

# **BMP #1-1**

## **Education Materials**



...you regard the street as your personal ashtray...

Don't litter. Your junk eventually ends up in our streams and waterways.



...you're not picking up after Princess...

Pets come with responsibility. Uncollected animal waste contributes dangerous bacteria that pollute stormwater runoff.



...you're overusing fertilizer and pesticides...

Do not apply pesticides or fertilizers before or during heavy rain due to the likelihood of runoff. Use natural alternatives when possible.



...you use industrial strength solvents to clean your car...

There are now effective, phosphate free, non-petroleum based cleaning agents available that are much friendlier to the environment.



...you're using the storm drain system as a disposal...

Water that is collected and conveyed by the Hudson storm drain system via catchbasins and ditches is not treated to remove pollutants. **ANYTHING THAT ENTERS THE SYSTEM EVENTUALLY REACHES OUR WATERWAYS.**



...you don't properly maintain your septic system...

Malfunctioning or overflowing septic systems release harmful bacteria and nutrients into the water cycle.

# What's FLUSHABLE?



A toddler will tell you that *everything* is flushable... but what you *think* is flushable could be costing you money!

Product labels can be misleading. Some items that claim to be "flushable" can clog sewer and septic systems and can end up costing you a pretty penny.

**"Flushable" does NOT mean it is SAFE for your septic system or sewer.**

"Disposable" items ARE NOT flushable and should be placed in the trash.

The bottom *line*:  
**ONLY**

Human waste and toilet paper  
**ARE FLUSHABLE**

# The DO NOT FLUSH List:



Diapers  
Cigarettes  
Paper Towels  
Cotton Swabs  
Feminine Hygiene Products

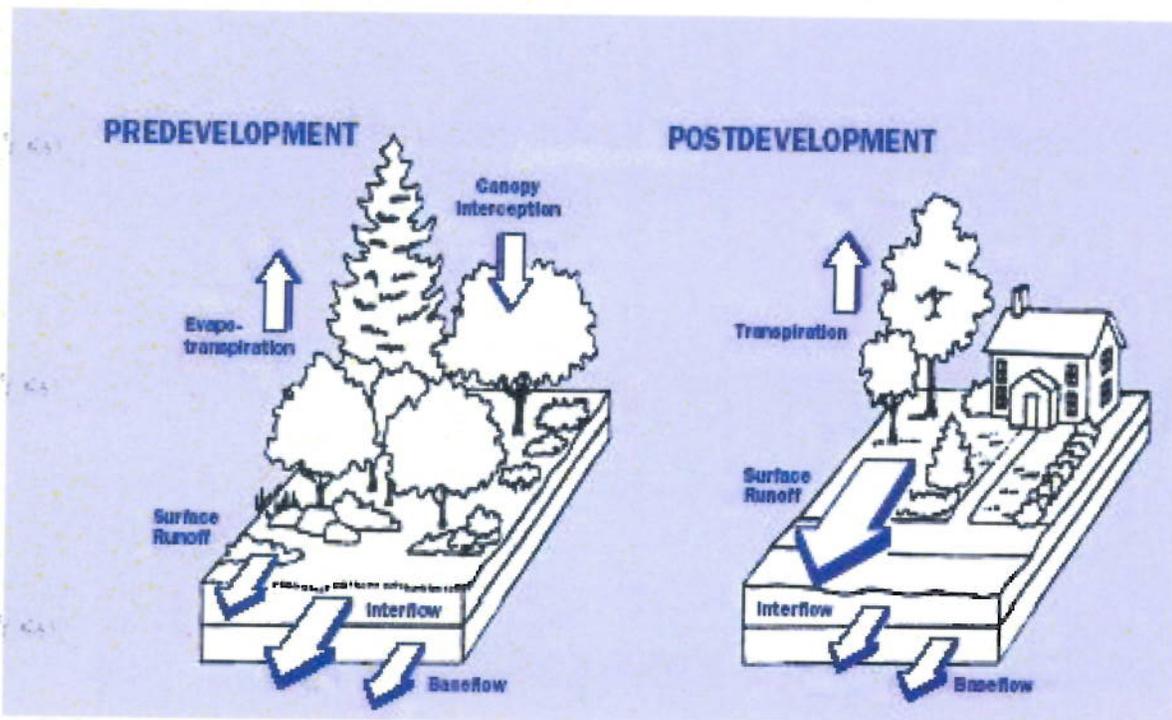
Toys  
Dental Floss  
Facial Tissues  
Wipes

## **BMP #1-2**

# **Stormwater Information from the Town Web Site**

## TOWN OF HUDSON, NEW HAMPSHIRE STORMWATER MANAGEMENT COMMITTEE

Hudson, like other southern New Hampshire towns, is experiencing rapid population growth. Urbanization occurs when native vegetation is replaced by impermeable surfaces such as building structures, roads, driveways and parking lots.



(NHDES, 1-04)

Rainfall runs off of these impermeable surfaces and carries pollutants into surface waters. Storm-water runoff accounts for 40% of the pollutants in New Hampshire's rivers and streams.

As part of the Town of Hudson's compliance with the Federal Environmental Protection Agency's mandate, Hudson has formed a Storm-Water Committee comprised of professional town staff. This committee will address issues related to storm-water pollution in surface waters and help to educate the public with increasing the importance of clean water.

