.3	1.6	25.6	6.4		5
2018-04-04	Bed	50	0.79		1		8.5	100	26.0	0.17	5.9	5.9	1.5	27.7		3.8	7
2018-04-19	Bed	50	0.48		1		9.9	18	27.0	0.03	6.1	6.7	1.4	28.4		3.4	3
2018-04-26	Bed	53	0.46		1		4.3	1800	16.0	0.23	6.4	10.2	1.6	17.8	8.2		9
2018-05-03	Bed	61	0.05		1		8.5	55	23.0	0.03	5.9	9.7	0.5	23.5		2.8	5
2018-05-16	Bed	53	0.13		1		7.9	5	26.0	0.03	6.3	12.5	1.0	27.0		4.2	7
2018-05-23	Bed	64	0.13		1		7.6	9	26.0	0.03	6.1	12.8	0.8	26.8	7.6		3
2018-05-29	Bed	59	0.13		1		7.7	5	36.0	0.00	6.3	14.2	1.0	37.0		3.4	9
2018-06-13	Bed	49	0.13		1		6.3	2800	39.0	0.03	6.8	16.2	1.4	40.4	15		9
2018-06-27	Bed	46	0.13		1		9.0	18	32.0	0.03	6.2	17.3	1.5	33.5		4.9	8
2018-07-11	Bed	40	0.13		1		6.2	5	34.0	0.03	6.2	19.9	1.3	35.3		4.5	7
2018-07-19	Bed	43	0.13		1		8.5	1	24.0	0.03	6.2	20.3	1.6	25.6	6.6		7
2018-07-25	Bed		0.13		1		6.0	6	30.0	0.03	5.9	20.5	1.8	31.8			
2018-08-02	Bed		0.13		1		5.7	1	32.0	0.03	6.4	22.4	1.6	33.6			
2018-08-08	Bed		0.13		1		6.2	4	35.0	0.03	6.0	22.0	1.9	36.9			
2018-08-15	Bed		0.13		1		5.4	1	43.0	0.03	6.0	22.3	1.3	44.3			
2018-08-22	Bed	26	0.13		1		6.9	10	36.0	0.03	5.9	22.0	1.0	37.0		3.5	12
2018-09-06	Bed	29	0.13		1		6.0	3	31.0	0.03	6.1	22.3	0.7	31.7		4.1	13
2018-09-20	Bed	28	0.13		1		8.6	5	40.0	0.01	6.3	21.0	1.3	41.3	6.3		10
2018-10-04	Bed	38	0.13		1		6.9	22	36.0	0.03	6.1	19.3	1.4	37.4		3.4	9
2018-10-10	Bed						5.8				5.9	19.1					
2018-10-25	Bed		0.13		1		7.4	4	34.0	0.03	5.9	14.6	0.8	34.8			
2018-11-07	Bed		0.13				7.6		28.0	0.03	6.1	14.4	1.5	29.5			
2018-11-19	Bed		0.13				8.1		24.5	0.03	5.6	10.5	1.0	25.5			
2018-11-28	Bed		0.96		1		8.8	84	17.0	0.03	5.9	8.9	2.6	19.6			
2018-12-19	Bed		0.13		1		10.5	77	22.0	0.03	6.1	6.2	0.3	22.3			
2019-01-09	Bed						10.0		23.0	0.03	6.1	5.7	1.1	24.1			
2019-01-17	Bed		0.90		1		10.8	220	27.0	0.03	6.1	4.0	1.7	28.7			
2019-01-23	Bed	30	2.40		1		9.7	410	16.0	0.03	6.1	3.4	3.4	19.4		4.1	1
2019-02-07	Bed	34	3.00		1		9.9	130	21.0	0.46	6.1	3.0	4.2	25.7		3.7	1
2019-02-20	Bed		0.85		1		9.5	18	31.0	1.00	6.1	3.2	1.4	33.4			
2019-03-07	Bed	37	0.49		1		9.0	18	17.0	0.13	6.1	2.1	1.4	18.5		3.5	2
2019-03-14	Bed		2.40		1		9.3	1100	17.0	0.33	6.2	2.5	2.9	20.2			
2019-03-18	Bed	26	2.50		1		8.4	91	24.0	0.42	6.1	3.6	3.1	27.5		3.7	4
2019-04-03	Bed	42	0.13		1		8.4	520	22.0	0.19	6.0	5.4	1.4	23.6		4.6	4

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2019-04-18	Bed	56	0.11		1		8.2	12	22.0	0.03	6.0	8.9	2.0	24.0		4	2
2019-04-25	Bed		0.11		1		8.1	5	19.0	0.03	6.1	10.7	0.1	19.2			
2019-05-01	Bed	78	0.13		1		7.8	1800	18.0	0.05	6.2	10.5	1.1	19.2		4	2
2019-05-15	Bed	74	0.25		1		7.8	2	13.0	0.01	6.3	11.3	1.2	14.2		2.8	3
2019-05-23	Bed		0.11		1		7.8	5	19.0	0.01	6.2	12.7	1.0	20.0			
2019-05-30	Bed	60	0.25		1		7.6	38	36.0	0.05	6.3	13.7	0.8	36.8		8	0.75
2019-06-13	Bed	56	0.25		1		7.1	180	20.0	0.15	6.1	15.7	1.4	21.6		5	2
2019-06-19	Bed		0.13		1		6.4	150	25.0	0.15	6.0	16.5	1.0	26.1			
2019-06-26	Bed	51	0.13		1		6.0	15	24.0	0.11	5.9	17.5	1.0	25.1		4.5	1
2019-07-11	Bed	50	0.13		1		5.7	2	22.0	0.03	6.2	20.2	0.1	22.2		4.8	1
2019-07-18	Bed		0.13		1		5.6	5	22.0	0.03	6.2	20.8	0.9	22.9			
2019-07-25	Bed	50	0.13		1		5.6	35	23.0	0.05	6.3	21.3	1.3	24.4		3.2	1
2019-08-08	Bed	36	0.13		1		5.3	100	32.0	1.00	6.1	21.8	0.8	33.8		3.6	8
2019-08-15	Bed		0.13		1		5.8	5	35.0	0.58	6.2	21.6	0.7	36.3			
2019-08-22	Bed	34	0.13		1		5.8	2	31.0	0.49	6.0	22.3	0.6	32.1		3.3	4.4
2019-09-05	Bed						6.0				6.1	21.1					
2019-09-12	Bed						6.3				6.0	20.1					
2019-09-16	Bed						6.5				6.1	19.8					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2016-10-25	Final Effluent		0.77	590			2.2		0.1	4.50	5.5	15.6	4.5	9.1			
2016-11-02	Final Effluent		2.10	640			7.2		0.1	0.03	5.4	8.5	6.2	6.3			
2016-11-08	Final Effluent	100	5.40	510			6.0		0.1	1.40	5.4	11.1	9.8	11.3			
2016-11-15	Final Effluent	110	0.20	250			5.7		0.1	0.03	6.1	12.6	3.4	3.5			
2016-11-21	Final Effluent	120	0.11	210			3.8		0.1	0.03	6.1	14.6	1.8	1.9			
2016-11-30	Final Effluent	120	0.30	1			4.8		0.1	0.03	6.5	12.7	2.5	2.6			
2016-12-05	Final Effluent	140	0.25	73			5.7		0.1	0.03	6.6	10.1	3.1	3.2			
2016-12-14	Final Effluent	130	0.09	94			8.8		0.1	0.03	6.5	6.1	1.8	1.9			
2016-12-21	Final Effluent	130	0.25	28			6.5		0.1	0.03	7.1	11.4	5.3	5.4			
2016-12-28	Final Effluent	140	0.11	1			6.7		0.2	0.03	6.8	10.8	1.8	2.0			
2017-01-04	Final Effluent	130	0.07	66		220	5.4		0.1	0.03	6.3	4.6	1.4	1.5			
2017-01-11	Final Effluent	120	0.18	44			6.5		2.6	0.51	6.7	5.4	2.3	5.4			
2017-01-17	Final Effluent	110	0.15				7.3		0.1	0.03	6.8	9.9	1.5	1.6			
2017-01-23	Final Effluent		0.07	25			7.3		9.4	0.03	6.9	5.3	1.6	11.0			
2017-01-25	Final Effluent						6.6				6.6	4.9					
2017-01-27	Final Effluent		0.17	23			7.5	110	0.1	0.03	6.7	6.2	1.8	1.9			
2017-02-01	Final Effluent						7.5				6.4	4.3					
2017-02-07	Final Effluent		0.18	52			8.0		0.1	0.03	7.1	4.3	1.3	1.4			
2017-02-15	Final Effluent						8.5				7.1	3.6					
2017-02-22	Final Effluent		0.10	27			8.0		0.1	0.03	6.7	6.1	1.0	1.0			
2017-03-08	Final Effluent		0.12	8			7.1	1	0.1	0.03	6.6	9.4	1.4	1.5			
2017-03-21	Final Effluent						7.8		0.2	0.10	6.2	3.8	1.4	1.7			
2017-03-30	Final Effluent								1.8	0.03			1.4	3.2			
2017-04-05	Final Effluent		0.18				7.8	66	2.0	0.28	6.6	12.9	0.1	2.3			
2017-04-18	Final Effluent			19			5.7				6.8	13.1					10
2017-05-05	Final Effluent		0.24	46			6.1		0.1	0.01	6.5	13.2	0.5	0.6			
2017-05-09	Final Effluent		0.13	19			7.7		0.1	0.03	5.9	8.9	1.9	2.0			10

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2017-05-16	Final Effluent		0.20	24			0.6		0.1	0.03	6.9	17.8	1.9	2.0			
2017-05-23	Final Effluent		0.05				4.1		0.1	0.03	7.0	18.8	1.0	1.0			
2017-06-06	Final Effluent		0.16	19			6.2		0.1	0.17	5.3	10.1	0.1	0.4			
2017-06-14	Final Effluent	140	0.05				4.1		0.1	0.05	7.3	23.6	1.6	1.7			
2017-06-20	Final Effluent	130	0.14		73				0.1	0.03			0.8	0.9			
2017-07-05	Final Effluent	140	0.10						0.1	0.03			0.8	0.8			
2017-07-11	Final Effluent	110	0.05						0.1	0.03			0.7	0.8			
2017-07-18	Final Effluent	110	0.05				4.0		0.4	0.10	6.8	20.8	0.5	1.0			
2017-07-25	Final Effluent	130	0.00				5.1	0	0.0	0.00	7.1	21.3	0.6	0.6			
2017-08-01	Final Effluent	120	0.00				4.4	0	0.0	0.00	7.3	21.4	0.0	0.1			
2017-08-08	Final Effluent	130	0.25		18		3.1	2	0.1	0.03	7.7	20.0	0.5	0.6			9
2017-08-15	Final Effluent	122	0.10		64		3.6	2	0.1	0.03	7.0	21.8	0.7	0.8			
2017-08-23	Final Effluent	110	0.05		30		6.3	40	0.1	0.03	6.8	22.3	0.1	0.1			
2017-08-31	Final Effluent	110	0.05		42		6.6	2	0.1	0.03	6.9	20.9	0.5	0.6			6
2017-09-07	Final Effluent	98	0.05		9.6		4.7	31	0.6	0.20	6.5	20.2					4
2017-09-13	Final Effluent	34	0.21		4.5		5.1	1	0.1	0.03	6.9	20.2	0.7	0.8		1.9	10
2017-09-28	Final Effluent	120	0.18				5.6	1	0.1	0.03	6.9	20.3	1.2	1.3			3
2017-10-12	Final Effluent	150	0.05		4.4		4.7	1	0.1	0.03	7.1	19.1	0.7	0.8		2.2	2
2017-10-19	Final Effluent	170	0.05		3.1		4.4	1	0.1	0.03	7.4	18.2	1.1	1.2	17		5
2017-10-26	Final Effluent	120	0.28				3.7	110	13.0	1.30	6.6	17.7	1.4	15.7			
2017-11-08	Final Effluent	130	0.09				5.4	5	2.3	0.03	7.4	15.0	1.1	3.4			
2017-11-21	Final Effluent	120	0.05				4.0	2	3.9	0.21	7.1	12.3	1.1	5.2			
2017-11-29	Final Effluent	120	0.05		1		6.8	5	4.4	0.27	7.1	10.9	1.0	5.7	16		3
2017-12-06	Final Effluent	120	0.05				3.9	2	4.0	0.17	6.6	10.1	0.4	4.6			
2017-12-18	Final Effluent	100	0.05		1		7.3	2	4.2	0.34	7.2	7.7	0.8	5.3	14		2
2018-01-03	Final Effluent	95	0.25				7.5	2	5.6	0.28	6.9	3.5	1.0	6.8			
2018-01-08	Final Effluent		0.43				9.0		4.0	0.27	6.0	3.6	0.8	5.0			
2018-01-18	Final Effluent	88	1.90				7.6	73	2.1	0.23	6.8	3.0	2.8	5.1			
2018-01-25	Final Effluent	62	1.70		2		7.1	100	13.0	0.73	6.7	3.4	2.8	14.0	12		3
2018-02-07	Final Effluent	76	1.20				7.8	11	12.0	0.52	6.1	3.8	2.3	14.8			
2018-02-21	Final Effluent	62	0.61		1		6.9	2	13.0	0.69	6.2	5.7	1.9	15.6	12		3
2018-03-07	Final Effluent	71	0.37				7.5		7.4	0.38	6.5	5.6	1.2	9.0			
2018-03-19	Final Effluent	89	0.36		1		6.4	11	7.6	0.49	6.6	3.9	1.3	9.4	7.9		2
2018-04-04	Final Effluent	82	0.63				6.5		16.0	0.56	6.2	5.6	1.7	18.3			
2018-04-19	Final Effluent	83	0.39				7.2		18.0	0.50	6.5	6.4	1.6	20.1			
2018-04-26	Final Effluent	100	0.35		3.2		9.6	40	26.0	0.19	5.9	7.9	1.4	27.6	9		4
2018-05-03	Final Effluent	120	0.11				6.9		1.6	0.09	6.9	9.5	0.8	2.4			
2018-05-15	Final Effluent	140	0.13					5	2.0	0.27			1.2	3.5			
2018-05-16	Final Effluent	130	0.13				7.0		2.3	0.27	6.9	12.9	1.2	3.8			
2018-05-23	Final Effluent	130	0.13		1		7.4	5	3.2	0.22	7.1	13.0	0.9	4.3	11		3
2018-05-29	Final Effluent	150	0.13				6.0		0.3	0.00	7.1	13.9	1.3	1.6			
2018-06-13	Final Effluent	170	0.26		1		8.8	9	0.2	0.03	6.0	15.6	1.7	1.9	21		4
2018-06-27	Final Effluent	160	0.51				4.9		0.4	0.03	6.6	17.7	2.1	2.6			
2018-07-11	Final Effluent	150	0.41				6.0		0.1	0.03	6.8	20.1	1.3	1.3			
2018-07-19	Final Effluent	140	0.62		1		6.2	5	0.1	0.03	7.0	20.7	2.2	2.3	11		11
2018-07-25	Final Effluent		0.46		1		4.6	5	0.1	0.03	6.6	21.7	2.1	2.2			
2018-08-02	Final Effluent		1.60		1		6.4	5	0.3	0.49	7.3	22.0	3.4	4.2			
2018-08-08	Final Effluent		0.48		1		4.4	5	0.1	0.03	6.6	24.2	2.4	2.5			

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2018-08-15	Final Effluent		0.57		1		5.1	2	0.9	0.03	6.9	22.8	2.0	2.9			
2018-08-22	Final Effluent						5.3		1.8	0.26	6.7	22.4	2.1	4.2			
2018-09-06	Final Effluent		0.41				4.9		1.7	0.03	6.6	22.6	1.5	3.2			
2018-09-20	Final Effluent	110	0.73		1		7.7	5	9.7	0.17	6.7	21.0	1.9	11.8	8.9		4
2018-10-04	Final Effluent		0.29				6.2		9.5	0.03	7.0	19.4	1.9	11.4			
2018-10-25	Final Effluent		0.13		1		6.6	9	9.4	0.03	6.4	14.7	1.2	10.6			
2018-11-07	Final Effluent		0.13				4.8		7.8	0.03	6.6	14.4	1.5	9.3			
2018-11-19	Final Effluent		0.13				7.2		4.6	0.03	5.7	10.8	1.3	5.9			
2018-11-28	Final Effluent		0.60		1		7.7	5	12.0	0.03	5.9	8.6	2.3	14.3			
2018-12-19	Final Effluent		0.13		1		9.8	2	14.0	0.03	6.7	6.0	0.1	14.2			
2019-01-09	Final Effluent						9.0		9.4	0.03	6.8	5.9	1.5	10.9			
2019-01-17	Final Effluent		0.43		1		8.6	11	12.0	0.03	6.7	4.1	1.3	13.3			
2019-01-23	Final Effluent		1.60				8.1		5.6	0.03	6.6	3.1	2.8	8.4			
2019-02-07	Final Effluent		1.90				8.3		10.0	0.12	6.5	2.8	2.8	12.9			
2019-02-20	Final Effluent		1.90		1		8.6	73	12.0	0.21	6.6	2.7	2.8	15.0			
2019-03-07	Final Effluent		0.50				8.7		12.0	0.14	6.3	1.9	1.4	13.5			
2019-03-14	Final Effluent		0.88		50		11.8	520	9.3	0.16	6.6	2.2	1.6	11.1			
2019-03-18	Final Effluent		1.60				10.1		12.0	0.14	6.9	3.1	2.2	14.3			
2019-04-03	Final Effluent		0.48				5.8		18.0	0.19	6.2	5.2	1.9	20.1			
2019-04-18	Final Effluent		0.46				8.0		12.0	0.13	6.6	8.6	2.4	14.5			
2019-04-25	Final Effluent		0.50		1		7.9	5	8.4	0.09	6.7	10.1	1.7	10.2			
2019-05-01	Final Effluent		0.13				6.3		8.7	0.09	6.6	10.3	1.5	10.3			
2019-05-15	Final Effluent		0.25				6.2		5.7	0.04	6.8	11.3	1.2	6.9			
2019-05-23	Final Effluent		0.27		1		6.1	5	5.1	0.05	6.9	12.7	1.3	6.5			
2019-05-30	Final Effluent		0.25				6.9		5.0	0.07	6.9	13.7	1.2	6.3			
2019-06-13	Final Effluent		0.25				7.5		9.5	0.16	7.1	15.6	1.7	11.4			
2019-06-19	Final Effluent		0.31		1		5.9	10	8.9	0.15	6.8	16.6	1.9	11.0			
2019-06-26	Final Effluent		0.20				6.1		7.6	0.13	6.6	17.8	1.5	9.2			
2019-07-11	Final Effluent		0.13				7.0		3.1	0.28	7.0	20.3	0.1	3.5			
2019-07-18	Final Effluent		0.13		1		6.6	5	3.6	0.20	6.9	21.2	1.0	4.8			
2019-07-25	Final Effluent		0.13				6.9		3.2	0.03	7.1	21.7	1.4	4.6			
2019-08-08	Final Effluent		0.13				5.3		1.6	0.96	6.7	22.6	1.0	3.6			
2019-08-15	Final Effluent		0.13		1		6.4	5	1.8	0.73	7.1	21.9	0.9	3.5			
2019-08-22	Final Effluent		0.13				7.0		4.5	0.28	7.0	22.7	0.9	5.7			
2019-09-05	Final Effluent						5.3				6.8	21.3					
2019-09-12	Final Effluent						6.2				7.1	20.4					
2019-09-16	Final Effluent						6.5				7.1	19.9					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2016-11-02	Port 1		7.50				1.7		0.1	0.84	7.4	13.0	9.2	10.1			
2016-11-15	Port 1		16.00				7.6		13.0	4.40	6.7	10.9	18.0	35.4			
2016-11-15	Port 1		16.00						13.0	4.40			18.0	35.4			
2016-11-21	Port 1		12.00				1.7		16.0	3.50	5.7	11.3	14.0	33.5			
2016-11-30	Port 1		5.80				4.7		15.0	1.80	6.2	8.4	6.0	22.8			
2017-01-11	Port 1		7.50				10.4		4.3	0.69	6.4	4.3	9.9	14.9			
2017-01-23	Port 1		1.00				6.6		22.0	0.03	5.5	6.1	2.7	24.7			
2017-02-01	Port 1						7.1				6.1	4.4					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2017-02-07	Port 1		4.60				8.7		28.0	0.45	6.4	3.3	4.4	32.9			
2017-02-15	Port 1						7.8				6.6	4.6					
2017-02-22	Port 1		1.20				6.6		24.0	2.10	5.3	4.1	2.8	28.9			
2017-03-08	Port 1		0.52				8.5	2500	26.0	1.20	5.5	4.0	2.0	29.2			
2017-05-04	Port 1		0.71				6.4		22.0	0.22	6.1	12.9	0.5	22.7			
2017-05-23	Port 1						6.7				6.3	14.8					
2017-08-15	Port 1		0.12				5.0	5	31.0	0.03	6.4	23.9	0.8	31.8			
2017-10-19	Port 1						4.1				6.5	17.0					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	COD	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TP	TSS
2017-10-19	Septic Tank Effluent	280	33.00	43			0.0	440000			7.3	18.0	39.0	39.0	36		28
2017-11-29	Septic Tank Effluent	230	32.00	51			0.0	380000			7.1	11.4	34.0	34.0	51		25
2017-12-18	Septic Tank Effluent	200	35.00	180			0.1	530000			7.1	8.4	38.0	38.0	97		16
2018-01-25	Septic Tank Effluent	150	31.00	0			0.3	740000			6.9	4.6	35.0	35.0	52		24
2018-02-21	Septic Tank Effluent	170	28.00	77			0.1	520000			6.7	5.7	37.0	37.0	67		25
2018-03-19	Septic Tank Effluent	210	36.00	120			0.3	490000			6.9	4.7	39.0	39.0	56		27
2018-04-26	Septic Tank Effluent	200	39.00	190			0.1	380000			6.7	7.9	44.0	44.0	95		38
2018-05-23	Septic Tank Effluent	260	51.00	200			0.0	340000			6.5	12.1	53.0	53.0	130		41
2018-06-13	Septic Tank Effluent	290	54.00	130			0.2	2000000			6.9	15.5	61.0	61.0	110		60
2018-07-19	Septic Tank Effluent	220	41.00	49			0.3	430000			6.8	19.8	55.0	55.0	43		34
2018-07-25	Septic Tank Effluent		44.00	37			0.0	490000			6.8	20.5	57.0	57.0			
2018-08-02	Septic Tank Effluent		45.00	48			0.0	20000			7.0	20.4	56.0	56.0			
2018-08-08	Septic Tank Effluent		46.00	59			0.0	560000			6.8	21.4	56.0	56.0			
2018-08-15	Septic Tank Effluent		48.00	110			0.1	910000			6.9	22.3	56.0	56.0			
2018-09-20	Septic Tank Effluent	270	49.00	63			0.0	450000			6.9	20.9	58.0	58.0	56		45
2018-10-25	Septic Tank Effluent		41.00	100			0.1	530000			6.9	1.2	44.0	44.0			
2018-11-28	Septic Tank Effluent		32.00	120			0.2	830000			6.7	10.0	39.0	39.0			
2018-12-19	Septic Tank Effluent		32.00	170			0.2	1100000			7.0	7.5	41.0	41.0			
2019-01-17	Septic Tank Effluent		39.00	75			1.9	750000			7.0	5.6	45.0	45.0			
2019-02-20	Septic Tank Effluent		42.00	75			2.4	2600000			6.9	4.1	41.0	41.0			
2019-03-14	Septic Tank Effluent		31.00	1			0.5	1200000			6.8	3.6	26.0	26.0			
2019-04-25	Septic Tank Effluent		38.00	1			0.0	840000			6.6	9.7	50.0	50.0			
2019-05-23	Septic Tank Effluent		40.00	110			0.1	650000			7.0	11.9	49.0	49.0			
2019-06-19	Septic Tank Effluent		39.00	44			0.1	670000			6.8	15.6	46.0	46.0			
2019-07-18	Septic Tank Effluent		38.00	50			0.1	120000			7.0	19.8	48.0	48.0			
2019-08-15	Septic Tank Effluent		48.00	31			0.0	760000			7.0	21.5	52.0	52.0			
2019-09-16	Septic Tank Effluent						0.1				6.9	20.2					

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2016-10-05	D-Sump		0.03	1		0.1		0.1	0.03	5.7	19.5	0.1	0.2		
2016-10-13	D-Sump		0.03	1		0.4		4.0	0.03	5.5	19.2	1.3	5.3		
2016-10-20	D-Sump					0.4				5.4	18.7				
2016-10-25	D-Sump		0.03	1		0.5		2.7	0.03	5.5	18.4	0.7	3.4		
2016-11-02	D-Sump		0.03	1		0.7		2.6	0.03	6.7	18.1	1.0	3.6		
2016-11-08	D-Sump		0.03	1		1.4		6.4	0.03	6.5	17.5	0.9	7.3		
2016-11-15	D-Sump		0.07	1		2.2		8.2	0.22	6.0	17.6	1.2	9.6		
2016-11-21	D-Sump		0.42	1		2.2		8.6	0.46	6.0	16.8	1.0	10.1		
2016-11-30	D-Sump		0.10	1		2.5		9.6	0.03	6.2	15.6	0.1	9.7		
2016-12-05	D-Sump		0.25	1		2.5		9.6	0.03	6.1	15.2	0.8	10.4		
2016-12-14	D-Sump		0.17	1		3.5		16.0	0.03	6.1	13.6	1.1	17.1		
2016-12-21	D-Sump					3.0				6.4	13.2				
2016-12-28	D-Sump		0.03	1		2.5		12.0	0.44	6.3	11.7	0.8	13.2		
2017-01-04	D-Sump		0.03	1		4.1		13.0	0.03	6.1	11.5	0.6	13.6		
2017-01-11	D-Sump					4.8				6.2	11.3				
2017-01-17	D-Sump	130	0.03			8.3		9.6	0.33	6.3	9.4	0.9	10.8		
2017-01-23	D-Sump		0.03			2.9		10.0	0.03	6.3	9.6	0.3	10.3		
2017-01-25	D-Sump		0.07			5.3		11.0	0.03	6.3	8.9	0.5	11.6		
2017-02-01	D-Sump					4.2				6.1	8.8				
2017-02-07	D-Sump		0.24	1		2.9		12.0	0.03	6.4	8.9	0.9	12.9		
2017-02-15	D-Sump					5.4				6.5	9.2				
2017-02-22	D-Sump		0.10	1		5.9		7.0	0.03	6.0	8.6	0.5	7.5		
2017-03-08	D-Sump		0.15			4.7		12.0	0.03	5.9	6.2	0.7	12.8		
2017-03-22	D-Sump		0.20			3.9		13.0	0.03	5.9	7.8	0.6	13.6		
2017-04-05	D-Sump		0.08			5.6		8.3	0.03	5.6	7.2	0.4	8.8		
2017-04-18	D-Sump		0.03			5.2		10.0	0.03	5.7	8.2	0.6	10.6		
2017-05-04	D-Sump		0.14	1		4.4		15.0	0.03	5.2	9.5	0.5	15.5		
2017-05-09	D-Sump		0.07			4.3		10.0	0.03	5.0	10.0	0.8	10.8		
2017-05-16	D-Sump		0.07			0.6		9.4	0.06	6.0	13.7	0.1	9.5		
2017-05-23	D-Sump		0.05			2.9		10.0	0.03	5.8	11.3	0.1	10.2		
2017-06-06	D-Sump		0.11		1	1.6		4.4	0.10	5.9	12.4	0.1	4.6		
2017-06-14	D-Sump	120	0.16			2.1		4.0	0.05	6.0	13.0	0.7	4.7		
2017-06-20	D-Sump	120	0.05		1	0.9		3.7	0.03	6.1	13.4	0.3	4.0		
2017-07-05	D-Sump	110	0.13					6.9	0.03			0.3	7.2		
2017-07-11	D-Sump	110	0.05					6.2	0.03			0.3	6.5		
2017-07-18	D-Sump	140	0.05					5.2	0.03			0.1	5.3		
2017-07-25	D-Sump	150	0.00			0.2	0	4.3	0.00	6.2	16.7	0.3	4.6		
2017-08-01	D-Sump	140	0.00			0.5		3.1	0.00	5.9	17.8	0.7	3.8		
2017-08-08	D-Sump	140	0.10			0.7	2	2.8	0.03	5.9	18.3	0.4	3.2		
2017-08-15	D-Sump	150	0.17		2	0.1	1	2.9	0.03	5.9	17.6	0.4	3.3		
2017-08-23	D-Sump	120	0.05			1.4	130	4.5	0.03	5.1	19.3	0.1	4.6		
2017-08-31	D-Sump	140	0.05			0.3		3.2	0.03	6.0	18.7	0.9	4.1		
2017-09-07	D-Sump	28	0.05			2.1	40	0.1	0.03	5.4	19.4	0.3	0.4		
2017-09-13	D-Sump	140	0.05		14	1.5	1	5.3	0.03	6.3	20.0	0.3	5.7		
2017-09-28	D-Sump	110	0.05			0.6	1	6.4	0.03	5.8	19.4	0.9	7.3		
2017-10-12	D-Sump	120	0.05			1.1	1	6.0	0.03	6.1	19.0	0.7	6.7		
2017-10-19	D-Sump	110	0.05		1	1.0	1	6.1	0.03	6.1	19.0	0.6	6.7	6.4	4
2017-10-26	D-Sump	97	0.14			1.5	1	0.1	0.03	5.9	18.5	0.5	0.6		
2017-11-07	D-Sump	130	0.05			1.9	1	10.0	0.03	6.2	18.1	0.7	10.7		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2017-11-20	D-Sump	140	0.05			2.3	1	8.9	0.03	6.2	17.0	0.6	9.5		
2017-11-29	D-Sump	120	0.18		1	8.6	2	14.0	0.03	6.0	14.6	0.9	14.9	5.2	1
2017-12-06	D-Sump	110	0.05			1.8	1	17.0	0.03	6.0	14.6	0.2	17.2		
2017-12-18	D-Sump	84	0.05		1	3.1	1	13.0	0.03	6.2	12.9	0.1	13.2	5.6	3
2018-01-03	D-Sump	81	0.05			3.1	1	18.0	0.03	5.9	11.4	0.1	18.2		
2018-01-08	D-Sump		0.05			3.3		16.0	0.03	6.2	10.1	0.4	16.4		
2018-01-18	D-Sump	80	0.05			4.8	1	14.0	0.03	6.1	9.2	0.3	14.3		
2018-01-25	D-Sump	77	0.05		1	5.4	1	9.2	0.03	6.1	8.4	0.6	8.7	7.6	1
2018-02-07	D-Sump	74	0.05			6.4		9.5	0.03	5.8	7.4	0.5	10.1		
2018-02-21	D-Sump	67	0.05		1	6.2	1	9.7	0.03	5.7	5.8	0.5	10.2	4	3
2018-03-07	D-Sump	63	0.05			6.8		12.0	0.03	5.8	7.1	0.5	12.5		
2018-03-19	D-Sump	70	0.08		1	4.9	1	12.0	0.03	5.9	7.0	0.5	12.5	6.4	2
2018-04-04	D-Sump	68	0.16			5.5		17.0	0.03	5.8	7.0	0.6	17.7		
2018-04-19	D-Sump	69	0.27			6.1		22.0	0.03	5.8	7.0	0.7	22.7		
2018-04-26	D-Sump	34	0.05		1	6.0	0	6.0	0.03	5.6	7.3	0.8	6.8	3.7	4
2018-05-03	D-Sump	75	0.05			5.9		18.0	0.03	5.7	8.1	0.4	18.4		
2018-05-16	D-Sump	72	0.13			5.5		12.0	0.03	5.4	9.3	0.8	12.8		
2018-05-23	D-Sump	84	0.13		1	3.4	9	13.0	0.03	5.4	9.6	0.4	13.5	7.3	1
2018-05-29	D-Sump	89	0.13			3.6		12.0	0.00	5.6	10.5	0.7	12.0		
2018-06-13	D-Sump	100	0.13		1	3.3	5	12.0	0.03	5.7	11.6	0.9	12.9	8.8	2
2018-06-27	D-Sump	110	0.13			3.3		8.5	2.10	5.7	12.7	1.4	12.0		
2018-07-11	D-Sump	120	0.05			1.3		10.0	0.03	5.7	13.9	1.0	11.0		
2018-07-19	D-Sump	120	0.13		1	2.4	1	8.9	0.03	5.4	15.3	1.0	9.9	11	5
2018-07-25	D-Sump		0.13		1	2.2	1	9.7	0.03	5.5	16.9	1.0	9.7		
2018-08-02	D-Sump		0.13		1	1.0	1	12.0	0.03	5.4	16.0	1.3	12.0		
2018-08-08	D-Sump		0.13		1	8.7	1	14.0	0.03	5.9	18.7	1.2	15.2		
2018-08-15	D-Sump		0.13		1	1.3	2	13.0	0.03	5.2	18.1	1.2	13.0		
2018-08-22	D-Sump		0.78			1.3		14.0	0.03	5.7	18.8	1.0	14.0		
2018-09-06	D-Sump		0.13			1.0		35.0	0.03	5.5	18.8	0.3	35.0		
2018-09-20	D-Sump	100	0.13		1	1.6	1	18.0	0.00	5.8	20.0	0.8	18.8	7.8	4
2018-10-04	D-Sump		0.13			1.9		19.0	0.03	5.9	20.5	0.9	19.9		
2018-10-25	D-Sump		0.13		1	1.7	1	13.0	0.03	5.6	18.8	1.0	14.0		
2018-11-07	D-Sump		0.13			2.0		15.0	0.03	6.0	17.0	0.9	16.0		
2018-11-19	D-Sump		0.13			4.0		11.0	0.03	5.9	14.4	0.9	11.9		
2018-11-28	D-Sump		0.13		2.5	4.5	1	12.0	0.03	5.7	13.9	0.8	12.8		
2018-12-19	D-Sump		0.13		1	4.6	1	13.0	0.03	5.9	10.9	0.1	13.2		
2019-01-09	D-Sump					6.5		11.0	0.03	6.0	8.5	0.7	11.7		
2019-01-17	D-Sump		0.13		1	7.3	1	12.0	0.03	5.9	8.4	0.6	12.7		
2019-01-23	D-Sump		0.13			8.5		8.2	0.03	6.0	7.6	0.6	8.9		
2019-02-07	D-Sump		0.13			8.7		10.0	0.03	6.1	6.1	0.6	10.6		
2019-02-20	D-Sump		0.13		1	8.3	1	8.5	0.03	6.0	6.0	0.5	9.0		
2019-03-07	D-Sump		0.55			7.5		10.0	0.10	6.0	4.9	0.9	11.0		
2019-03-14	D-Sump		0.97		70	9.0	1	13.0	0.03	6.2	4.0	1.4	14.4		
2019-03-18	D-Sump		1.50			7.4		14.0	0.76	6.1	4.8	1.8	16.6		
2019-04-03	D-Sump		2.40			3.3		23.0	0.36	5.9	5.0	3.1	26.5		
2019-04-18	D-Sump		3.40			5.4		28.0	0.74	5.8	7.2	5.3	34.0		
2019-04-25	D-Sump		2.80		1	2.2	1	24.0	0.43	5.6	7.6	6.1	30.5		
2019-05-01	D-Sump		2.10			0.6		18.0	0.03	5.6	8.2	2.5	20.5		
2019-05-15	D-Sump		0.76			1.3		13.0	0.19	5.6	9.8	1.6	14.8		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2019-05-23	D-Sump		0.50		1	0.2	1	13.0	0.22	5.7	9.9	1.0	14.2		
2019-05-30	D-Sump		0.25			0.5		13.0	0.03	5.7	10.5	0.9	13.9		
2019-06-13	D-Sump		0.25			2.7		16.0	0.14	5.6	12.4	0.6	16.8		
2019-06-19	D-Sump		0.13		1	3.0	1	16.0	0.12	5.7	13.1	0.8	16.9		
2019-06-26	D-Sump		0.13			3.2		13.0	0.08	5.6	14.4	0.6	13.7		
2019-07-11	D-Sump		0.13			2.0		14.0	0.03	5.8	15.1	0.1	14.2		
2019-07-18	D-Sump		0.13		1	1.8	1	12.0	0.03	5.8	15.8	1.1	13.1		
2019-07-25	D-Sump		0.13			2.2		16.0	0.03	5.8	17.1	0.8	16.9		
2019-08-08	D-Sump		0.33			1.4		13.0	0.83	6.1	18.1	0.9	14.7		
2019-08-15	D-Sump		0.13		1	1.7	1	16.0	0.50	5.9	18.4	0.7	17.2		
2019-08-22	D-Sump		0.13			1.6		17.0	0.22	5.8	18.6	0.7	17.9		
2019-09-05	D-Sump					2.4				5.9	20.1				
2019-09-12	D-Sump					2.6				5.8	20.1				
2016-10-05	Port 1		0.28			0.1		13.0	0.03	6.4	21.4	1.0	14.0		
2016-10-13	Port 1		0.63			0.3		0.1	0.44	6.3	19.4	6.0	6.5		
2016-10-20	Port 1					0.7				6.3	18.8				
2016-10-25	Port 1		0.87			0.5		2.0	0.03	6.3	19.3	2.1	4.1		
2016-11-02	Port 1		0.28			3.1		34.0	0.38	6.7	16.3	1.2	35.6		
2016-11-08	Port 1		0.10			1.8		37.0	0.40	6.2	15.4	0.3	37.7		
2016-11-15	Port 1		0.16			3.2		33.0	1.10	6.0	14.1	1.4	35.5		
2016-11-21	Port 1		4.40			4.9		34.0	0.75	6.0	13.6	1.1	35.9		
2016-11-30	Port 1		1.10			5.2		37.0	0.03	5.6	11.3	0.1	37.1		
2017-01-11	Port 1		2.90			5.6		33.0	1.10	5.3	5.5	3.9	38.0		
2017-01-17	Port 1		4.10			9.2		5.4	0.03	5.2	7.4	5.6	11.0		
2017-01-23	Port 1		4.30			5.6		5.9	0.03	5.3	5.7	4.1	10.0		
2017-02-15	Port 1					2.8				6.1	4.3				
2017-02-22	Port 1		4.30			3.2		27.0	0.03	4.9	4.2	5.7	32.7		
2017-03-08	Port 1		4.20			4.4		29.0	0.03	5.4	5.7	7.7	36.7		
2017-05-09	Port 1		0.07			2.7		30.0	0.03	5.3	13.2	1.4	31.4		
2017-05-16	Port 1		0.07			2.1		13.0	0.03	5.8	13.6	0.6	13.6		
2017-05-23	Port 1		0.05			0.8		12.0	0.16	6.2	15.4	1.0	13.2		
2017-06-06	Port 1		0.49			1.2		13.0	0.05	5.9	16.3	1.0	14.0		
2017-06-14	Port 1	29	0.33			2.5		16.0	0.05	5.5	17.7	1.1	17.2		
2017-06-20	Port 1	32	0.25			0.8		11.0	0.03	5.6	19.4	1.2	12.2		
2017-07-05	Port 1	40	0.24					14.0	0.03			0.7	14.7		
2017-08-01	Port 1	7.1	0.00			7.4		36.0	0.00	5.0	23.5	0.0	36.1		
2017-08-08	Port 1	5.6	0.05			5.1		23.0	0.03	5.4	23.8	0.4	23.4		
2017-08-15	Port 1	5.4	0.18			4.1		37.0	0.03	5.1	23.3	0.6	37.6		
2017-08-23	Port 1	2.9	0.05				20	36.0	0.03	5.7		0.1	36.1		
2017-08-31	Port 1	5.5	0.05				9	27.0	0.03	5.9		0.5	27.5		
2017-09-07	Port 1	9.6	0.05			4.6		37.0	0.03	5.3	20.8	0.6	37.6		
2017-09-28	Port 1	9.4	0.43			3.5	9	38.0	0.56	4.8	24.9	1.6	40.2		
2017-10-12	Port 1	16	0.09				200	37.0	0.03	5.6		0.8	37.8		
2017-10-19	Port 1	32	0.05		1	6.6	73	35.0	0.03	6.5	19.7	1.1	36.1	7.4	140
2017-10-26	Port 1	32	0.16			3.8	7900	31.0	0.03	5.4	18.6	1.0	32.0		
2017-11-07	Port 1	28	0.09			4.8	110	47.0	0.03	5.7	16.9	1.1	48.1		
2017-11-20	Port 1	20	0.18			4.8	27	21.0	0.06	5.5	12.9	0.4	21.4		
2017-11-29	Port 1					8.8				5.6	11.7				
2017-12-06	Port 1	15	0.07			7.4	80	33.0	0.06	5.6	10.6	0.8	33.9		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2017-12-18	Port 1					8.9				5.9	8.2				
2018-01-03	Port 1	26	0.05			8.8	24	33.0	0.03	5.3	4.5	0.7	33.7		
2018-01-11	Port 1					8.1				5.7	3.6				
2018-01-18	Port 1	68	1.80			5.9	680	12.0	0.11	5.3	5.0	2.6	14.7		
2018-01-22	Port 1					12.2				5.3	2.9				
2018-01-25	Port 1					9.0				5.2	3.6				
2018-02-07	Port 1	28	1.40			8.8		25.0	0.06	4.7	3.7	2.3	27.4		
2018-02-21	Port 1					7.7				5.0	4.7				
2018-03-07	Port 1	27	0.12			6.3		21.0	0.03	5.6	6.4	1.5	22.5		
2018-03-19	Port 1					8.3				5.5	4.2				
2018-04-04	Port 1	29	0.14			6.1		29.0	0.03	5.2	5.7	1.1	30.1		
2018-04-19	Port 1	28	0.13			6.7		33.0	0.03	5.2	7.0	0.9	34.0		
2018-04-26	Port 1					6.2				5.6	9.1				
2018-05-03	Port 1	31	0.05			5.4		26.0	0.03	5.5	10.2	0.9	26.9		
2018-05-16	Port 1	24	0.13			3.7		35.0	0.03	5.3	13.5	1.3	36.3		
2018-05-23	Port 1					4.6				5.2	14.2				
2018-05-29	Port 1	29	0.13			4.5		32.0	0.00	5.6	15.4	1.4	32.0		
2018-06-13	Port 1									5.9	20.2				
2018-06-27	Port 1	43	0.60			3.6		29.0	0.45	5.3	19.2	2.7	32.2		
2018-07-11	Port 1	22	0.05			1.2		35.0	0.03	5.1	21.7	1.5	36.5		
2018-07-19	Port 1									5.9	22.9				
2018-09-06	Port 1		0.39			0.4	18	35.0	0.03	5.7	24.5	1.2			
2018-09-07	Port 1		0.13				200	42.0	0.00			1.0	43.0		
2018-09-20	Port 1		0.13			2.7		39.0	0.00	5.5	23.1	0.7	39.7		
2018-11-07	Port 1		0.13			5.1		25.0	0.03	5.5	14.6	1.2	26.2		
2019-01-09	Port 1					7.6		14.0	0.03	5.9	4.9	6.7	20.7		
2019-01-23	Port 1		16.00			10.6		5.5	0.03	6.3	3.0	17.0	22.5		
2019-02-07	Port 1		16.00			11.3		8.6	0.20	6.2	2.4	16.0	24.8		
2019-02-20	Port 1					10.9		12.0	0.34	5.7	2.4	21.0	33.3		
2019-03-07	Port 1		19.00			6.8		12.0	0.21	6.3	2.0	18.0	30.2		
2019-03-14	Port 1					10.2				5.4	2.2				
2019-03-18	Port 1		15.00			6.0		19.0	0.49	6.3	3.3	15.0	34.5		
2019-04-03	Port 1		9.10			3.9		26.0	0.22	6.0	5.3	10.0	36.2		
2019-04-18	Port 1		1.90			1.0		29.0	0.27	5.6	9.3	4.4	33.7		
2019-04-25	Port 1					5.5				5.5	10.9				
2019-05-01	Port 1		0.13			4.1		24.0	0.50	5.6	11.5	1.5	26.0		
2019-05-15	Port 1		0.25			4.2		19.0	0.03	5.6	12.7	1.1	20.1		
2019-05-23	Port 1					3.6				5.6	13.9				
2019-05-30	Port 1		0.25			3.4		18.0	0.15	5.6	15.2	0.3	18.5		
2019-06-13	Port 1					2.9				5.4	17.4				
2019-06-19	Port 1					4.5				5.3	18.3				
2019-06-26	Port 1		0.14			2.9		34.0	0.12	5.3	19.2	1.2	35.3		
2019-07-11	Port 1		0.13			1.4		33.0	0.03	5.5	21.8	0.1	33.2		
2019-07-18	Port 1					2.5				5.2	22.7				
2019-07-25	Port 1		0.28			3.2		31.0	0.13	5.2	23.4	2.7	33.8		
2019-08-08	Port 1		0.80			1.0		29.0	0.42	5.7	24.1	1.7	31.1		
2019-08-15	Port 1					3.1				5.3	23.8				
2019-08-22	Port 1		0.29			1.6		35.0	0.21	5.5	24.1	1.0	36.2		
2019-09-05	Port 1					0.6				5.6	22.8				

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2019-09-12	Port 1					2.2				5.6	22.2				
2019-09-16	Port 1					4.0				5.6	21.7				
2017-11-29	Port 1 & 1a	25	0.26		2.5			41.0	0.03			0.9	41.9	5.8	36
2017-12-06	Port 1 & 1a	15	0.07				80	33.0	0.06			0.8	33.9		
2017-12-18	Port 1 & 1a	20	0.05		1			30.0	0.03			0.5	30.5	5.7	4
2018-01-18	Port 1 & 1a	68	1.80				680	12.0	0.11			2.6	14.7		
2018-01-25	Port 1 & 1a	29	1.90		8.9			24.0	0.25			3.8	28.1	9.6	3
2018-02-21	Port 1 & 1a	21	1.10		1			25.0	0.33			1.8	27.1	6	3
2018-03-19	Port 1 & 1a	32	0.09		1			16.0	0.03			0.9	16.9	7.3	3
2018-04-26	Port 1 & 1a	31	0.13		1			28.0	0.07			0.7	28.8	7.3	4
2018-05-23	Port 1 & 1a	34	0.13		1			30.0	0.03			0.7	30.7	7.9	5
2018-06-13	Port 1 & 1a	23	0.13		1			38.0	0.03			1.4	39.4	8	340
2018-07-19	Port 1 & 1a	9.4	0.13		1			37.0	0.03			1.6	38.6	6.5	69
2018-09-20	Port 1 & 1a	6.8	0.13		1			43.0	0.00			1.0	44.0	5.4	13
2019-01-23	Port 1 & 1a		10.00		2.8		3000	7.8	0.03			11.0	18.8		
2019-02-20	Port 1 & 1a		21.00		1		1300	16.0	0.82			17.0	33.8		
2019-03-14	Port 1 & 1a		13.00		99		73	18.0	0.20			13.0	31.2		
2019-04-25	Port 1 & 1a		0.14		1		18	27.0	0.03			0.1	27.2		
2019-05-23	Port 1 & 1a		0.10		1		5	19.0	0.01			0.4	19.4		
2019-06-19	Port 1 & 1a		0.13		1		390	34.0	0.16			1.1	35.3		
2019-07-18	Port 1 & 1a		0.13		1		18	38.0	0.03			1.0	39.0		
2019-08-15	Port 1 & 1a		0.13		1		100	37.0	0.07			0.9	38.0		
2017-05-04	Port 1a		0.69			4.1		28.0	0.09	5.2	14.3	1.0	29.1		
2017-05-09	Port 1a		0.10			2.7		28.0	0.03	5.5	13.6	0.1	28.1		
2017-05-16	Port 1a		0.09			0.6		18.0	0.08	6.1	13.7	1.8	19.9		
2017-05-23	Port 1a		0.42			0.7		16.0	0.03	6.0	15.5	1.4	17.4		
2017-06-06	Port 1a		0.49			0.4		13.0	0.03	6.2	16.1	1.0	14.0		
2017-06-14	Port 1a	60	1.40			0.6		12.0	0.05	5.8	17.8	1.9	14.0		
2017-06-14	Port 1a	60	1.40			0.6		12.0	0.05	5.8	17.8	1.9	14.0		
2017-06-20	Port 1a	58	1.10			0.8		12.0	0.03	5.8	19.5	1.8	13.8		
2017-07-05	Port 1a	58	0.84					13.0	0.03			1.0	14.0		
2017-08-01	Port 1a	11	0.43			5.2		35.0	0.00	5.2	25.3	0.3	35.3		
2017-08-08	Port 1a	12	0.05			4.6		23.0	0.03	5.6	23.5	0.1	23.1		
2017-08-15	Port 1a	0	0.10			5.0	5	40.0	0.03	5.5	23.8	0.3	40.4		
2017-08-23	Port 1a	11	0.25				40	32.0	0.03	5.7		0.1	32.1		
2017-08-31	Port 1a	44	1.70				5	22.0	0.03	6.0		1.9	23.9		
2017-09-07	Port 1a	13	0.05			3.9		36.0	0.03	5.6	20.7	0.5	36.5		
2017-09-28	Port 1a	28	0.17			2.9	9	29.0	0.03	5.0	24.9	1.2	30.2		
2017-10-12	Port 1a	38	0.11			4.6	55	37.0	0.03	6.0	18.8	0.9	38.0		
2017-10-19	Port 1a	32	0.05		1	4.3	73	35.0	0.03	6.0	20.8	1.1	36.1	7.4	140
2017-10-26	Port 1a	35	0.05			4.2	8200	25.0	0.03	5.6	19.1	1.2	26.2		
2017-11-07	Port 1a	180	0.05			5.5	27	60.0	0.03	5.9	17.0	1.1	61.1		
2017-11-20	Port 1a	26	0.05			5.9	35	32.0	0.03	5.6	13.1	0.2	32.2		
2017-11-29	Port 1a					10.0				5.8	11.5				
2017-12-06	Port 1a	25	0.05			7.8	12	38.0	0.07	5.6	10.2	0.1	38.2		
2017-12-18	Port 1a					8.9				5.9	8.0				
2018-01-03	Port 1a	34	1.20			12.0	18	33.0	0.10	6.0	5.8	1.8	34.9		
2018-01-11	Port 1a					7.5				5.9	3.2				
2018-01-18	Port 1a	59	2.50			5.3	820	18.0	0.15	6.1	6.0	3.6	21.8		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2018-01-22	Port 1a					11.6				5.5	2.8				
2018-01-25	Port 1a					8.5				5.3	3.1				
2018-02-07	Port 1a	31	2.60			8.8		26.0	0.45	5.3	5.1	3.3	29.8		
2018-02-21	Port 1a					8.2				5.1	4.7				
2018-03-07	Port 1a	24	0.05			5.5		24.0	0.03	5.5	6.8	1.2	25.2		
2018-03-19	Port 1a					7.1				5.3	4.6				
2018-04-04	Port 1a	27	0.05			8.1		39.0	0.03	5.5	6.0	1.0	40.0		
2018-04-19	Port 1a	30	0.15			7.2		36.0	0.03	5.5	7.6	0.9	36.9		
2018-04-26	Port 1a					6.6				5.5	8.8				
2018-05-03	Port 1a	29	0.05			5.9		26.0	0.03	5.5	10.3	0.9	26.9		
2018-05-16	Port 1a	30	0.13			3.5		31.0	0.03	5.4	13.7	1.3	32.3		
2018-05-23	Port 1a					4.2				5.4	14.4				
2018-05-29	Port 1a	37	0.13			4.5		36.0	0.00	5.6	15.4	1.4	37.4		
2018-06-13	Port 1a									5.9	18.4				
2018-06-27	Port 1a	32	0.13			3.2		33.0	0.03	5.5	19.6	1.8	34.8		
2018-07-11	Port 1a	29	0.05			1.6		38.0	0.03	5.4	22.1	1.4	39.4		
2018-07-19	Port 1a									5.8	22.6				
2018-09-06	Port 1a		0.13			0.5	9	38.0	0.03	5.5	25.1	1.2	39.2		
2018-09-07	Port 1a		0.13				350	42.0	0.00			0.4	42.4		
2018-09-20	Port 1a		0.13			3.6		43.0	0.00	5.4	23.5	0.5	43.5		
2018-11-07	Port 1a		0.13			5.1		25.0	0.03	5.6	14.6	1.3	26.3		
2019-01-09	Port 1a					9.4		21.0	0.03	5.8	5.5	3.9	24.9		
2019-01-23	Port 1a		0.52			10.6		10.0	0.03	5.9	3.9	1.5	11.5		
2019-02-07	Port 1a		7.50			10.6		13.0	0.07	6.3	2.4	9.0	22.1		
2019-02-20	Port 1a					11.0		19.0	0.03	6.5	3.9	17.0	36.0		
2019-03-07	Port 1a		12.00			7.7		17.0	0.16	6.2	2.1	12.0	29.2		
2019-03-14	Port 1a					10.1				5.2	1.4				
2019-03-18	Port 1a		10.00			8.2		23.0	0.20	6.3	4.4	11.0	34.2		
2019-04-03	Port 1a		1.80			3.0		34.0	0.11	5.6	6.0	2.8	36.9		
2019-04-18	Port 1a		0.21			2.6		29.0	0.28	5.4	9.5	2.0	31.3		
2019-04-25	Port 1a					5.5				5.5	10.8				
2019-05-01	Port 1a		0.13			4.6		24.0	0.03	5.6	11.6	1.2	25.2		
2019-05-15	Port 1a		0.25			3.6		20.0	0.03	5.6	12.8	1.2	21.2		
2019-05-23	Port 1a					3.9				5.6	13.7				
2019-05-30	Port 1a		0.25			3.2		34.0	0.14	5.6	15.3	0.3	34.4		
2019-06-13	Port 1a		0.25			3.5		32.0	0.15	5.3	17.6	0.3	32.5		
2019-06-19	Port 1a					4.2				5.3	18.2				
2019-06-26	Port 1a		0.13			3.7		39.0	0.14	5.1	19.7	1.2	40.3		
2019-07-11	Port 1a		0.13			0.7		38.0	0.03	5.2	22.2	0.1	38.2		
2019-07-18	Port 1a					3.8				5.0	22.7				
2019-07-25	Port 1a		0.13			2.7		33.0	0.03	5.1	23.8	8.7	41.7		
2019-08-08	Port 1a		0.62			2.4		34.0	0.93	5.3	24.5	1.4	36.3		
2019-08-15	Port 1a					4.2				4.9	24.0				
2019-08-22	Port 1a		0.51			1.6		40.0	0.33	5.3	24.3	1.2	41.5		
2019-09-05	Port 1a					0.4				5.8	23.4				
2019-09-12	Port 1a					2.7				5.6	22.4				
2019-09-16	Port 1a					3.7				5.4	21.7				
2016-10-05	Port 2		2.00			0.1		0.1	0.03	6.5	21.7	7.0	7.1		
2016-10-13	Port 2		0.91			0.1		0.1	0.03	6.5	20.1	2.1	2.2		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2016-10-20	Port 2					0.1				6.4	19.2				
2016-10-25	Port 2		1.20			0.0		0.1	0.03	6.5	19.1	7.3	7.4		
2016-11-02	Port 2		0.66			0.3		0.1	0.76	6.7	17.1	3.3	4.1		
2016-11-08	Port 2		0.99			0.2		0.1	0.03	6.4	16.1	2.1	2.2		
2016-11-15	Port 2		0.47			0.3		0.1	0.03	6.3	14.8	2.8	2.9		
2016-11-21	Port 2		0.47			0.3		1.9	0.03	6.3	13.9	1.7	3.6		
2016-11-30	Port 2		0.78			0.2		0.1	0.03	6.2	12.1	3.1	3.2		
2017-01-11	Port 2		0.50			5.0		3.7	0.24	6.0	5.9	2.6	6.5		
2017-01-23	Port 2		1.20			5.1		4.9	0.03	6.2	6.1	2.9	7.8		
2017-01-25	Port 2		1.10			5.0		3.8	0.03	6.2	6.1	3.1	6.9		
2017-02-01	Port 2					4.3				6.0	6.2				
2017-02-07	Port 2		1.20			4.9		5.4	1.80	6.5	5.3	2.6	9.8		
2017-02-15	Port 2					3.1				6.8	4.9				
2017-02-22	Port 2		0.96			3.3		9.2	0.03	5.7	4.5	2.1	11.3		
2017-03-08	Port 2		1.20			4.7		4.3	0.03	5.8	6.2	3.2	7.5		
2017-03-22	Port 2		0.88			0.8		8.2	0.03	5.7	6.2	2.3	10.5		
2017-04-05	Port 2		0.79			0.8		13.0	0.35	5.7	6.2	2.5	15.9		
2017-04-18	Port 2		1.40			0.5		9.3	0.61	5.8	9.0	2.8	12.7		
2017-05-04	Port 2		0.57			0.8		0.6	0.01	5.8	12.2	2.7	3.3		
2017-05-09	Port 2		0.26			0.4		5.0	0.64	5.8	12.9	2.5	8.1		
2017-05-16	Port 2		0.27			0.4		0.3	0.03	6.0	13.2	2.3	2.6		
2017-06-06	Port 2		0.56			0.2		0.1	0.08	6.0	16.1	0.2	0.3		
2017-06-14	Port 2	200	0.69			0.3		0.1	0.05	6.3	16.9	1.6	1.7		
2017-06-20	Port 2	190	0.58			0.1		0.1	0.03	6.3	18.5	1.3	1.4		
2017-07-05	Port 2	170	1.20					0.1	0.03			1.6	1.7		
2017-07-18	Port 2	270	0.46					0.1	0.03			1.5	1.6		
2017-08-01	Port 2	260	1.40			1.2		0.0	0.00	6.3	23.1	1.9	2.0		
2017-08-08	Port 2	270	4.30			1.8		0.1	0.03	6.2	22.1	4.3	4.4		
2017-08-15	Port 2	250	2.70			2.1		2.0	0.03	6.0	23.3	5.4	7.4		
2017-08-23	Port 2	280	3.00				0	0.1	0.03	6.3		5.0	5.1		
2017-08-31	Port 2	240	2.20				5	3.6	0.03	6.0		3.5	7.1		
2017-09-07	Port 2	220	0.75			1.7		0.1	0.03	6.1	21.1	2.0	2.1		
2017-09-28	Port 2	180	2.00			4.5	5	0.1	0.03	5.9	25.0	3.3	3.4		
2017-10-12	Port 2	190	0.05			2.0	5	0.1	0.03	6.4	18.9	1.8	1.9		
2017-10-19	Port 2	200	0.24		2.2	1.2	5	0.8	0.03	6.3	20.0	1.0	1.8	18	120
2017-10-26	Port 2	200	0.36			0.3	9	3.1	0.03	6.1	18.8	1.6	4.7		
2017-11-07	Port 2	210	0.25			0.0	5	0.1	0.03	6.3	17.0	2.1	2.2		
2017-11-20	Port 2	180	0.05			1.6	5	0.1	0.03	6.3	14.1	0.7	0.8		
2017-11-29	Port 2					6.8				6.4	12.4				
2017-12-06	Port 2	160	0.94			6.1	10	1.6	0.09	6.4	11.9	1.4	3.1		
2017-12-18	Port 2									6.7	10.6				
2018-01-03	Port 2	120	0.23			1.7	5	3.1	0.08	5.5	6.7	0.7	3.9		
2018-01-11	Port 2					2.4				6.2	4.7				
2018-01-18	Port 2	71	0.63			0.9	5	13.0	0.13	5.9	5.3	1.4	14.5		
2018-01-22	Port 2					13.6				5.6	3.3				
2018-01-25	Port 2					1.3				5.9	5.0				
2018-02-07	Port 2	65	0.51			2.6		15.0	0.03	5.3	4.9	1.4	16.4		
2018-02-21	Port 2					6.1				5.7	5.3				
2018-03-07	Port 2	80	1.20			0.5		17.0	0.03	5.8	6.4	1.6	18.6		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2018-03-19	Port 2					6.6				5.9	5.9				
2018-04-04	Port 2	75	0.42			1.8		22.0	0.18	5.7	6.0	1.6	23.8		
2018-04-19	Port 2	97	0.40			2.9		23.0	0.03	5.8	7.8	1.5	24.5		
2018-04-26	Port 2					3.0				5.8	7.8				
2018-05-03	Port 2	110	0.38			0.9		17.0	0.03	5.7	9.6	1.3	18.3		
2018-05-16	Port 2	220	0.13			1.8		0.2	0.03	6.0	12.7	2.2	2.4		
2018-05-23	Port 2					1.8				5.8	13.6				
2018-05-29	Port 2	190	0.13			1.1		0.0	0.00	6.0	14.4	2.2	2.2		
2018-06-13	Port 2					1.1				6.1	16.7				
2018-06-27	Port 2	250	1.30			1.3		0.5	4.80	6.1	18.6	5.6	10.9		
2018-07-11	Port 2	230	1.30			0.1		0.3	0.03	6.0	20.8	3.8	4.1		
2018-07-16	Port 2	210	1.00					0.1	0.03			3.7	3.8		
2018-07-19	Port 2					0.5				5.9	21.5				
2018-07-25	Port 2					0.0				5.9	21.9				
2018-08-02	Port 2					0.1				5.6	22.7				
2018-08-08	Port 2					0.4				5.9	23.5				
2018-08-15	Port 2					0.6				5.6	24.0				
2018-08-22	Port 2		0.72			0.4		0.1	0.03	6.0	23.9	2.5	2.6		
2018-09-06	Port 2		0.63			0.2	9	0.1	0.03	5.6	23.9	2.2	2.3		
2018-09-07	Port 2		0.33				0	0.0	0.00			2.0	2.0		
2018-09-20	Port 2		0.45			0.3		3.0	0.00	6.0	23.1	1.5	4.5		
2018-10-04	Port 2		0.29			0.1		0.1	0.03	6.1	21.1	1.8	1.9		
2018-10-25	Port 2					0.4				5.9	16.6				
2018-11-07	Port 2		0.13			0.4		0.1	0.03	6.1	15.2	1.5	1.6		
2018-11-28	Port 2					0.7				5.7	8.7				
2018-12-19	Port 2					1.9				5.7	6.0				
2019-01-09	Port 2					1.5		14.0	0.03	5.8	6.1	3.1	17.1		
2019-01-17	Port 2					9.2				5.8	4.4				
2019-01-23	Port 2		6.20			4.6		17.0	0.03	5.8	4.0	7.1	24.1		
2019-02-07	Port 2		1.10			8.8		12.0	0.06	6.1	2.9	1.9	14.0		
2019-02-20	Port 2					9.1		12.0	0.03	6.1	2.6	6.4	18.4		
2019-03-07	Port 2		12.00			4.1		15.0	0.13	6.2	2.5	12.0	27.1		
2019-03-14	Port 2					6.4				6.3	3.4				
2019-03-18	Port 2		10.00			6.4		18.0	0.20	6.3	4.4	10.0	28.2		
2019-04-03	Port 2		6.00			3.4		28.0	0.52	6.0	5.5	6.9	35.4		
2019-04-18	Port 2		3.40			0.1		24.0	0.69	5.8	8.6	6.2	30.9		
2019-04-25	Port 2					4.4				5.9	10.3				
2019-05-01	Port 2		0.13			2.7		24.0	0.03	6.0	11.0	1.2	25.2		
2019-05-15	Port 2		0.25			0.1		0.5	0.02	6.0	12.4	2.5	3.0		
2019-05-23	Port 2					0.3				6.0	13.2				
2019-05-30	Port 2		0.25			0.4		7.4	2.10	6.0	14.6	2.3	11.8		
2019-06-13	Port 2		0.25			0.2		2.2	0.15	5.9	16.9	2.4	4.8		
2019-06-19	Port 2					0.2				6.0	17.4				
2019-06-26	Port 2		0.81			0.2		2.4	0.13	5.8	18.3	1.8	4.3		
2019-07-11	Port 2		0.78			0.2		1.6	0.03	6.1	20.8	0.1	1.8		
2019-07-18	Port 2					0.4				6.0	21.7				
2019-07-25	Port 2		0.45			0.2		3.0	0.11	6.1	22.8	1.8	4.9		
2019-08-08	Port 2		0.60			0.3		2.3	0.72	6.0	23.5	2.4	5.4		
2019-08-15	Port 2					0.2				6.1	23.4				

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2019-08-22	Port 2		0.48			0.1		2.4	0.23	6.1	23.4	1.5	4.2		
2019-09-05	Port 2					0.1				6.1	23.0				
2019-09-12	Port 2					0.0				6.1	22.2				
2019-09-16	Port 2					0.0				6.1	21.8				
2017-11-29	Port 2 & 2a	130	0.27		2.2		5	0.1	0.03			1.0	1.1	9.2	43
2017-12-06	Port 2 & 2a	160	0.94				10	1.6	0.09			1.4	3.1		
2017-12-18	Port 2 & 2a	85	0.47		1		5	5.0	0.14			0.5	5.6	6.8	25
2018-01-03	Port 2 & 2a	120	0.23				5	3.1	0.08			0.7	3.9		
2018-01-18	Port 2 & 2a	71	0.63				5	13.0	0.13			1.4	14.5		
2018-01-25	Port 2 & 2a	63	0.84		2.8		5	10.0	0.03			1.7	11.7	9.8	12
2018-02-21	Port 2 & 2a	92	2.90		2.1			9.2	0.15			3.7	13.1	13	7
2018-03-19	Port 2 & 2a	85	0.65					20.0	0.15			1.3	21.5	10	6
2018-04-26	Port 2 & 2a	120	0.05		1		0	14.0	0.03			2.3	16.3	12	15
2018-05-23	Port 2 & 2a	180	0.13		2.1		5	0.3	0.03			1.3	1.6	20	19
2018-06-13	Port 2 & 2a	200	0.54		4.2		5	0.1	0.03			3.3	3.4	36	98
2018-07-19	Port 2 & 2a	190	1.10		2.4		5	0.1	0.03			3.6	3.7	29	10
2018-07-25	Port 2 & 2a		1.10		1		200	0.1	0.03			3.2	3.3		
2018-07-25	Port 2 & 2a		1.10		1		200	0.1	0.03			3.2	3.3		
2018-08-02	Port 2 & 2a		1.30		1		5	2.3	0.03			3.2	5.5		
2018-08-02	Port 2 & 2a		1.30		1		5	2.3	0.03			3.2	5.5		
2018-08-08	Port 2 & 2a		0.92		3.4		5	0.1	0.03			2.9	3.0		
2018-08-15	Port 2 & 2a		0.87		3.6		10	0.1	0.03			2.7			
2018-09-20	Port 2 & 2a	170	0.42		1		5	0.1	0.00			1.9	2.0	15	35
2018-10-25	Port 2 & 2a		0.13		1		18	0.1	0.03			1.8	1.9		
2018-11-28	Port 2 & 2a		0.36		7.2		9	6.4	0.03			2.6	9.0		
2018-12-19	Port 2 & 2a		0.50		1		2	14.0	0.03			1.2	15.2		
2019-01-17	Port 2 & 2a		1.20		1		2	15.0	0.03			2.0	17.0		
2019-02-20	Port 2 & 2a		11.00		1		2	10.0	0.22			9.3	19.5		
2019-03-14	Port 2 & 2a		13.00		1		2	19.0	0.11			12.0	31.1		
2019-04-25	Port 2 & 2a		0.27		1		5	18.0	0.03			0.1	18.2		
2019-05-23	Port 2 & 2a		0.31		1		5	6.3	0.02			0.4	6.7		
2019-06-19	Port 2 & 2a		0.45		1		610	7.0	0.03			2.0	9.0		
2019-07-18	Port 2 & 2a		0.13		3.6		9	2.1	0.03			2.0	4.1		
2019-08-15	Port 2 & 2a		0.52		1		91	1.7	0.50			1.9	4.1		
2017-03-22	Port 2a		0.48			2.4		19.0	0.03	5.7	5.2	1.9	20.9		
2017-04-05	Port 2a		0.25			1.3		23.0	0.42	5.6	6.2	1.2	24.6		
2017-04-18	Port 2a		0.51			0.8		18.0	0.93	5.7	9.0	1.8	20.7		
2017-05-04	Port 2a		0.03			0.5		8.6	0.18	5.6	12.1	1.0	9.8		
2017-05-09	Port 2a		0.13			0.4		0.1	0.00	5.7	12.8	1.9	2.0		
2017-05-16	Port 2a		0.44			0.4		0.1	0.03	6.1	13.2	1.6	1.7		
2017-06-06	Port 2a		0.97			0.4		0.1	0.05	6.1	15.6	2.2	2.4		
2017-06-14	Port 2a	220	1.00			0.3		0.1	0.05	6.3	16.5	1.5	1.6		
2017-06-20	Port 2a	190	0.92			0.0		0.1	0.03	6.3	18.5	1.8	1.9		
2017-07-05	Port 2a	190	1.70					0.1	0.03			2.2	2.3		
2017-07-18	Port 2a	220	0.34					0.1	0.03			1.1	1.2		
2017-08-01	Port 2a	210	0.74			2.2		0.0	0.00	6.2	22.9	0.3	0.3		
2017-08-08	Port 2a	220	2.10			2.5		0.1	0.03	6.2	22.2	2.9	3.0		
2017-08-15	Port 2a	220	1.10			1.3	5	2.0	0.03	6.2	23.4	1.7	3.7		
2017-08-23	Port 2a	240	1.90				0	0.1	0.03	6.3		0.2	0.3		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2017-08-31	Port 2a	220	1.10				5	4.0	0.03	6.2		1.9	5.9		
2017-09-07	Port 2a	200	1.10			2.1		0.1	0.03	6.2	21.2	1.8	1.9		
2017-09-28	Port 2a	180	0.61			2.0	5	0.1	0.03	6.0	25.0	1.6	1.7		
2017-10-12	Port 2a	190	0.05			2.3	36	0.1	0.03	6.3	20.0	1.5	1.6		
2017-10-19	Port 2a					0.1				6.2	20.1				
2017-10-26	Port 2a	210	0.27			0.2	5	0.1	0.03	6.1	19.0	1.0	1.0		
2017-11-07	Port 2a	180	0.15			0.1	5	0.2	0.03	6.2	17.1	1.5	1.8		
2017-11-20	Port 2a	180	0.23			0.1	5	0.1	0.06	6.1	13.8	0.7	0.8		
2017-11-29	Port 2a					0.2				6.2	12.5				
2017-12-06	Port 2a	130	0.16			0.1	5	0.4	0.03	6.1	11.3	0.9	1.3		
2017-12-18	Port 2a					1.8				6.1	9.0				
2018-01-03	Port 2a	71	0.59			6.2	5	9.8	0.19	5.5	6.8	1.3	11.3		
2018-01-11	Port 2a					2.7				6.0	4.9				
2018-01-18	Port 2a	80	0.58			0.6	5	13.0	0.11	5.9	5.0	1.7	14.8		
2018-01-22	Port 2a					9.4				5.6	3.6				
2018-01-25	Port 2a					2.3				5.9	3.7				
2018-02-07	Port 2a	86	2.70			3.0		14.0	0.03	5.6	4.5	3.6	17.6		
2018-02-21	Port 2a					7.2				5.8	4.9				
2018-03-07	Port 2a	85	4.30			1.6		20.0	0.24	5.8	6.9	4.7	24.9		
2018-03-19	Port 2a					7.6				5.6	5.4				
2018-04-04	Port 2a	76	0.44			3.1		23.0	0.19	5.5	5.9	1.4	24.6		
2018-04-19	Port 2a	100	0.55			4.5		20.0	0.13	5.8	6.8	1.6	21.7		
2018-04-26	Port 2a					3.8				5.8	7.6				
2018-05-03	Port 2a	110	0.41			1.1		17.0	0.14	5.7	9.4	1.4	18.5		
2018-05-16	Port 2a	180	0.25			1.6		0.6	0.03	6.0	12.6	1.7	2.3		
2018-05-23	Port 2a					1.3				5.9	13.0				
2018-05-29	Port 2a	180	0.58			1.1		60.0	0.00	5.9	14.2	2.7	62.7		
2018-06-13	Port 2a					0.9				6.0	16.4				
2018-06-27	Port 2a	190	1.20			1.6		0.1	0.03	6.0	18.4	0.9	0.9		
2018-07-11	Port 2a	180	1.50			0.1		0.3	0.03	6.0	20.7	3.7	4.0		
2018-07-16	Port 2a	190	1.20					0.1	0.03			3.6	3.7		
2018-07-19	Port 2a					0.4				5.9	21.2				
2018-07-25	Port 2a					0.0				5.9	21.7				
2018-08-02	Port 2a					0.1				5.6	22.5				
2018-08-08	Port 2a					0.0				5.9	23.2				
2018-08-15	Port 2a					0.3				5.6	24.1				
2018-08-22	Port 2a		16.00			0.1		0.1	0.03	5.9	24.0	2.2	2.3		
2018-09-06	Port 2a		0.64			0.2	10	0.1	0.03	5.8	23.9	2.0	2.1		
2018-09-07	Port 2a		0.29				270	0.0	0.00			1.3	1.3		
2018-09-20	Port 2a		0.50			0.2		0.3	0.00	6.0	23.0	1.0	1.3		
2018-10-04	Port 2a		0.65			0.1		0.1	0.03	6.1	21.1	1.9	2.0		
2018-10-25	Port 2a					0.3				5.8	16.8				
2018-11-07	Port 2a		0.41			0.2		0.1	0.03	6.0	15.1	1.1	1.2		
2018-11-28	Port 2a					4.2				5.4	8.8				
2018-12-19	Port 2a					6.9				5.8	6.1				
2019-01-09	Port 2a					1.3		18.0	0.03	5.8	6.3	1.8	19.8		
2019-01-17	Port 2a					9.3				5.8	4.4				
2019-01-23	Port 2a		4.70			4.5		13.0	0.03	5.8	4.1	5.7	18.7		
2019-02-07	Port 2a		6.20			7.1		13.0	0.10	6.1	3.6	7.6	20.7		

Sample Date	Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TOC	TSS
2019-02-20	Port 2a					9.4		10.0	0.08	6.4	4.1	16.0	26.1		
2019-03-07	Port 2a		17.00			2.7		13.0	0.15	6.3	3.0	17.0	30.2		
2019-03-14	Port 2a					5.8				6.3	1.9				
2019-03-18	Port 2a		14.00			5.4		21.0	0.31	6.2	4.1	13.0	34.3		
2019-04-03	Port 2a		5.40			3.2		37.0	0.56	6.0	5.6	6.1	43.7		
2019-04-18	Port 2a		1.40			0.1		31.0	1.10	5.7	8.5	2.0	34.1		
2019-04-25	Port 2a					4.8				5.7	9.8				
2019-05-01	Port 2a		0.13			3.5		25.0	0.03	5.9	10.8	2.0	27.0		
2019-05-15	Port 2a		0.25			1.0		9.9	0.04	5.8	12.2	2.1	12.0		
2019-05-23	Port 2a					4.0				5.8	12.8				
2019-05-30	Port 2a		0.25			3.2		30.0	0.14	5.8	14.4	2.6	32.7		
2019-06-13	Port 2a		0.25			1.0		17.0	0.03	5.8	17.1	6.5	23.5		
2019-06-19	Port 2a					2.0				5.9	17.3				
2019-06-26	Port 2a		0.21			0.4		22.0	0.12	5.8	18.6	1.9	24.0		
2019-07-11	Port 2a		0.56			0.3		4.9	0.03	6.0	21.0	0.1	5.1		
2019-07-18	Port 2a					1.1				6.0	21.8				
2019-07-25	Port 2a		0.92			0.4		2.6	0.03	6.1	23.1	2.6	5.2		
2019-08-08	Port 2a		1.40			0.3		1.7	0.18	6.0	23.6	4.4	6.3		
2019-08-15	Port 2a					0.1				6.1	23.2				
2019-08-22	Port 2a		0.96			0.1		0.3	0.23	6.1	23.3	2.4	3.0		
2019-09-05	Port 2a					0.1				6.1	22.9				
2019-09-16	Port 2a					0.0				6.0	21.6				
2017-10-19	Septic Tank Effluent	290	32.00	40		0.0	270000			7.3	18.3	36.0	36.0	37	22
2017-11-29	Septic Tank Effluent	230	34.00	52		0.0	300000			7.2	12.0	35.0	35.0	50	17
2017-12-18	Septic Tank Effluent	210	35.00	120		0.0	1000000			7.2	9.0	40.0	40.0	65	22
2018-01-25	Septic Tank Effluent	160	33.00	0		0.1	100000			6.9	5.2	37.0	36.0	87	27
2018-02-21	Septic Tank Effluent	180	28.00	87		0.2	570000			6.7	5.8	37.0	37.0	64	21
2018-03-19	Septic Tank Effluent	220	36.00	120		0.2	550000			6.9	5.3	39.0	39.0	44	33
2018-04-26	Septic Tank Effluent	220	39.00	150		0.2	330000			6.7	8.1	44.0	44.0	81	33
2018-05-23	Septic Tank Effluent	270	49.00	170		0.1	230000			6.7	12.9	50.0	50.0	130	33
2018-06-13	Septic Tank Effluent	290	53.00	150		0.2	1600000			6.8	15.6	60.0	60.0	130	48
2018-07-19	Septic Tank Effluent	230	44.00	48		0.4	71000			6.6	19.5	61.0	61.0	44	16
2018-07-25	Septic Tank Effluent		46.00	52		0.0	84000			6.8	20.0	58.0	58.0		
2018-08-02	Septic Tank Effluent		44.00	54		0.0	260000			6.9	20.7	55.0	55.0		
2018-08-08	Septic Tank Effluent		43.00	45		0.2	460000			6.8	21.5	50.0	50.0		
2018-08-15	Septic Tank Effluent		49.00	50		0.1	360000			6.9	21.9	58.0	58.0		
2018-09-20	Septic Tank Effluent	270	50.00	68		0.0	830000			6.9	21.2	56.0	56.0	56	55
2018-10-25	Septic Tank Effluent		40.00	120		0.1	110000			6.9	15.8	48.0	48.0		
2018-11-28	Septic Tank Effluent		29.00	57		0.4	600000			6.5	10.4	36.0	36.0		
2018-12-19	Septic Tank Effluent		32.00	46		0.3	1200000			7.0	7.9	44.0	44.0		
2019-01-17	Septic Tank Effluent		39.00	87		1.9	890000			7.0	5.6	46.0	46.0		
2019-02-20	Septic Tank Effluent		42.00	93		2.6	2500000			6.9	4.4	43.0	43.0		
2019-03-14	Septic Tank Effluent		32.00	1		0.8	1600000			6.7	3.7	37.0	37.0		
2019-04-25	Septic Tank Effluent		34.00	92		-0.1	2300000			6.7	10.1	47.0	47.0		
2019-05-23	Septic Tank Effluent		40.00	150		0.0	1300000			6.6	12.3	49.0	49.0		
2019-06-19	Septic Tank Effluent		38.00	33		0.1	230000			6.9	15.7	41.0	41.0		
2019-07-18	Septic Tank Effluent		39.00	25		0.1	120000			7.0	19.6	42.0	42.0		
2019-08-15	Septic Tank Effluent		47.00	42		0.0	810000			7.0	21.2	48.0	48.0		
2019-09-16	Septic Tank Effluent					0.2				6.9	20.1				

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2015-07-09	Silt Sump		0.25					3.8	0.03			1.4	5.2		
2015-07-14	Silt Sump		0.23					2.0	0.03			1.8	3.8		
2015-07-23	Silt Sump		0.25					0.3	0.06			1.5	1.9		
2015-07-30	Silt Sump		0.25					0.1	0.03			1.5	1.6		
2015-08-06	Silt Sump		0.23					2.2	0.03			1.5	3.7		
2015-08-12	Silt Sump		0.19					2.4	0.03			1.9	4.3		
2015-08-20	Silt Sump		0.25			0.1		1.1	0.03	6.3	19.6	1.2	2.3		
2015-08-26	Silt Sump		0.33			5.1		1.0	0.03	6.2	20.4	1.1	2.1		
2015-09-02	Silt Sump		0.44			0.3		1.2	0.03	6.3	20.8	1.5	2.7		
2015-09-09	Silt Sump		0.41			0.4		0.7	0.03	6.2	21.2	1.8	2.5		
2015-09-15	Silt Sump		0.75			0.4		0.1	0.03	6.2	21.3	2.2	2.3		
2015-09-23	Silt Sump		0.68	8		0.3		0.2	0.03	6.4	21.3	1.9	2.1		
2015-09-29	Silt Sump		1.20	27		0.2		0.2	0.03	6.4	21.1	2.3	2.5		
2015-10-08	Silt Sump			1		0.3		2.0	0.03	6.5	20.8	1.6	3.6		
2015-10-14	Silt Sump					0.7				6.6	20.4				
2015-10-20	Silt Sump					0.1		2.4	0.03	6.5	19.7	1.3	3.7		
2015-11-04	Silt Sump			1.5		0.6		4.2	0.03	6.5	18.1	1.1	5.3		
2015-11-17	Silt Sump		0.11			0.6		3.4	0.08	6.5	16.9	0.6	4.1		
2015-11-24	Silt Sump							4.5	0.07			0.8	5.4		
2015-12-02	Silt Sump					1.0		4.0	0.08	6.4	15.3	1.0	5.1		
2015-12-09	Silt Sump					1.4		6.2	0.17	6.3	14.5	0.6	6.9		
2015-12-15	Silt Sump					1.2		6.7	0.03	6.0	14.0	0.3	7.3		
2015-12-21	Silt Sump					1.7		8.6	0.03	6.2	13.3	0.3	8.9		
2015-12-29	Silt Sump					2.4				6.3	12.8				
2016-01-05	Silt Sump		0.03	1		1.8		7.8	0.03	6.6	12.6	0.5	8.3		
2016-01-12	Silt Sump		0.25	1		3.2		6.1	0.03	6.3	11.9	0.6	6.7		
2016-01-19	Silt Sump					3.2				6.2	11.3				
2016-01-26	Silt Sump			1		5.6		9.0	0.19	6.2	10.3	0.3	9.4		
2016-02-02	Silt Sump			1.5		2.9		8.0	0.03	6.5	9.8	0.5	8.5		
2016-02-09	Silt Sump			1		4.3		8.7	0.03	7.0	8.7	0.6	9.3		
2016-02-16	Silt Sump		0.13	1		4.1		9.3	0.22	6.5	8.4	0.6	10.1		
2016-02-23	Silt Sump		0.06	2.5		3.7		10.0	0.03	6.5	8.0	0.3	10.3		
2016-03-02	Silt Sump		0.07	1		4.2		12.0	0.03	7.0	7.9	0.3	12.3		
2016-03-08	Silt Sump		0.07	1		3.8		14.0	0.03	6.0	7.9	0.3	14.3		
2016-03-15	Silt Sump		0.03	1		4.8		13.0	0.03	5.9	7.8	0.3	13.3		
2016-03-22	Silt Sump					4.1				5.8	7.9				
2016-04-05	Silt Sump		0.03	1		3.3		9.8	0.03	5.7	8.3	0.3	10.1		
2016-04-12	Silt Sump		0.03	1		2.5		9.1	0.03	5.7	8.7	0.3	9.4		
2016-04-19	Silt Sump		0.05	1		2.9		6.8	0.03	5.8	8.7	0.3	7.1		
2016-04-26	Silt Sump		0.03	1		2.8		5.7	0.03	5.7	9.0	0.5	6.3		
2016-05-03	Silt Sump		0.03			2.9		6.3	0.03	5.4	9.4	0.9	7.2		
2016-05-10	Silt Sump			290		2.1		6.8	0.03	5.8	9.8	0.6	7.5		
2016-05-17	Silt Sump		0.03	1.5		2.3		7.3	0.03	5.9	10.1	0.5	7.8		

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2016-05-24	Silt Sump		0.03			4.7		6.8	0.03	6.2	14.6	0.3	7.1		
2016-06-01	Silt Sump		0.03	1		1.9		8.3	0.03	5.5	11.3	1.1	9.4		
2016-06-07	Silt Sump		0.06	1		0.9		7.9	0.03	5.4	12.0	0.2	8.1		
2016-06-14	Silt Sump		0.03	2.5		0.9		7.4	0.03	5.6	12.7	0.3	7.7		
2016-06-21	Silt Sump		0.17			1.1		6.9	0.03	5.8	13.5	0.3	7.2		
2016-06-28	Silt Sump		0.03	1		0.2		9.4	0.03	5.9	14.1	0.3	9.7		
2016-07-06	Silt Sump		0.51	3.2		0.3		9.6	0.03	5.7	14.9	0.9	10.5		
2016-07-12	Silt Sump		0.61	3.8		0.1		11.0	0.03	5.9	15.5	4.5	15.5		
2016-07-18	Silt Sump		1.40					6.0	0.03			1.9	7.9		
2016-07-19	Silt Sump		1.60	1		0.4		6.2	0.03	5.3	16.3	2.5	8.7		
2016-07-20	Silt Sump		1.60			0.3		5.8	0.03	5.7	16.4	2.0	7.8		
2016-07-21	Silt Sump		1.80					6.6	0.03			2.0	8.6		
2016-07-26	Silt Sump		1.40	1		0.3		3.6	0.03	6.0	17.0	2.2	5.8		
2016-08-03	Silt Sump		1.40	1		0.2		3.4	0.03	6.3	17.8	1.1	4.5		
2016-08-09	Silt Sump		0.94	1		0.8		2.9	0.03	5.7	18.3	1.5	4.4		
2016-08-16	Silt Sump		0.46			0.4		3.8	0.03	6.1	18.9	1.4	5.2		
2016-08-24	Silt Sump		0.22	1		0.5		4.0	0.03	6.7	19.4	2.4	6.4		
2016-08-30	Silt Sump		0.19	1		0.4		4.5	0.03	6.6	19.7	0.3	4.8		
2016-09-07	Silt Sump					0.3				6.3	20.1				
2016-09-12	Silt Sump		0.59	1		0.2		7.9	0.03	6.7	20.2	0.8	8.7		
2016-09-20	Silt Sump		0.19	1		0.6		7.7	0.03	6.2	20.6	0.3	8.0		
2016-09-27	Silt Sump					0.2				6.6	20.5				
2016-10-05	Silt Sump		0.40	1		0.7		5.2	0.03	6.4	20.4	0.2	5.4		
2016-10-13	Silt Sump					0.5				6.4	20.0				
2016-10-25	Silt Sump		0.14	1		0.8		7.3	0.03	6.3	17.0	1.3	8.6		
2016-11-02	Silt Sump		0.06	1		0.8		8.8	0.03	6.8	18.3	0.7	9.6		
2016-11-08	Silt Sump		0.03	1		1.2		8.7	0.03	6.6	17.7	0.7	9.4		
2016-11-15	Silt Sump		0.04	1		1.4		9.4	0.03	6.3	17.2	0.9	10.4		
2016-11-30	Silt Sump		0.09	1		1.2		7.9	0.03	6.3	15.7	0.6	8.5		
2016-12-05	Silt Sump		0.25	1		1.8		8.1	0.03	6.2	15.3	0.7	8.8		
2016-12-14	Silt Sump		0.03	1		2.7		8.0	0.03	6.2	14.2	0.3	8.3		
2016-12-21	Silt Sump		0.03			3.0		8.2	0.03	6.2	13.2	0.3	8.5		
2016-12-28	Silt Sump		0.03	1		3.5		11.0	0.03	6.2	12.4	0.7	11.7		
2017-01-04	Silt Sump					3.2				6.0	11.6				
2017-01-11	Silt Sump		0.26	1		4.5		12.0	0.03	6.2	10.6	0.8	12.9		
2017-01-17	Silt Sump	140	0.03			5.8		13.0	0.03	5.9	10.2	0.8	13.8		
2017-01-23	Silt Sump		0.03	1		4.0		17.0	0.03	6.3	9.8	0.3	17.5		
2017-01-25	Silt Sump		0.03			4.8		10.0	0.03	6.1	9.6	0.7	10.7		
2017-02-01	Silt Sump					4.6				6.0	9.1				
2017-02-07	Silt Sump		0.03	1		4.4		12.0	0.03	6.4	9.0	0.3	12.3		
2017-03-22	Silt Sump					5.2				6.1	7.7				
2017-04-05	Silt Sump		0.05			5.9		15.0	0.03	5.6	7.1	0.5	15.5		
2017-04-18	Silt Sump					4.5				5.5	7.5				

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2017-05-04	Silt Sump		0.09	1		5.2		11.0	0.05	5.0	8.9	0.5	11.6		
2017-05-09	Silt Sump					3.3				4.7	9.3				
2017-05-15	Silt Sump					3.9				5.4	10.0				
2017-05-23	Silt Sump					3.7				6.0	10.5				
2017-06-06	Silt Sump		0.10		2	2.8		6.5	0.05	5.4	11.7	0.1	6.7		
2017-06-14	Silt Sump	150	0.05			4.6		4.7	0.05	6.2	12.4	0.9	5.7		
2017-06-20	Silt Sump	150	0.05		1	2.9		5.1	0.03	6.3	12.9	0.4	5.5		
2017-07-05	Silt Sump	150	0.10					4.9	0.03			0.2	5.2		
2017-07-11	Silt Sump	170	0.05					6.8	0.03			0.1	6.9		
2017-07-18	Silt Sump	170	0.05					7.0	0.03			0.3	7.3		
2017-07-25	Silt Sump	170	0.00			1.0		6.1	0.00	6.2	16.3	0.0	6.2		
2017-08-01	Silt Sump	170	0.00			1.3		5.7	0.00	6.3	21.8	0.0	5.8		
2017-08-08	Silt Sump	170	0.05			1.6	35	4.1	0.03	6.0	17.4	0.4	4.6		
2017-08-15	Silt Sump	170	0.05		2.5	0.7	12	6.6	0.03	5.4	17.7	0.7	7.3		
2017-08-23	Silt Sump	160	0.05			2.3		6.6	0.03	5.8	18.5	0.1	6.7		
2017-08-30	Silt Sump	180	0.05			0.3		1.9	0.03	5.9	18.1	0.5	2.4		
2017-09-06	Silt Sump		0.05			2.8		0.7	0.03	5.7	20.2	0.4	1.1		
2017-09-13	Silt Sump	160	0.05			0.1		0.1	0.03	5.9	18.8	0.4	0.5		
2017-09-27	Silt Sump	59	0.05			1.5	1	3.8	0.03	5.8	19.1	0.1	3.9		
2017-10-10	Silt Sump					1.5				6.2	18.5				
2017-10-10	Silt Sump					1.3				6.4	18.5				
2017-10-11	Silt Sump	68	0.05			1.0	4	3.9	0.03	6.4	17.9	0.5	4.4		
2017-10-25	Silt Sump	55	0.05			0.3	2	3.2	0.03	6.0	17.7	0.3	3.5		
2017-11-07	Silt Sump	110	0.05			3.6	1	6.8	0.03	6.3	17.3	0.9	7.7		
2017-11-20	Silt Sump	120	0.05			4.1	6	6.3	0.03	6.5	22.6	0.9	7.3		
2017-12-06	Silt Sump	120	0.05			4.4	1	6.7	0.03	6.5	23.2	0.1	6.9		
2017-12-20	Silt Sump	100	0.05			5.0	1	6.6	0.03	6.6	13.6	0.4	7.0		
2018-01-02	Silt Sump	110	0.05			6.1	1	8.1	0.03	6.3	12.4	0.3	8.5		
2018-01-08	Silt Sump		0.05			7.6		10.0	0.03	6.6	11.0	0.1	10.1		
2018-01-18	Silt Sump	110	0.05			7.8	1	8.2	0.03	6.4	9.8	0.4	8.6		
2018-01-24	Silt Sump		0.05			7.8		9.5	0.03	6.2	9.2	0.6	10.2		
2018-02-05	Silt Sump	110	0.13			8.1		9.9	0.03	6.4	8.5	0.7	10.6		
2018-02-21	Silt Sump	96	0.05			8.3	1	8.1	0.03	6.1	7.7	0.4	8.5		
2018-03-07	Silt Sump	95	0.05			8.4		5.8	0.03	6.3	7.6	0.3	6.2		
2018-03-19	Silt Sump	90	0.05			7.7	1	6.9	0.03	6.3	8.6	0.4	7.3		
2018-04-04	Silt Sump	86	0.11			8.7		4.0	0.03	6.2	7.3	0.4	4.4		
2018-04-19	Silt Sump	87	0.05			7.8		4.3	0.03	6.2	7.1	0.4	4.7		
2018-05-03	Silt Sump	88	0.05			7.9		5.6	0.03	6.0	7.8	0.3	5.9		
2018-05-16	Silt Sump	93	0.13					4.4	0.03			0.6	5.1		
2018-05-29	Silt Sump	80	0.13			8.2		4.0	0.00	5.0	9.8	0.3	4.3		
2018-06-13	Silt Sump	86	0.13			6.6	1	3.5	0.03	5.9	10.9	0.3	3.8		
2018-06-27	Silt Sump	99	0.13			3.2		2.6	0.03	5.8	12.0	0.8	3.5		
2018-07-11	Silt Sump	92	0.13			5.1		2.2	0.03	5.7	13.3	0.6	2.8		

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2018-07-25	Silt Sump	89	0.13			3.1		3.1	0.03	5.5	14.5	1.1	4.2		
2018-08-08	Silt Sump	85	0.13			3.9		6.9	0.03	5.6	16.4	1.3	8.2		
2018-08-22	Silt Sump		0.13			3.5		7.8	0.03	6.0		0.8	8.6		
2018-09-06	Silt Sump		0.13			0.4		5.4	0.03	5.6	17.7	0.3	5.7		
2018-09-20	Silt Sump		0.13			2.2		4.1	0.00	6.1		0.8	4.9		
2018-10-04	Silt Sump		0.13			1.1		5.6	0.03	6.1	28.1	0.7	6.3		
2018-10-25	Silt Sump		0.13			1.6		6.4	0.03	6.0	20.2	0.7	7.1		
2018-11-07	Silt Sump		0.13			2.4		4.7	0.03	6.2	17.4	0.4	5.1		
2018-11-19	Silt Sump		0.13			5.0		2.7	0.03	6.3	14.9	0.5	3.2		
2018-12-03	Silt Sump					6.1		2.7	0.03	6.1	12.7	0.5	3.2		
2018-12-19	Silt Sump					3.2		12.0	0.03	6.3	20.5	0.1	12.2		
2019-01-09	Silt Sump					2.8		9.6	0.03	6.2	21.6	0.7	10.4		
2019-01-23	Silt Sump		0.13					8.4	0.03			0.8	9.2		
2019-02-07	Silt Sump		0.13			6.1		9.5	0.03	6.4	9.1	0.7	10.2		
2019-02-20	Silt Sump		0.28			6.7		8.8	0.03	6.4	7.1	0.6	9.4		
2019-03-07	Silt Sump		0.13			9.6		8.4	0.03	6.3	6.4	0.5	8.9		
2019-03-18	Silt Sump		0.13			9.2		8.2	0.03	6.4	5.9	0.4	8.6		
2019-04-03	Silt Sump		0.13			8.9		9.4	0.03	6.2	6.1	0.4	9.8		
2019-04-18	Silt Sump		0.03			10.2		9.8	0.03	6.2	8.1	0.4	10.2		
2019-05-01	Silt Sump		0.13			9.3		8.0	0.03	6.3	8.6	0.5	8.5		
2019-05-15	Silt Sump		0.25			10.0		6.6	0.01	6.4	11.9	0.3	6.9		
2019-05-30	Silt Sump		0.25			8.1		7.4	0.03	6.2	10.4	0.3	7.7		
2019-06-13	Silt Sump		0.25			7.4		6.8	0.03	6.2	12.6	0.6	7.5		
2019-06-26	Silt Sump		0.13			7.2		6.4	0.03	6.1	13.0	0.5	6.9		
2019-07-11	Silt Sump					6.3				6.1	14.3				
2019-07-12	Silt Sump		0.13					5.0	0.03			0.1	5.2		
2019-07-25	Silt Sump		0.13			6.4		4.8	0.03	6.1	15.6	0.5	5.3		
2019-08-08	Silt Sump		0.13					4.0	0.36			0.6	5.0		
2019-08-22	Silt Sump		0.13			4.6		3.9	0.03	6.0	18.1	0.4	4.3		
2019-09-05	Silt Sump					5.4				6.1	18.9				
2019-09-12	Silt Sump					6.4				6.2	20.2				
Sample Date	**Location**	**Alkalinity**	**NH4**	**BOD5**	**CBOD5**	**DO**	**Fecal Coli**	**NO3**	**NO2**	**pH**	**Temp**	**TKN**	**TN**	**TP**	**TSS**
2015-07-23	Port 1							0.1				6.7	6.8		
2015-07-30	Port 1							0.1				6.1	6.2		
2015-08-12	Port 1							0.1				5.6	5.7		
2015-08-20	Port 1							0.1				6.4	6.5		
2015-08-26	Port 1					3.9		0.3		6.7	21.9	3.5	3.8		
2015-09-02	Port 1		2.40			0.5		0.7		6.7	22.2	4.9	5.6		
2015-09-09	Port 1		2.30	28		0.2		4.2		6.5	22.4	4.9	9.1		
2015-10-14	Port 1					0.3				6.8	20.3				
2015-11-17	Port 1		0.37	0.37		0.2		0.1		6.7	16.3	1.5	1.6		
2015-12-02	Port 1							4.9					4.9		

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2015-12-15	Port 1					2.2		6.7		6.0	12.8	0.7	7.4		
2015-12-21	Port 1					0.3		2.1		6.2	12.4	1.8	3.9		
2015-12-29	Port 1					1.0				6.4	11.9				
2016-01-05	Port 1		0.03	1		2.0		1.8		6.7	11.6	1.2	3.0		
2016-01-12	Port 1		0.25	1		5.8		4.6		6.4	10.7	0.3	4.9		
2016-01-19	Port 1					3.9				6.3	9.7				
2016-01-26	Port 1		0.03			8.0		6.5		6.6	9.4	0.3	6.8		
2016-02-02	Port 1					1.4		10.0		6.6	7.9	0.6	10.6		
2016-02-09	Port 1					2.1		7.9		7.0	7.1	0.3	8.2		
2016-02-16	Port 1					3.5		8.6		6.4	7.4	0.3	8.9		
2016-02-23	Port 1					2.6		8.2		6.3	6.8	0.6	8.8		
2016-03-02	Port 1					4.5		7.8		7.0	6.7	0.3	8.1		
2016-03-08	Port 1					4.6		13.0		6.2	7.0	0.3	13.3		
2016-03-15	Port 1					8.9		7.1		6.0	7.2	0.3	7.4		
2016-03-22	Port 1					1.8				5.9	7.4				
2016-03-29	Port 1					2.6				5.7	8.0				
2016-05-03	Port 1					0.5		0.0		5.8	9.4	0.7	0.8		
2016-05-10	Port 1							6.2				0.6	6.8		
2016-05-17	Port 1		0.05			7.4		4.3		6.1	10.5	0.6	4.9		
2016-06-01	Port 1		0.11			2.9		5.1		5.6	12.0	0.3	5.4		
2016-06-07	Port 1		0.44			3.9		3.2		5.6	12.8	1.5	4.7		
2016-06-14	Port 1		1.10			0.8		1.7		5.9	13.7	2.1	3.8		
2016-06-21	Port 1		1.60			0.5		2.3		6.0	14.7	2.3	4.6		
2016-06-28	Port 1		3.40			0.4		0.4		6.1	15.5	5.5	5.9		
2016-07-06	Port 1		1.50			0.8		0.2		5.6	16.2	2.7	2.9		
2016-07-12	Port 1		1.30			0.1		11.0		5.9	15.5	2.3	13.3		
2016-07-18	Port 1		4.80					0.1				6.7	6.8		
2016-07-19	Port 1		3.10			0.4		0.1		5.3	16.3	5.7	5.8		
2016-07-20	Port 1		4.40			0.3		0.1		5.7	16.4	8.0	8.1		
2016-07-21	Port 1		4.50					0.1				6.6	6.7		
2016-07-26	Port 1		3.00			0.9		0.1		6.0	18.3	4.2	4.3		
2016-08-03	Port 1		0.13			3.4		0.3		5.9	19.5	0.9	1.2		
2016-08-09	Port 1		0.23			0.4		0.2		5.7	19.6	1.1	1.3		
2016-08-16	Port 1		0.58			0.2		0.1		6.2	20.1	2.0	2.1		
2016-08-24	Port 1		0.36			1.3		21.0		6.6	20.6	2.2	23.2		
2016-08-30	Port 1		0.56			0.2		2.1		6.5	21.0	2.0	4.1		
2016-09-07	Port 1					0.3		4.1		6.4	21.2				
2016-09-12	Port 1		0.80			0.1		4.2		6.8	21.2	2.0	6.2		
2016-09-20	Port 1		0.73			0.3		3.0		6.5	21.4	1.6	4.6		
2016-09-27	Port 1					0.1				6.6	21.1				
2016-10-05	Port 1		1.40			0.4		5.0		6.6	20.7	3.0	8.0		
2016-10-13	Port 1					0.6				6.6	19.9				
2016-10-25	Port 1		0.55			0.4		1.2		6.6	18.9	2.4	3.6		

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2016-11-02	Port 1		0.34			0.7		0.1		7.0	18.0	1.8	1.9		
2016-11-08	Port 1		0.36			0.6		0.1		6.8	17.2	0.8	0.8		
2016-11-15	Port 1		0.31			0.5		0.1	0.03	6.5	16.5	2.7	2.8		
2016-11-30	Port 1		0.32			4.2		0.0		6.7	15.3	2.1	2.5		
2016-12-05	Port 1		0.23			0.9		0.6		5.8	14.2	0.7	1.3		
2016-12-21	Port 1		0.03			1.7		1.8	0.03	6.0	11.8	0.6	2.4		
2016-12-28	Port 1		0.06			2.7		2.6	0.03	6.1	10.7	0.7	3.3		
2017-01-04	Port 1		0.03			3.8		2.8	0.03	6.1	9.7	0.3	3.1		
2017-01-11	Port 1		0.03			5.0		1.2	0.03	5.8	9.8	1.0	2.2		
2017-01-17	Port 1		0.03			8.1		2.6	0.03	6.4	7.5	0.8	3.4		
2017-01-23	Port 1		0.03			4.4		28.0	0.05	6.2	8.1	0.3	28.3		
2017-01-25	Port 1		0.03			3.7		2.5	0.03	6.0	8.1	0.9	3.4		
2017-02-01	Port 1					3.6				6.0	8.0				
2017-02-07	Port 1		0.11			6.2		3.5	0.03	6.4	8.2	1.0	4.5		
2017-03-22	Port 1					8.1				6.2	6.8				
2017-04-05	Port 1		0.03			7.9		1.7	0.03	5.6	6.5	0.3	2.1		
2017-04-18	Port 1					6.2				5.2	7.2				
2017-05-04	Port 1					4.1				5.4	9.0				
2017-05-15	Port 1					2.4				5.8	10.5				
2017-05-23	Port 1					7.1				6.1	11.1				
2017-06-06	Port 1		1.50		2	0.7		0.2	0.05	5.8	12.6	1.6	1.9		
2017-06-14	Port 1	230	3.10			0.8		0.1	0.05	6.4	13.1	4.2	4.4		
2017-06-20	Port 1	220	3.60		5.6	0.2		0.1	0.03	6.5	14.0	4.4	4.5		
2017-07-05	Port 1	220	6.80					0.1	0.03			6.8	6.9		
2017-08-01	Port 1	290	0.00			3.0		0.4	0.00	6.4	22.1	0.0	0.5		
2017-08-08	Port 1	280	0.64			2.6		0.4	0.03	6.4	19.7	1.9	2.3		
2017-08-15	Port 1	250	0.54			4.3	5	0.1	0.03	6.3	23.4	3.2	3.4		
2017-08-23	Port 1	240	2.20					0.1	0.03	6.4		2.8	2.9		
2017-08-30	Port 1	190	0.30			4.6		0.2	0.00	6.3	17.6	1.0	1.2		
2017-09-06	Port 1		0.05			4.2		0.1	0.03	6.3	22.2	0.8	0.8		
2017-09-13	Port 1		0.05					0.2	0.03	6.1	21.0	0.5	0.7		
2017-09-27	Port 1	120	0.05			2.9	2	1.3	0.03	5.9	19.8	0.5	1.9		
2017-10-11	Port 1	140	0.05			2.1	2	0.9	0.03	6.2	19.2	0.6	1.5		
2017-10-25	Port 1	140	0.28			0.3	2	1.9	0.03	5.9	19.0	0.7	2.6		
2017-11-07	Port 1	130	0.05			2.2	2	2.3	0.03	6.2	18.1	0.6	2.9		
2017-11-20	Port 1	120	0.05				2	2.7	0.03	7.1	12.2	0.7	3.4		
2017-12-06	Port 1	110	0.05			9.1	4	3.3	0.03	6.7	14.6	0.1	3.5		
2017-12-20	Port 1	90	0.05				4	3.7	0.03	6.5	16.5	0.3	4.0		
2018-01-02	Port 1	87	0.05				2	3.8	0.03	6.5	8.0	0.3	4.2		
2018-01-18	Port 1	77	0.05			8.5	2	9.6	0.03	5.8	8.2	0.1	9.8		
2018-01-22	Port 1					14.5				6.9	8.9				
2018-01-24	Port 1		0.05					2.8	0.03	6.9	8.1	0.5	3.3		
2018-02-05	Port 1	100	0.10			9.7		3.5	0.03	5.8	7.5	0.5	4.0		

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2018-02-21	Port 1	78	0.05			8.8	4	12.0	0.03	5.3	6.2	0.6	12.6		
2018-03-07	Port 1	56	0.05			8.7		8.6	0.03	5.4	6.8	0.5	9.1		
2018-03-19	Port 1	60	0.05			9.1	2	5.4	0.03	6.5	6.7	0.4	5.8		
2018-04-04	Port 1	68	0.05			10.9		1.4	0.03	4.9	6.3	0.4	1.8		
2018-04-19	Port 1	77	0.08					2.4	0.03	6.5	14.4	0.4	2.8		
2018-05-03	Port 1	62	0.05			7.2		5.0	0.03	4.9	7.2	0.1	5.2		
2018-05-16	Port 1	69	0.13					2.2	0.03	5.6	11.2	1.0	3.2		
2018-05-29	Port 1	88	1.50					0.9	0.00			1.8	2.7		
2018-06-13	Port 1	95					5	0.1	0.11	6.0	14.5				
2018-06-27	Port 1	103						1.0	0.11	5.9	15.5				
2018-07-11	Port 1	85	0.79					1.0	0.16	5.6	16.2	1.8	3.0		
2018-07-25	Port 1	85	0.13					2.9	0.03	5.7	18.8	2.9	5.8		
2018-08-08	Port 1	92	0.13					2.0	0.03	5.8	19.3	1.8	3.8		
2018-08-22	Port 1		0.13					2.6	1.10	5.8	18.6	1.0	4.7		
2018-09-06	Port 1		0.13					3.2	0.03	6.4	20.5	1.4	4.6		
2018-09-20	Port 1		0.13					2.3	0.00	6.7	19.1	1.8	4.1		
2018-10-04	Port 1		0.13			4.6		0.1	0.03	6.3	18.9	1.6	1.7		
2018-12-03	Port 1					7.4		2.0	0.03	6.7	13.3	1.0	3.0		
2018-12-19	Port 1					7.3		4.1	0.03	6.5	11.1	0.7	4.8		
2019-01-09	Port 1					8.9		1.8	0.03	6.3	9.6	0.4	2.2		
2019-01-23	Port 1		0.13			10.0		3.2	0.03	6.6	8.5	0.5	3.8		
2019-02-07	Port 1		0.13			11.6		1.9	0.03	5.9	6.9	0.6	2.5		
2019-02-20	Port 1		0.13					0.8	0.03	6.8	5.0	0.5	1.3		
2019-03-07	Port 1		0.13			11.4		11.0	0.03	6.1	5.5	0.3	11.3		
2019-03-18	Port 1		0.13					4.8	0.03	6.5	5.7	0.5	5.3		
2019-04-03	Port 1		0.13					1.2	0.03	6.4	8.4	0.5	1.7		
2019-04-18	Port 1		0.08			10.2		2.7	0.03	5.8	12.1	0.4	3.1		
2019-05-01	Port 1		0.13			10.2		0.8	0.03	7.1	11.4	0.7	1.5		
2019-05-15	Port 1		0.25					1.0	0.01			0.3	1.3		
2019-05-30	Port 1							2.7	0.06						
2019-06-13	Port 1							3.9	0.03						
2019-06-26	Port 1		0.13					4.9	0.08			1.0	6.0		
2019-07-12	Port 1		0.13					3.5	0.03			0.1	3.7		
2019-07-25	Port 1		0.13			6.7		2.6	0.03	5.9	16.3	0.9	3.5		
2019-08-08	Port 1		0.13					2.6	0.06			1.1	3.8		
2019-08-22	Port 1		0.13					3.4	0.03			1.2	4.6		
2019-09-05	Port 1					5.8				6.1	18.8				
Sample Date	**Location**	**Alkalinity**	**NH4**	**BOD5**	**CBOD5**	**DO**	**Fecal Coli**	**NO3**	**NO2**	**pH**	**Temp**	**TKN**	**TN**	**TP**	**TSS**
2015-07-23	Port 2							0.1				3.2	3.3		
2015-07-30	Port 2							0.1				2.4	2.5		
2015-08-26	Port 2					3.2				6.8	23.3				
2015-10-14	Port 2					0.6				6.7	20.3				

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2015-11-17	Port 2		0.03			4.8		0.1		6.9	16.4	0.7	0.7		
2015-12-02	Port 2					7.3		3.2		7.4	12.5	1.5	4.7		
2015-12-21	Port 2					6.7		6.0		6.7	12.4	0.6	6.6		
2015-12-29	Port 2					8.5				6.7	12.0				
2016-01-05	Port 2		0.03			8.7		4.4		7.2	11.1	0.7	5.1		
2016-01-12	Port 2		0.25			7.8		1.5		6.5	10.6	0.6	2.1		
2016-01-19	Port 2					9.9				6.5	9.6				
2016-01-26	Port 2		0.03					8.1				0.3	8.4		
2016-02-02	Port 2					9.5		5.5		7.1	7.8	0.6	6.1		
2016-02-09	Port 2					9.0		8.6		7.1	7.0	0.6	9.2		
2016-02-16	Port 2					8.9		10.0		6.7	7.3	0.6	10.6		
2016-02-23	Port 2					10.0		6.8		6.4	6.5	0.3	7.1		
2016-03-02	Port 2							6.9				0.5	7.4		
2016-03-29	Port 2					5.3				5.7	7.7				
2016-05-17	Port 2					10.7				4.0	12.1				
2016-07-18	Port 2		0.09					1.7				0.9	2.6		
2016-07-19	Port 2		0.07			2.9		0.4		6.1	28.0	0.6	1.0		
2016-07-20	Port 2		0.11			1.6		0.4		5.9	21.0	0.6	1.0		
2016-07-21	Port 2		0.12					0.4				0.7	1.1		
2016-07-26	Port 2		0.09			4.4		2.1		6.5	16.2	0.3	2.4		
2016-08-03	Port 2		0.40			2.4		0.4		6.4	21.5	1.6	2.0		
2016-08-09	Port 2		0.09			3.0		1.6		6.1	22.6	1.0	2.6		
2016-08-16	Port 2		0.03			2.3		2.2		6.6	26.4	0.9	3.1		
2016-08-24	Port 2		0.03			2.5		1.8		6.9	27.0	1.6	3.4		
2016-08-30	Port 2		0.03			3.2		3.8		7.0	23.8	0.3	4.1		
2016-09-07	Port 2					4.8				7.1	12.7				
2016-09-12	Port 2		2.20			3.4		4.9		7.1	23.4	3.2	8.1		
2016-09-20	Port 2		0.67			2.9		4.4		6.8	21.8	1.3	5.7		
2016-09-27	Port 2					0.9				6.7	21.7				
2016-10-05	Port 2		0.27			2.4		1.9		6.6	21.0	0.8	2.7		
2016-10-13	Port 2					3.1				6.7	20.3				
2016-10-25	Port 2		0.07			5.3		3.8		7.1	18.8	1.0	4.8		
2016-11-02	Port 2		0.03			5.7		2.9		6.9	17.7	0.8	3.7		
2016-11-08	Port 2		0.03			5.5		6.4		6.6	12.0	0.8	7.2		
2016-11-15	Port 2		0.05			2.3		9.6	0.03	6.4	16.1	0.9	10.5		
2016-11-30	Port 2		0.17			5.0		9.7		6.7	15.1	2.2	11.9		
2016-12-05	Port 2		0.25			7.2		5.8		6.8	14.2	1.1	6.9		
2016-12-21	Port 2		0.03			7.5		10.0	0.03	6.7	11.6	0.6	10.7		
2016-12-28	Port 2		0.13			10.2		12.0	0.03	6.5	10.5	0.7	12.7		
2017-01-04	Port 2		0.03			8.9		14.0	0.03	6.4	9.5	0.3	14.3		
2017-01-11	Port 2		0.03			9.8		14.0	0.03	7.0	9.8	0.5	14.6		
2017-01-17	Port 2	140	0.03			9.3		9.3	0.03	6.4	6.6	0.7	10.0		
2017-01-23	Port 2		0.55			8.7		1.8	0.03	6.7	8.1	0.7	2.5		

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2017-01-25	Port 2		0.03			8.0		14.0	0.03	6.0	7.6	0.7	14.7		
2017-02-01	Port 2					7.3				6.2	7.9				
2017-02-07	Port 2		0.06			10.0		14.0	0.03	7.1	4.1	1.3	15.3		
2017-03-22	Port 2					8.6				6.5	6.1				
2017-04-05	Port 2		0.03			9.3		14.0	0.03	5.7	6.2	0.4	14.5		
2017-04-18	Port 2					9.5				5.2	7.2				
2017-05-04	Port 2		0.14			7.0		11.0	0.05	4.6	9.1	0.5	11.6		
2017-05-15	Port 2					3.2				5.8	11.1				
2017-05-23	Port 2					2.9				6.2	11.7				
2017-06-06	Port 2		0.60		4.3	5.2		1.4	0.07	5.8	13.2	0.7	2.2		
2017-06-14	Port 2	190	1.00			5.0		0.3	0.05	6.6	13.8	1.3	1.6		
2017-06-20	Port 2	180	0.53		2	2.2		1.0	0.03	5.9	14.4	1.3	2.3		
2017-07-05	Port 2	180	0.75					0.8	0.03			0.9	1.8		
2017-08-01	Port 2	200	0.05					2.8	0.03			0.8	3.6		
2017-08-08	Port 2	200	0.05			3.4		1.9	0.03	6.3	20.8	0.3	2.3		
2017-08-15	Port 2	200	0.05			4.5	18	2.8	0.03	6.5	24.1	0.7	3.6		
2017-08-23	Port 2	180	0.05					0.1	0.03	6.3		0.1	0.1		
2017-08-30	Port 2	180	0.00			4.8		1.8	0.00	6.5	18.9	0.5	2.3		
2017-09-06	Port 2		0.05					0.8	0.03			0.5	1.3		
2017-09-13	Port 2	170	0.05					3.1	0.03	6.0	20.6	0.3	3.4		
2017-09-27	Port 2	160	0.05			4.6	2	0.7	0.03	6.2	24.1	0.5	1.3		
2017-10-11	Port 2	160	0.05				19	2.0	0.03	6.1	18.9	0.7	2.7		
2017-10-25	Port 2	150	0.05				8	4.2	0.03	6.5	21.0	0.6	4.9		
2017-11-07	Port 2	160	0.16			5.8	4	2.1	0.03	6.7	17.9	0.9	3.0		
2017-11-20	Port 2	140	0.05				4	3.0	0.03	7.5	18.4	0.7	3.7		
2017-12-06	Port 2	130	0.05			8.5	2	2.6	0.03	7.4	14.4	0.1	2.8		
2017-12-20	Port 2	110					40	4.1	0.03	6.6	15.0				
2018-01-02	Port 2	110					2	2.9	0.03	6.9	11.3				
2018-01-18	Port 2	92	0.05			11.3	2	5.7	0.03	6.6	7.9	0.7	6.5		
2018-01-22	Port 2					15.4				6.9	7.8				
2018-01-24	Port 2		0.08					12.0	0.03	7.0	7.8	0.6	12.7		
2018-02-05	Port 2	85	0.05					10.0	0.03	6.7	8.1	0.6	10.6		
2018-02-21	Port 2	65	0.05			9.4	2	13.0	0.03	5.4	6.0	0.5	13.5		
2018-03-07	Port 2	74	0.05			10.1		2.4	0.03	6.0	6.8	0.3	2.8		
2018-03-19	Port 2	58	0.05			9.6	4	3.5	0.03	6.8	7.4	0.3	3.9		
2018-04-04	Port 2	68	0.05			11.7		1.4	0.03	5.9	6.4	0.4	1.8		
2018-04-19	Port 2	53	0.05					1.5	0.03	6.5	11.1	0.4	1.9		
2018-05-03	Port 2	73	0.05			8.9		0.9	0.03	5.8	7.6	0.1	1.0		
2018-05-16	Port 2									6.4	14.7				
2018-05-29	Port 2	70						2.1	0.00	6.4	15.0				
2018-06-13	Port 2									6.2	15.7				
2018-06-27	Port 2									5.9	15.8				
2018-08-08	Port 2	80	0.13					6.4	0.03	6.1	20.9	1.9	8.3		

Sample Date	Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
2018-08-22	Port 2							5.6	0.03	6.5	21.3				
2018-09-06	Port 2							6.2	0.03	6.7	21.7				
2018-09-20	Port 2							6.5		7.0	23.0				
2018-10-04	Port 2		0.13			5.7		4.5	0.03	5.9	19.9	1.1	5.6		
2018-12-03	Port 2					9.0		6.2	0.03	6.7	13.5	1.2	7.4		
2018-12-19	Port 2							5.3	0.03	6.8	16.0				
2019-01-09	Port 2					10.1		9.6	0.03	6.8	10.0	0.9	10.5		
2019-01-23	Port 2		0.13			11.3		6.3	0.03	6.4	8.0	0.8	7.1		
2019-02-07	Port 2		0.13			12.9		8.2	0.03	7.1	6.8	0.9	9.1		
2019-02-20	Port 2		0.13					4.6	0.03	7.0	6.2	0.7	5.3		
2019-03-07	Port 2		0.13			11.9		8.0	0.03	6.4	5.3	0.3	8.4		
2019-03-18	Port 2		0.13					8.7	0.03	6.9	4.9	0.5	9.2		
2019-04-03	Port 2		0.13					8.1	0.03	6.4	5.4	0.7	8.9		
2019-04-18	Port 2		0.07			10.4		2.9	0.07	6.3	12.8	0.4	3.4		
2019-05-01	Port 2					10.2		4.6	0.03	6.9	13.0				
2019-05-15	Port 2							1.8	0.01						
2019-05-30	Port 2							2.6	0.03						
2019-06-26	Port 2							3.0	0.03						
2019-07-12	Port 2							3.3	0.03						
2019-07-25	Port 2		0.13			7.1		1.6	0.03	5.9	17.9	0.8	2.4		
2019-08-08	Port 2							2.2	0.03						
2019-08-22	Port 2							2.4	0.03						
2019-09-05	Port 2					5.2				6.0	19.7				

Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
Final Effluent	160	0.5	1		0.5		7.6	0.03	6.1	7.6	1.2	8.8		23
Final Effluent					0.3				5.8	7.1				
Final Effluent	180	1.6	1				2.7	0.03			2.9	5.6		
Final Effluent	200	5.3			1.0		1.6	0.03	6.1	6.8	6.9	8.5		
Final Effluent		5.4	1		0.2		0.2	0.03	6.7	6.9	9.1	9.3		
Final Effluent		9.0	0		1.2		1.3	0.03	6.4	6.9	11.0	12.3		
Final Effluent					0.3				5.8	6.6				
Final Effluent		12.0	1		0.1		1.7	0.03	6.6	5.9	13.0	14.7		
Final Effluent					0.1				6.9	5.5				
Final Effluent		15.0	1		0.2		4.6	0.03	6.3	6.0	17.0	21.6		
Final Effluent		12.0	1		0.2		15.0	0.03	6.1	6.6	14.0	29.0		
Final Effluent					0.2				6.0	5.7				
Final Effluent		4.6			0.3		16.0	0.33	5.7	6.3	6.6	22.9		
Final Effluent					0.2				5.6	9.7				
Final Effluent		1.3	1		0.4		21.0	0.18	5.5	11.9	0.5	21.7		
Final Effluent		0.3			0.4		19.0	0.36	5.6	12.5	1.2	20.6		
Final Effluent		0.4			0.3		20.0	0.31	5.6	12.6	0.6	20.9		
Final Effluent							13.0	0.14			1.4	14.5		
Final Effluent		0.3	2	2	0.4		6.5	0.05	6.0	15.6	0.2	6.8		
Final Effluent		0.3			0.5		8.8	0.05	5.4	16.1	0.1	8.9		
Final Effluent		0.3					8.8					9.1		
Final Effluent		0.2					9.7	0.05			0.1	9.8		
Final Effluent	150	0.2			0.5		9.6	0.03	6.0	16.4	1.3	10.9		
Final Effluent	150	0.2			3.0		9.6	0.05	6.2	20.4	1.3	11.0		
Final Effluent	270	0.4		17	0.1		0.1	0.03	6.6	18.3	2.6	2.7		
Final Effluent	220	1.8					0.1	0.03			2.0	2.1		
Final Effluent	190	1.6					0.2	0.06			2.6	2.8		
Final Effluent	220	1.7			0.1		0.0	0.00	6.2	21.3	2.0	2.1		
Final Effluent	200	1.8			0.0		0.0	0.00	6.3	22.2	2.5	2.6		
Final Effluent	180	1.9			0.0		0.0	0.00	6.0	21.6	3.0	3.1		
Final Effluent	200	1.6			0.1	8	0.1	0.03	6.1	22.1	1.7	1.8		
Final Effluent	180	1.5		3.1	0.0	2	0.1	0.03	5.9	21.9	1.8	1.9		
Final Effluent	170	1.4		3.6	0.0		0.1	0.03	6.1	22.2	1.8	1.9		
Final Effluent	170	1.2		3.2	0.2		0.1	0.03	6.1	21.7	2.2	2.3		6
Final Effluent		1.0		1	0.1		0.1	0.03	5.9	21.1	1.8	2.0		5
Final Effluent		0.6		1	0.1	2	0.1	0.03	6.2	20.9	1.5	1.6		4
Final Effluent		0.4		2.1	0.1	2	0.3	0.03	6.0	20.1	1.8	2.2		7
Final Effluent	170	0.4		2.1	0.1	2	0.8	0.03	6.2	19.5	1.1	1.9	1	4
Final Effluent	180	0.4		1	0.0	2	0.9	0.03	6.2	18.1	1.0	2.0		4
Final Effluent	140	0.2			0.1	2	2.8	0.03	6.3	16.7	1.3	4.1		
Final Effluent	120	0.3			0.0		5.2	0.05	6.2	13.2	1.1	6.4		

Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
Final Effluent	120	0.5			0.0	2	4.1	0.03	6.2	11.0	0.9	5.0		
Final Effluent	91	0.7			0.1	2	6.0	0.13	6.3	8.4	1.1	7.2		
Final Effluent	89	0.6			0.2	2	5.6	0.10	6.0	6.5	1.4	7.1		
Final Effluent		0.8			0.1		7.4	0.11	6.3	5.6	1.5	9.0		
Final Effluent	100	1.3			0.1	4	1.3	0.07	6.0	4.8	2.4	3.8		
Final Effluent		1.7			0.7		4.8	0.03	5.4	4.6	2.7	7.5		
Final Effluent	92	2.7			0.3		7.7	0.05	5.9	4.8	3.4	11.2		
Final Effluent	89	2.7			0.1	2	6.2	0.03	6.0	5.4	4.0	10.2		
Final Effluent	89	1.8			0.1		4.0	0.13	6.2	6.1	2.4	6.5		
Final Effluent	83	1.6			0.3	46	7.9	0.15	6.1	5.4	3.2	11.3		
Final Effluent	84	1.4			0.3		11.0	0.16	6.0	6.1	2.2	13.4		
Final Effluent	100	1.4			0.3		9.4	0.19	6.1	6.6	2.0	11.6		
Final Effluent	120	1.0			0.1		2.9	0.15	6.1	9.1	1.8	4.9		
Final Effluent	180	0.9			0.2		0.2	0.19	6.1	11.4	3.1	3.4		
Final Effluent	140	0.6			0.2		3.2	0.00	6.0	13.3	1.2	4.4		
Final Effluent	140	0.3			0.3	5	2.3	0.03	5.9	15.1	1.4	3.7		
Final Effluent	150	0.3			0.4		1.0	0.03	5.8	16.6	2.3	3.3		
Final Effluent	150	0.3			0.1		0.7	0.03	5.7	18.5	1.4	2.1		
Final Effluent	160	0.4			0.0		2.4	0.03	5.7	19.4	2.3	4.7		
Final Effluent	160	0.3			0.8		0.1	0.03	5.9	22.7	2.4	2.5		
Final Effluent		0.5			0.2		1.0	0.03	5.6	21.8	2.3	3.3		
Final Effluent		0.3			0.1		5.0	1.10	6.0	21.9	1.2	7.3		
Final Effluent		0.1			0.1		0.3	0.00	6.0	21.2	1.7	2.0		
Final Effluent		0.1			0.1		0.4	0.03	6.1	19.9	2.3	2.7		
Final Effluent		0.1			0.1		0.1	0.03	5.6	16.5	1.5	1.6		
Final Effluent		0.1			0.1		0.8	0.03	6.1	15.2	1.4	2.2		
Final Effluent		0.1			0.8		0.5	0.03	5.4	11.8	2.3	2.8		
Final Effluent					0.5		2.5	0.03	6.1	9.7	1.6	4.1		
Final Effluent					0.2		3.1	0.03	6.1	6.5	1.9	5.0		
Final Effluent					0.7		2.4	0.03	6.2	5.9	1.6	4.0		
Final Effluent		1.2			0.9		2.9	0.03	6.1	3.8	2.1	5.0		
Final Effluent		1.6			2.0		5.8	0.03	6.2	3.4	2.6	8.4		
Final Effluent		1.8			3.2		6.2	0.03	6.2	2.9	3.0	9.2		
Final Effluent		3.3			0.3		9.0	0.03	6.3	2.6	3.9	12.9		
Final Effluent		3.3			0.2		6.8	0.10	6.3	3.4	4.3	11.2		
Final Effluent		4.1			0.2		8.8	0.14	6.2	5.1	8.6	17.5		
Final Effluent		3.1			0.0		7.4	0.13	6.2	8.2	4.2	11.7		
Final Effluent		2.8			0.0		1.7	0.03	6.2	9.7	4.1	5.8		
Final Effluent		1.4			0.2		1.6	0.02	6.1	10.7	3.0	4.6		
Final Effluent		0.8			0.2		2.5	0.03	6.1	12.7	2.2	4.7		
Final Effluent					0.2				6.0					

Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
Final Effluent		0.3			0.2		2.0	0.03	6.0	13.9	0.3	2.3		
Final Effluent		1.2			0.1		5.4	0.03	5.9	16.2	1.8	7.2		
Final Effluent					0.2				6.0	19.0				
Final Effluent		0.3					0.8	0.29			0.1	1.2		
Final Effluent		0.3			0.2		3.3	0.03	6.0	20.9	1.8	5.1		
Final Effluent													9	
Final Effluent		0.3					2.2	0.03			1.7	3.9		
Final Effluent		0.3			0.1		2.6	0.17	6.0	21.8	1.3	4.1		
Final Effluent					0.1				6.0	20.8				
Final Effluent					0.1				6.0	20.2				
Sample Location	Alkalinity	NH4	BOD5	CBOD5	DO	Fecal Coli	NO3	NO2	pH	Temp	TKN	TN	TP	TSS
Pan D					1.0				5.4	5.8				
Pan D							0.1	0.03			0.8	0.8		
Pan D		0.3			8.4		0.1	0.03	6.1	9.3	1.0	1.1		
Pan D					9.6				6.3	5.4				
Pan D					9.6		1.1	0.03	6.3	5.4	29.0	30.1		
Pan D					6.0		40.0	0.93	5.8	13.6	1.0	41.9		
Pan D	100	0.3					33.0	0.03			0.8	33.8		
Pan D	85	17.0			3.6	81	31.0	0.03	6.4	23.2	17.0	48.0		
Pan D	47	6.2					25.0	0.56	6.3		6.5	32.1		
Pan D	38	5.0				50	39.0	0.63	6.2	22.5	5.6	45.2		
Pan D	40	0.1				5	58.0	0.03			1.4	59.4		
Pan D	13	0.1				9	30.0	0.03	5.8	7.8	0.6	30.6		

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2014-07-09	Column 1				0.1	0.02				
2014-07-10	Column 1			0.2	0.1	0.02	6.3	25.3	9.6	9.7
2014-07-11	Column 1			0.2	0.1	0.02	6.3	22.0		0.1
2014-07-14	Column 1	250		0.2	0.1	0.02	6.3	24.8	7	7.1
2014-07-15	Column 1			0.2			6.1	23.7		
2014-07-16	Column 1			0.2			6.1	23.2		
2014-07-17	Column 1			0.5			6.1	20.8		
2014-07-18	Column 1			0.5			5.9	21.3		
2014-07-21	Column 1	370	0.25	0.3	0.1	0.02	6.0	21.8	4.8	4.9
2014-07-22	Column 1			0.8			6.0	24.6		
2014-07-23	Column 1			0.9			5.9	27.0		
2014-07-24	Column 1			1.8			5.8	25.2		
2014-07-25	Column 1			3.1			5.9	20.3		
2014-07-28	Column 1			2.6			5.8	23.3		
2014-07-29	Column 1			1.2	0.1	0.02	5.9	24.5	3.2	3.3
2014-07-30	Column 1			1.0			6.0	26.6		
2014-08-04	Column 1			1.2	0.1	0.02	5.9	24.7	2.6	2.7
2014-08-05	Column 1			0.6			6.0	27.7		
2014-08-06	Column 1			0.4			6.1	25.9		
2014-08-07	Column 1			0.5			6.2	23.4		
2014-08-11	Column 1			1.1	0.1	0.02	6.0	24.4	3	3.1
2014-08-13	Column 1			1.2			6.0	21.4		
2014-08-14	Column 1			0.8			6.1	20.7		
2014-08-15	Column 1			1.1			6.1	23.3		
2014-08-19	Column 1	330	0.25	1.1	0.1	0.90	6.8	18.8	3.2	4.2
2014-08-20	Column 1			2.1			6.5	21.6		
2014-08-21	Column 1			1.5			6.3	23.7		
2014-08-22	Column 1			0.5	0.1	0.44	6.2	20.6		
2014-08-26	Column 1			0.4			6.3	25.8		
2014-08-27	Column 1			0.4	0.1	0.59	6.3	28.0		
2014-08-28	Column 1			0.3			6.3	28.3		
2014-08-29	Column 1			0.4			6.4	24.0		
2014-09-03	Column 1	360		0.2	0.1	0.45	6.4	27.9		
2014-09-04	Column 1	360	0.2	0.1	0.1	0.45	6.4	26.8	1.8	2.3
2014-09-05	Column 1			0.3			6.3	27.1		
2014-09-08	Column 1	380	0.25	0.6	0.1	0.10	6.4	22.9	2.7	2.9
2014-10-02	Column 1			0.2			7.1	17.5		
2014-10-03	Column 1			0.2			6.8	15.2		
2014-10-06	Column 1			0.7			6.8	18.4		
2014-10-07	Column 1	260	0.25	0.4	0.1	0.03	6.8	21.6	4	4.1
2014-10-08	Column 1			0.3			6.7	23.3		
2014-10-09	Column 1			0.2			6.6	20.7		
2014-10-10	Column 1			0.2			6.6	22.7		
2014-10-14	Column 1			0.1			6.3	15.1		
2014-10-16	Column 1		0.25	0.1	0.1	0.27	6.3	23.3	3	3.3
2014-10-17	Column 1			0.1			6.3	20.6		
2014-10-20	Column 1			0.5			6.5	16.7		
2014-10-21	Column 1			0.2			6.4	16.0		
2014-10-22	Column 1			0.2			6.2	15.3		
2014-10-23	Column 1			0.2			6.2	15.4		
2014-10-24	Column 1	360	0.25	0.1	0.1	0.42	6.2	14.4	2.3	2.8
2014-10-28	Column 1			0.6			6.3	14.1		
2014-10-29	Column 1	350	0.23	0.2	0.1	0.03	6.4	22.4	2	2.1
2014-10-30	Column 1			0.3			6.4	16.1		

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2014-11-03	Column 1			0.3			6.2	8.5		
2014-11-05	Column 1			0.3			6.3	11.9		
2014-11-07	Column 1			0.9			6.0	11.1		
2014-11-10	Column 1			0.7			6.3	12.1		
2014-11-12	Column 1	320	0.25	0.6	0.9	0.12	6.3	13.2	1.9	2.9
2014-11-14	Column 1			0.3			6.2	9.3		
2014-11-17	Column 1			0.3			6.3	16.2		
2014-11-19	Column 1			0.2			6.3	15.9		
2014-11-21	Column 1			0.4			6.4	12.6		
2014-11-24	Column 1			0.9			6.4	24.1		
2014-12-01	Column 1	330	0.25	0.9	0.1	0.03	6.3	14.4	1.7	1.8
2014-12-03	Column 1	350	0.26	0.2	0.1	0.03	6.2	13.5	1.7	1.8
2014-12-05	Column 1			0.3			6.3	17.3		
2014-12-08	Column 1	360	0.25	1.6	0.1	0.03	6.3	15.2	2	2.1
2014-12-10	Column 1			0.5			6.3	12.4		
2014-12-15	Column 1			0.3			6.0	6.1		
2014-12-17	Column 1			0.2			6.1	11.6		
2014-12-19	Column 1			0.5			6.0	7.7		
2014-12-22	Column 1	240	0.25	0.5	0.1	0.03	6.2	18.5	1.5	1.6
2014-12-29	Column 1	260	0.25	0.4	0.1	0.03	6.1	7.8	1.6	1.7
2014-12-31	Column 1			0.3			6.2	7.4		
2015-01-02	Column 1			0.4			6.3	15.9		
2015-01-05	Column 1			0.2			6.3	12.5		
2015-01-07	Column 1			0.4			6.2	9.7		
2015-01-09	Column 1	210	0.25		0.1	0.03			1.3	1.4
2015-01-12	Column 1			0.1			6.2	15.0		
2015-01-14	Column 1			0.7			6.2	14.8		
2015-01-16	Column 1	200	0.25		0.1	0.03			1.5	1.6
2015-01-21	Column 1	260	0.25	0.2	0.1	0.03	6.2	16.3	1.6	1.7
2015-01-26	Column 1			1.3			6.2	14.7		
2015-01-29	Column 1	270	0.25	0.5	0.1	0.03	6.3	15.6	1.8	1.9
2015-02-02	Column 1			0.4			6.2	14.6		
2015-02-04	Column 1		0.08	0.8	0.0	0.03	6.3	13.9	1.2	1.3
2015-02-06	Column 1			0.4			6.2	10.0		
2015-02-09	Column 1			0.3			6.1	13.6		
2015-02-11	Column 1	290	0.12	0.4	0.0	0.17	6.2	14.2	1	1.2
2015-02-13	Column 1			0.2			6.3	12.2		
2015-02-17	Column 1	230	0.14	0.2	0.0	0.01	6.0	8.7	0.81	0.8
2015-02-20	Column 1			0.2			6.1	8.3		
2015-02-23	Column 1			0.5			6.2	12.7		
2015-02-25	Column 1		0.19	0.4	0.2	0.00	6.2	10.8	0.79	1.0
2015-03-02	Column 1			0.4			6.5	13.0		
2015-03-04	Column 1		0.14	1.4	0.1	0.03	6.6	14.7	0.76	0.9
2015-03-06	Column 1			1.1			6.1	7.8		
2015-03-09	Column 1			0.8			6.8	11.7		
2015-03-12	Column 1		0.25	0.8	0.1	0.07	6.5	15.5	1.4	1.5
2015-03-15	Column 1			0.5			6.1	7.7		
2015-03-18	Column 1			0.5			6.6	12.1		
2015-03-20	Column 1			0.5			6.5	12.4		
2015-03-27	Column 1		0.25	0.3	0.1	0.10	6.4	12.1	1.1	1.3
2015-03-30	Column 1		0.34	0.4	0.1	0.13	6.4	8.6	0.9	1.1
2015-04-02	Column 1			0.7			6.4	7.7		
2015-04-06	Column 1			0.4			6.3	8.4		
2015-04-08	Column 1			0.3			6.3	7.4		

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2015-04-13	Column 1			0.1			6.3	11.0		
2015-04-23	Column 1	260	0.25	0.3	0.1	0.03	6.2	10.7	1.7	1.8
2015-04-30	Column 1		0.25	0.3	0.1	0.03	6.3	9.6	1.1	1.2
2015-05-06	Column 1		0.29	0.1	0.1	0.03	6.4	15.1	1.1	1.2
2015-05-14	Column 1		0.25	0.4	0.1	0.03	6.4	15.3	1.4	1.5
2015-05-21	Column 1		0.25	0.4	0.1	0.03	6.5	16.6	1.8	1.9
2015-05-28	Column 1		0.25	0.0	0.1	0.03	6.4	19.0	1.7	1.8
2015-06-04	Column 1		0.25	0.1	0.1	0.03	6.2	13.1	1.4	1.5
2015-06-11	Column 1		0.25	0.4	0.1	0.10	6.3	20.6	1.2	1.3
2015-06-17	Column 1		0.22	0.1	0.1	0.06	6.3	19.2	1.3	1.4
2015-06-25	Column 1			0.1			6.2	21.5		
2015-07-06	Column 1		0.23	0.1	0.1	0.03	6.3	27.1	1.2	1.3
2015-08-13	Column 1		0.25	0.1	0.1	0.03	6.2	25.4	1.9	2.0
2015-08-26	Column 1		0.52	0.6		0.03	6.2	24.9	1.5	
2015-09-15	Column 1			0.4	0.1	0.03	6.0	19.8	2	2.1
2015-11-04	Column 1			1.4	0.1	0.03	5.8	14.3	1.6	1.7
2015-12-30	Column 1			0.3			6.4	5.3		
2016-01-05	Column 1	160	0.03	0.3	0.1	0.03	6.6	5.9	0.72	0.8
2016-01-21	Column 1		0.11	0.4	0.1	0.03	6.4	2.9	1.1	1.2
2016-02-10	Column 1			0.1			6.4	7.3		
2016-03-18	Column 1	200	0.06	0.3	0.1	0.03	6.0	8.2	0.61	0.7
2016-05-04	Column 1			0.3			5.9	9.9		
2016-05-12	Column 1			0.2	0.1	0.03	6.0	16.6	2	2.1
2016-05-19	Column 1		0.07	0.5	1.3	0.03	6.1	15.0	0.54	1.9
2016-05-26	Column 1		0.11	0.4	0.1	0.03	6.1	23.7	1.1	1.2
2016-06-02	Column 1		0.2	0.2	0.1	0.03	5.5	18.0	1.5	1.6
2016-06-20	Column 1		0.13	0.4	0.1	0.03	5.8	21.0	1.1	1.2
2016-07-14	Column 1			0.1			5.9	25.4		
2016-08-18	Column 1		0.51	0.0	8.4	0.03	6.9	29.3	2	10.4
2016-09-21	Column 1			0.1	0.5	0.03	7.0	23.1		
2016-11-17	Column 1		0.66	0.2	0.1	0.03	6.4	10.1	3.9	4.0
2017-02-14	Column 1		0.29		0.1	0.03			6.6	6.7
2017-03-15	Column 1		0.1		0.1	0.03			2.2	2.2
2017-06-20	Column 1		0.17		0.1	0.03			0.69	0.8
2017-06-22	Column 1		0.17	0.2	0.1	0.03	6.3	23.2	0.69	0.8
2017-07-28	Column 1		0.05		0.1	0.03			0.67	0.7
2017-08-29	Column 1	190	0.1	0.4	0.1	0.03	6.0	18.9	1	1.1
2017-09-13	Column 1	170	0.05	0.1	0.1	0.03	6.4	27.3	0.83	0.9
2017-10-25	Column 1		0.05	0.6	0.1	0.03	6.6	18.3	0.34	0.4
2017-12-21	Column 1	140	0.05	0.3	0.7	0.10	7.0	11.4	1.8	2.6
2017-12-28	Column 1	180	0.15	0.1	0.0	0.01	6.5	3.4	1	1.0
2018-05-04	Column 1	150	0.05	0.4	0.1	0.03	6.6	15.6	0.53	0.6
2018-09-06	Column 1		0.13	0.2	0.1	0.03	6.2	25.2	1.3	1.4
2018-12-12	Column 1		0.13	2.2	0.1	0.03	6.4	12.1	1.8	1.9
2019-08-01	Column 1			0.1	1.5	0.03	6.2	26.3	3.4	
2019-08-06	Column 1			0.2			6.0	23.2		
2019-08-22	Column 1		0.21	0.2	2.1	0.20	6.1	23.4	1.9	4.2
2014-07-09	Column 2				0.1	0.02				
2014-07-10	Column 2			0.2	0.1	0.02	6.4	25.3	8.8	8.9
2014-07-11	Column 2			0.2	0.1	0.02	6.3	22.2		0.1
2014-07-14	Column 2	260		0.5	0.1	0.02	6.3	25.3	7.8	7.9
2014-07-15	Column 2			0.2			6.1	23.7		
2014-07-16	Column 2			0.4			6.2	23.4		
2014-07-17	Column 2			0.5			6.2	21.0		

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2014-07-18	Column 2			0.5			6.0	21.1		
2014-07-21	Column 2	400	0.25	0.7	0.1	0.02	6.1	22.3	6.3	6.4
2014-07-22	Column 2			0.8			6.0	24.9		
2014-07-23	Column 2			1.0			5.9	27.8		
2014-07-24	Column 2			1.5			5.8	25.4		
2014-07-25	Column 2			2.8			5.9	20.5		
2014-07-28	Column 2			2.5			5.8	23.6		
2014-07-29	Column 2			1.2	0.1	0.02	5.8	24.5	4	4.1
2014-07-30	Column 2			1.1			6.0	27.1		
2014-08-04	Column 2			1.3	0.1	0.02	5.9	24.8	3.3	3.4
2014-08-05	Column 2			0.5			5.9	28.5		
2014-08-06	Column 2			0.4			6.0	26.8		
2014-08-07	Column 2			0.4			6.1	24.3		
2014-08-11	Column 2			1.8	0.1	0.02	6.0	25.1	2.9	3.0
2014-08-13	Column 2			1.4			6.0	21.6		
2014-08-14	Column 2			0.8			6.0	20.7		
2014-08-15	Column 2			1.5			6.1	23.9		
2014-08-19	Column 2	330	0.25	3.0	0.1	1.10	6.8	19.2	4.9	6.1
2014-08-20	Column 2			1.9			6.5	21.6		
2014-08-21	Column 2			1.6			6.3	23.9		
2014-08-22	Column 2			0.7	0.1	0.55	6.3	20.6		0.6
2014-08-26	Column 2			0.4			6.3	25.7		
2014-08-27	Column 2			0.4	0.1	0.92	6.3	28.6		1.0
2014-08-28	Column 2			0.3			6.3	29.7		
2014-08-29	Column 2			0.5			6.3	23.8		
2014-09-03	Column 2	380		0.2	0.1	0.74	6.3	26.8		
2014-09-04	Column 2	380	0.49	0.3	0.1	0.74	6.3	25.2	5.3	6.1
2014-09-05	Column 2			0.3			6.3	26.5		
2014-09-08	Column 2	280	0.25	0.3	0.1	0.31	6.4	25.9	2.4	2.8
2014-10-02	Column 2			0.2			7.1	17.5		
2014-10-03	Column 2			0.3			6.9	15.4		
2014-10-06	Column 2			0.4			7.0	17.9		
2014-10-07	Column 2	240	0.25	0.2	0.1	0.03	6.8	19.4	3.2	3.3
2014-10-08	Column 2			0.2			6.6	22.6		
2014-10-09	Column 2			0.1			6.5	19.6		
2014-10-10	Column 2			0.1			6.3	15.1		
2014-10-14	Column 2			0.1			6.2	15.3		
2014-10-16	Column 2			0.2			6.3	22.9		
2014-10-17	Column 2			0.1			6.2	20.4		
2014-10-20	Column 2			0.2			6.5	17.8		
2014-10-21	Column 2			0.2			6.3	15.2		
2014-10-22	Column 2			0.2			6.1	14.9		
2014-10-23	Column 2			0.3			6.1	15.1		
2014-10-24	Column 2	380	0.25	0.1	0.1	0.03	6.1	14.4	2.8	2.9
2014-10-28	Column 2			0.2			6.2	18.0		
2014-10-29	Column 2	370	0.43	0.2	0.1	0.03	6.3	21.9	2.4	2.5
2014-10-30	Column 2			0.3			6.2	15.9		
2014-11-03	Column 2			0.3			6.1	9.2		
2014-11-05	Column 2			0.3			6.1	12.6		
2014-11-07	Column 2			1.5			5.9	10.9		
2014-11-10	Column 2			0.4			6.2	12.0		
2014-11-12	Column 2	240	0.25	0.3	0.6	0.03	6.2	13.3	2	2.6
2014-11-14	Column 2			0.3			6.1	8.8		
2014-11-17	Column 2			0.2			6.3	18.4		

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2014-11-19	Column 2			0.1			6.2	16.4		
2014-11-21	Column 2			0.8			6.3	14.2		
2014-11-24	Column 2			0.3			6.3	24.9		
2014-12-01	Column 2	300	0.25	0.4	0.1	0.03	6.2	15.1	2.5	2.6
2014-12-03	Column 2	320	0.21	0.2	0.1	0.03	6.2	14.0	1.6	1.7
2014-12-05	Column 2			0.2			6.2	19.3		
2014-12-08	Column 2	280	0.25	0.5	0.1	0.03	6.3	16.3	1.8	1.9
2014-12-10	Column 2			0.6			6.2	13.7		
2014-12-15	Column 2			0.4			6.0	7.5		
2014-12-17	Column 2			0.5			6.1	12.9		
2014-12-19	Column 2			0.4			6.0	7.7		
2014-12-22	Column 2	260	0.25	0.1	0.1	0.03	6.2	19.7	1.4	1.5
2014-12-29	Column 2	260	0.25	0.3	0.3	0.03	6.1	9.3	1.3	1.6
2014-12-31	Column 2			0.5			6.1	9.0		
2015-01-02	Column 2			0.2			6.2	17.6		
2015-01-05	Column 2			0.2			6.2	12.9		
2015-01-07	Column 2			0.4			6.2	11.6		
2015-01-09	Column 2	280	0.25		0.1	0.03			1.3	1.4
2015-01-12	Column 2			0.1			6.2	17.1		
2015-01-14	Column 2			0.3			6.2	16.6		
2015-01-16	Column 2	270	0.25		0.1	0.03			1.5	1.6
2015-01-21	Column 2	280	0.17	0.2	0.1	0.03	6.2	14.7	1.2	1.3
2015-01-26	Column 2			0.2			6.2	16.3		
2015-01-29	Column 2	300	0.25	0.5	0.1	0.03	6.3	19.5	1.5	1.6
2015-02-02	Column 2			0.3			6.2	15.8		
2015-02-04	Column 2		0.09	0.9	0.0	0.02	6.3	17.1	1.1	1.1
2015-02-06	Column 2			0.3			6.2	11.8		
2015-02-09	Column 2			0.2			6.1	15.8		
2015-02-11	Column 2	270	0.1	0.2	0.0	0.01	6.1	17.1	0.94	1.0
2015-02-13	Column 2			0.2			6.2	14.3		
2015-02-17	Column 2	280	0.11	0.4	0.0	0.01	6.0	10.3	0.87	0.9
2015-02-20	Column 2			0.3			6.0	10.4		
2015-02-23	Column 2			0.5			6.1	16.4		
2015-02-25	Column 2		0.05	0.4	0.2	0.00	6.1	14.2	0.88	1.1
2015-03-02	Column 2			0.3			6.4	16.1		
2015-03-04	Column 2		0.06	1.2	0.1	0.06	6.5	17.4	0.78	0.9
2015-03-06	Column 2			0.9			6.0	6.5		
2015-03-09	Column 2			0.8			6.6	12.6		
2015-03-12	Column 2		0.25	0.6	0.1	0.06	6.4	18.0	1	1.1
2015-03-15	Column 2			0.5			6.1	8.3		
2015-03-18	Column 2			0.6			6.5	14.8		
2015-03-20	Column 2			0.3			6.4	14.6		
2015-03-27	Column 2		0.25	0.4	0.1	0.08	6.3	12.9	1	1.1
2015-03-30	Column 2		0.1	0.3	0.1	0.09	6.3	10.0	0.8	0.9
2015-04-02	Column 2			0.5			6.3	9.9		
2015-04-06	Column 2			0.3			6.2	8.7		
2015-04-08	Column 2			0.3			6.2	7.5		
2015-04-13	Column 2			0.2			6.3	11.6		
2015-04-23	Column 2	230	0.25	0.2	0.1	0.03	6.3	11.1	1.7	1.8
2015-04-30	Column 2		0.25	0.3	0.1	0.03	6.3	9.7	0.8	0.9
2015-05-06	Column 2		0.12	0.1	0.1	0.03	6.4	15.2	0.79	0.9
2015-05-14	Column 2		0.25	0.5	0.1	0.03	6.3	15.7	1.1	1.2
2015-05-21	Column 2		0.25	0.5	0.1	0.03	6.4	16.1	0.8	0.9
2015-05-28	Column 2		0.25	0.0	0.1	0.03	6.3	19.0	1.3	1.4

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2015-06-04	Column 2		0.25	0.1	0.1	0.03	6.3	14.1	1.3	1.4
2015-06-11	Column 2		0.25	0.3	0.1	0.07	6.3	21.0	1	1.1
2015-06-17	Column 2		0.15	0.1	0.1	0.11	6.3	19.2	1.1	1.3
2015-06-25	Column 2			0.1			6.2	21.7		
2015-07-06	Column 2		0.2	0.1	0.1	0.03	6.3	26.4	1.1	1.2
2015-08-13	Column 2		0.25	0.1	0.1	0.03	6.2	24.2	2.1	2.2
2015-08-26	Column 2		0.31	0.4	0.1	0.03	6.2	24.7	1.3	1.4
2015-09-15	Column 2			0.3	0.1	0.03	6.0	19.9	1.7	1.8
2015-11-04	Column 2			0.3	0.1	0.03	6.2	15.2	1.6	1.7
2015-12-30	Column 2			0.6			6.5	5.7		
2016-01-05	Column 2	210	0.03	0.3	0.1	0.03	6.7	5.8	0.62	0.7
2016-01-21	Column 2		0.06	0.4	0.1	0.03	6.4	1.6	0.8	0.9
2016-02-10	Column 2			0.1			6.4	7.2		
2016-03-18	Column 2	190	0.03	0.3	0.1	0.03	6.0	8.0	0.53	0.6
2016-05-04	Column 2			0.3			5.4	10.3		
2016-05-12	Column 2			0.2	0.1	0.03	6.0	15.0	1.1	1.2
2016-05-19	Column 2		0.14	0.6	0.1	0.03	6.2	14.3	0.98	1.1
2016-05-26	Column 2		0.24	0.6	0.1	0.03	6.0	19.8	0.9	1.0
2016-06-02	Column 2	310	0.11	0.1	0.1	0.03	5.7	17.9	1	1.1
2016-06-20	Column 2		0.19	0.5	0.1	0.03	5.9	20.9	0.8	0.9
2016-07-14	Column 2			0.0			5.8	25.0		
2016-08-18	Column 2		0.58	0.0	0.1	0.03	6.9	26.3	2.1	2.2
2016-09-21	Column 2			0.1	0.5	0.03	6.5	23.0		
2016-11-17	Column 2		0.51		0.1	0.03			1.7	1.8
2017-02-14	Column 2		0.34		0.1	0.03			13	13.1
2017-03-15	Column 2		0.08		0.1	0.03			0.25	0.3
2017-06-20	Column 2		0.14		0.1	0.03			0.66	0.7
2017-06-22	Column 2		0.14	0.3	0.1	0.03	6.3	22.3	0.66	0.7
2017-07-28	Column 2		0.1		0.1	0.03			0.05	0.1
2017-08-29	Column 2	200	0.05	0.2	0.1	0.03	5.9	18.6	0.6	0.7
2017-09-13	Column 2		0.05	0.1	0.1	0.03	6.3	23.0	0.64	0.7
2017-10-25	Column 2		0.05	0.2	0.4	0.03	6.5	18.3	0.51	0.9
2017-12-21	Column 2	140	0.05	0.1	0.1	0.03	7.0	13.3	0.82	0.9
2017-12-28	Column 2	190	0.05	0.1	0.0	0.01	6.9	4.4	0.96	1.0
2018-05-04	Column 2	140	0.05	0.2	0.1	0.03	6.5	15.7	0.67	0.7
2018-09-06	Column 2		0.13	0.1	0.1	0.03	6.1	21.6	2	2.1
2018-12-12	Column 2		0.13	1.7	0.1	0.03	6.5	11.9	1.6	1.7
2019-08-01	Column 2			0.1	2.3	0.03	6.0	26.1	3.5	5.8
2019-08-06	Column 2			0.1			6.0	23.1		
2019-08-22	Column 2		0.13	0.1	2.6	0.06	6.2	23.4	1.5	4.2
2014-07-09	Column 3				0.1	0.02				
2014-07-10	Column 3			0.7	0.1	0.02	6.4	25.3	7.1	7.2
2014-07-11	Column 3			0.1	0.1	0.02	6.3	22.1		0.1
2014-07-14	Column 3	240		0.8	0.1	0.02	6.3	25.3	14	14.1
2014-07-15	Column 3			0.2			6.1	23.7		
2014-07-16	Column 3			0.4			6.1	23.4		
2014-07-17	Column 3			0.5			6.1	21.0		
2014-07-18	Column 3			0.2			6.0	20.9		
2014-07-21	Column 3	380		1.5	0.1	0.02	6.0	22.2	5.9	6.0
2014-07-22	Column 3			0.7			6.0	24.6		
2014-07-23	Column 3			0.7			5.9	27.2		
2014-07-24	Column 3			1.8			5.8	25.1		
2014-07-25	Column 3			2.7			5.9	20.4		
2014-07-28	Column 3			2.3			5.8	23.5		

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2014-07-29	Column 3			1.3	0.1	0.02	5.9	24.1	3.3	3.4
2014-07-30	Column 3			1.0			6.0	26.8		
2014-08-04	Column 3			1.3	0.1	0.02	5.9	24.3	3.2	3.3
2014-08-05	Column 3			0.6			6.1	28.0		
2014-08-06	Column 3			0.4			6.1	26.7		
2014-08-07	Column 3			0.4			6.2	24.0		
2014-08-11	Column 3			1.6	0.1	0.02	6.1	24.8	2.8	2.9
2014-08-13	Column 3			1.5			6.1	21.6		
2014-08-14	Column 3			1.1			6.0	20.6		
2014-08-15	Column 3			2.2			6.2	23.8		
2014-08-19	Column 3	360	0.25	2.7	0.1	1.00	6.9	19.5	2.8	3.9
2014-08-20	Column 3			1.1			6.5	21.2		
2014-08-21	Column 3			1.8			6.4	23.7		
2014-08-22	Column 3			0.7	0.1	0.53	6.3	20.4		
2014-08-26	Column 3			0.5			6.3	24.7		
2014-08-27	Column 3			0.4	0.1	0.68	6.4	28.2		
2014-08-28	Column 3			0.3			6.4	29.5		
2014-08-29	Column 3			0.6			6.3	22.4		
2014-09-03	Column 3	370		0.2	0.1	0.42	6.4	26.0		
2014-09-04	Column 3	370	0.28	0.4	0.1	0.42	6.3	24.2	2.1	2.6
2014-09-05	Column 3			0.4			6.3	25.1		
2014-09-08	Column 3	370	0.25	0.3	0.1	0.07	6.3	26.4	2	2.1
2014-10-02	Column 3			0.1			7.1	17.2		
2014-10-03	Column 3			0.3			7.0	15.3		
2014-10-06	Column 3			0.3			7.0	16.8		
2014-10-07	Column 3	240	0.25	0.3	0.1	0.03	6.8	18.7	2.6	2.7
2014-10-08	Column 3			0.2			6.7	20.8		
2014-10-09	Column 3			0.2			6.6	17.7		
2014-10-10	Column 3			0.2			6.6	18.6		
2014-10-14	Column 3			0.1			6.3	15.9		
2014-10-16	Column 3	330	0.25	0.2	0.1	0.03	6.3	22.1	4	4.1
2014-10-17	Column 3			0.1			6.2	19.9		
2014-10-20	Column 3			0.2			6.4	14.3		
2014-10-21	Column 3			0.2			6.2	15.0		
2014-10-22	Column 3			0.2			6.1	14.8		
2014-10-23	Column 3			0.3			6.1	15.2		
2014-10-24	Column 3	340	0.25	0.3	0.1	0.03	6.1	14.2	2.6	2.7
2014-10-28	Column 3			0.2			6.1	16.4		
2014-10-29	Column 3	310	0.25	0.3	0.1	0.49	6.2	21.1	2.2	2.7
2014-10-30	Column 3			0.2			6.2	14.9		
2014-11-03	Column 3			0.4			6.1	9.3		
2014-11-05	Column 3			0.3			6.2	13.0		
2014-11-07	Column 3			0.9			5.9	10.9		
2014-11-10	Column 3			0.5			6.1	12.6		
2014-11-12	Column 3	260	0.25	0.2	0.1	0.03	6.1	13.5	1.8	1.9
2014-11-14	Column 3			0.4			6.0	8.2		
2014-11-17	Column 3			0.2			6.3	19.4		
2014-11-19	Column 3			0.1			6.2	15.8		
2014-11-21	Column 3			1.4			6.3	13.7		
2014-11-24	Column 3			0.1			6.3	23.5		
2014-12-01	Column 3	300	0.25	0.4	0.1	0.03	6.2	14.5	1.8	1.9
2014-12-03	Column 3	300	0.16	0.1	0.1	0.03	6.2	13.7	1.6	1.7
2014-12-05	Column 3			0.2			6.2	17.8		
2014-12-08	Column 3	270	0.26	0.5	0.1	0.03	6.2	14.9	1.8	1.9

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2014-12-10	Column 3			0.6			6.2	12.6		
2014-12-15	Column 3			0.5			6.0	7.3		
2014-12-17	Column 3			0.4			6.1	12.2		
2014-12-19	Column 3			0.4			6.0	7.3		
2014-12-22	Column 3	240	0.25	0.1	0.2	0.03	6.2	17.4	1.5	1.7
2014-12-29	Column 3	240	0.25	0.3	0.2	0.03	6.1	8.7	1.3	1.5
2014-12-31	Column 3			0.4			6.2	9.0		
2015-01-02	Column 3			0.2			6.3	18.2		
2015-01-05	Column 3			0.2			6.3	11.8		
2015-01-07	Column 3			0.3			6.2	11.6		
2015-01-09	Column 3	240	0.25		0.1	0.03			1	1.1
2015-01-12	Column 3			0.2			6.2	14.8		
2015-01-14	Column 3			0.4			6.2	15.0		
2015-01-16	Column 3	250	0.25		0.1	0.03			1.3	1.4
2015-01-21	Column 3	250	0.24	0.4	0.3	0.03	6.2	13.0	1.4	1.8
2015-01-26	Column 3			0.3			6.2	14.5		
2015-01-29	Column 3	250	0.25	0.5	0.1	0.03	6.3	16.9	1.6	1.7
2015-02-02	Column 3			0.3			6.2	13.8		
2015-02-04	Column 3		0.18	0.6	0.1	0.01	6.3	14.0	0.96	1.0
2015-02-06	Column 3			0.3			6.2	10.2		
2015-02-09	Column 3			0.2			6.1	14.6		
2015-02-11	Column 3	280	0.15	0.2	0.0	0.01	6.2	15.9	0.79	0.8
2015-02-13	Column 3			0.2			6.3	13.1		
2015-02-17	Column 3	260	0.15	0.3	0.0	0.01	6.0	9.1	0.72	0.8
2015-02-20	Column 3			0.3			6.1	9.2		
2015-02-23	Column 3			0.5			6.1	15.7		
2015-02-25	Column 3		0.08	0.3	0.2	0.00	6.2	13.2	0.75	0.9
2015-03-02	Column 3			0.2			6.4	14.5		
2015-03-04	Column 3		0.23	1.2	0.1	0.03	6.4	16.1	0.86	0.9
2015-03-06	Column 3			0.9			5.9	6.5		
2015-03-09	Column 3			0.8			6.7	11.1		
2015-03-12	Column 3		0.25	0.6	0.1	0.07	6.4	14.8	0.9	1.0
2015-03-15	Column 3			0.5			6.0	7.1		
2015-03-18	Column 3			0.6			6.5	14.7		
2015-03-20	Column 3			0.3			6.4	14.6		
2015-03-27	Column 3		0.25	0.3	0.1	0.07	6.4	11.8	0.9	1.0
2015-03-30	Column 3		0.16	0.2	0.1	0.03	6.4	10.2	0.8	0.9
2015-04-02	Column 3			0.5			6.3	10.9		
2015-04-06	Column 3			0.3			6.2	8.5		
2015-04-08	Column 3			0.3			6.3	7.4		
2015-04-13	Column 3			0.2			6.3	11.4		
2015-04-23	Column 3	240	0.25	0.2	0.2	0.03	6.6	11.1	1.1	1.3
2015-04-30	Column 3		0.25	0.3	0.1	0.03	6.4	10.0	0.9	1.0
2015-05-06	Column 3		0.12	0.1	0.1	0.03	6.5	15.1	0.95	1.0
2015-05-14	Column 3		0.25	0.3	0.1	0.03	6.4	15.5	0.7	0.8
2015-05-21	Column 3		0.25	0.5	0.1	0.03	6.5	15.9	1.4	1.5
2015-05-28	Column 3		0.25	0.1	0.1	0.03	6.4	18.9	1.3	1.4
2015-06-04	Column 3		0.25	0.1	0.1	0.03	6.3	14.4	1	1.1
2015-06-11	Column 3		0.25	0.3	0.1	0.08	6.4	20.8	1.1	1.2
2015-06-17	Column 3		0.2	0.1	0.1	0.03	6.4	18.9	1.1	1.2
2015-06-25	Column 3			0.1			6.2	21.5		
2015-07-06	Column 3		0.2	0.1	0.1	0.03	6.3	25.7	1.1	1.2
2015-08-13	Column 3		0.25	0.1	0.1	0.03	6.3	23.4	1.4	1.5
2015-08-26	Column 3		0.19	0.1	0.1	0.03	6.2	24.2	1.1	1.2

Saturated soil columns

Sample Date	Sample Location	Alkalinity	NH4	DO	NO3	NO2	pH	Temp	TKN	TN
2015-09-15	Column 3			0.3	0.1	0.03	6.1	19.8	1.9	2.0
2015-11-04	Column 3			0.2	0.1	0.03	6.4	14.1	1.4	1.5
2015-12-30	Column 3			0.3			6.7	6.1		
2016-01-05	Column 3	220	0.03	0.2	0.1	0.03	6.6	4.9	0.75	0.8
2016-01-21	Column 3		0.03	0.4	0.1	0.03	6.4	1.2	0.89	1.0
2016-02-10	Column 3			0.2			6.4	6.0		
2016-03-18	Column 3	200	0.03	0.3	0.1	0.03	6.1	7.8	0.25	0.3
2016-05-04	Column 3			0.2			5.9	9.8		
2016-05-12	Column 3			0.3	0.1	0.03	6.0	15.0	1.3	1.4
2016-05-19	Column 3		0.16	1.8	0.1	0.03	6.3	13.9	1	1.1
2016-05-26	Column 3		0.16	0.3	0.1	0.03	6.0	21.3	0.94	1.0
2016-06-02	Column 3	310	0.15	0.1	0.1	0.03	5.7	16.6	1.4	1.5
2016-06-20	Column 3		0.1	0.3	0.1	0.03	5.9	20.4	0.79	0.9
2016-07-14	Column 3			0.1			5.8	24.5		
2016-08-18	Column 3		0.58	0.2	0.1	0.03	6.3	26.3	1.9	2.0
2016-09-21	Column 3			0.3	0.5	0.03	6.4	22.6		
2016-11-17	Column 3		0.23		0.1	0.03			4.3	4.4
2017-02-14	Column 3		0.1		0.1	0.03			1.2	1.3
2017-03-15	Column 3		0.12		0.1	0.03			8.4	8.5
2017-06-20	Column 3		0.21		0.1	0.03			0.82	0.9
2017-06-22	Column 3		0.21	0.3	0.1	0.03	6.3	21.6	0.82	0.9
2017-07-28	Column 3		0.05		0.1	0.03			0.05	0.1
2017-08-29	Column 3	190	0.05	0.2	0.1	0.03	5.9	18.2	0.68	0.8
2017-09-13	Column 3		0.05	0.2	0.1	0.03	6.3	21.3	0.65	0.7
2017-10-25	Column 3		0.06	0.3	0.1	0.03	6.6	18.5	0.65	0.7
2017-12-21	Column 3	150	0.31	0.1	0.1	0.03	7.0	12.3	1.4	1.5
2017-12-28	Column 3	170	0.14	0.0	0.0	0.01	6.9	5.1	0.89	0.9
2018-05-04	Column 3	140	0.05	0.1	0.1	0.03	6.5	16.0	0.69	0.8
2018-09-06	Column 3		0.13	0.1	0.1	0.03	6.1	24.3	0.83	0.9
2018-12-12	Column 3		0.13	4.0	0.1	0.03	6.5	11.9	1.6	1.7
2019-08-01	Column 3			0.1	2.7	0.03	6.1	24.9	3.6	6.3
2019-08-06	Column 3			0.1			6.0	23.0		
2019-08-22	Column 3		0.13	0.1	3.0	0.10	6.2	23.7	1.6	4.7