Residents can help reduce pollution caused by storm-water runoff by doing the following:

- ✓ Use fertilizers sparingly



- ✓ Never dump anything down storm drains other than clean water or storm-water



- ✓ Compost your yard waste away from wetlands
- ✓ Avoid pesticides: learn about Integrated Pest Management (IPM)
- ✓ Direct gutter downspouts away from paved surfaces
- ✓ Take your car to a car wash instead of washing it in the driveway
- ✓ If you must wash your car in your driveway use environmentally friendly bio-degradable detergents



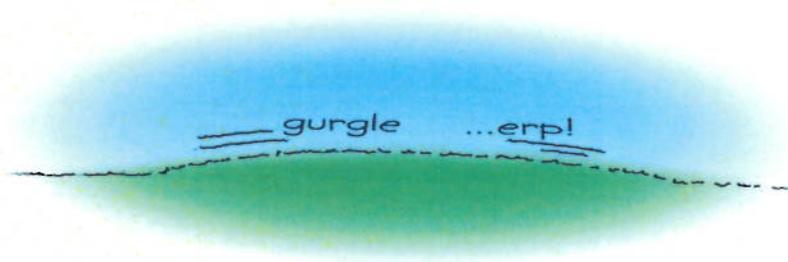
- ✓ Check your car for leaks, and recycle motor oil



- ✓ Pick up after your pet – Waste can be buried or flushed down the toilet



- ✓ Have your septic tank pumped and system inspected regularly.



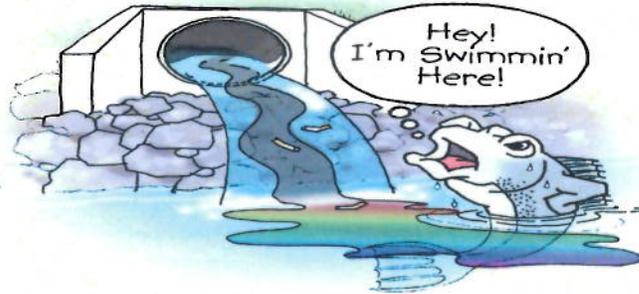
- ✓ Become familiar with [Hudson Town ordinances](#) regarding wetland and surface water protection.

## WETLAND CONSERVATION DISTRICT

A clean and abundant water supply is a resource that can no longer be taken for granted. Residents working in cooperation with the local government can help insure that Hudson will have an adequate supply of clean water now and in the future.

The Town of Hudson New Hampshire is designated by the U.S. Environmental Protection Agency (EPA) as the owner and operator of a regulated municipal separate storm sewer system (MS4) and as such needs to address specific requirements in the designated permit coverage areas.

The Storm-Water Management Committee is committed to the objectives outlined to implement Best Management Practices (BMP's) not only in the permit coverage area but also for the entire town in an effort to protect significant water resources. This committee will be working toward educating the public soliciting public participation, exploring illicit discharge and elimination systems, seeking to control both construction and post-construction runoff, and to developing a plan for municipal storm-water controls in an effort to reduce the amount of pollutants originating in Hudson that contribute to the receiving waters of the United States. These include the Merrimack River, Beaver and Chase Brooks.



***The history of why this team was formed:***

Since the creation of the Clean Water Act in 1972, the National Pollutant Discharge Elimination Systems (NPDES) program has been a major force in the nation's efforts to protect and restore the quality of our rivers, lakes, ponds, and coastal waters. Thirty years ago only one-third of our waters were considered healthy. Today, approximately two-thirds are healthy. This progress has brought a wide-range of environmental, recreational and economic benefits to millions of Americans.

The NPDES program faces at least two significant challenges in the near future. First, we must safeguard our gains in water quality and strive to improve those waters still impaired by pollution. Second, we must improve water and sewer systems infrastructure. Increases in population and development will stress infrastructure threatening the progress the nation has made. These efforts will make future improvements to our water quality more desirable. Also, the NPDES program must extend its influence beyond the traditional boundaries of the program to promote comprehensive solutions to the diverse and complex problems that continue to threaten the quality of our nation's waters.

This storm-water management program is intended to improve the quality of waterways in the United States by reducing pollutants picked up and carried to storm sewer systems and surface waters during storm events. Common pollutants include oil and grease from roadways, pesticides from lawns, sediment from construction sites, and carelessly discarded trash, such as cigarette butts, paper wrappers and plastic bottles. These pollutants can impair waterways, contaminate drinking water supplies, and interfere with habitat for fish and other aquatic organisms and wildlife.

Look for additional information on the community cable channel, in your local newspapers, and in mailings from the Town of Hudson. Please help to keep our waters clean!

**BMP #1-3**  
**Town of Hudson**  
**Stormwater Information Web Page**



[Engineering/Land Use](#)

[FAQs](#)

[Forms](#)

[GIS for Public Use](#)

[Personnel](#)

[Stormwater](#)

### Hudson Town Calendar

#### Board of Selectmen

Tue, 02/13/2018 - 7:00pm

#### CANCELLED-Planning Board

Wed, 02/14/2018 - 7:00pm

#### Benson Park Cte.

Thu, 02/15/2018 - 7:00pm

[more](#)

### Public Notices

[Fine for Impeding Snow Removal](#)

[Hudson Landfill Hours](#)

[Online Bill Payment](#)

## Storm Water Committee

As part of the Town of Hudson's compliance with the Federal Environmental Protection Agency's mandate, Hudson has formed a Storm-Water Committee comprised of professional town staff. This committee will address issues related to storm-water pollution in surface waters and help to educate the public with increasing the importance of clean water. Please see [the attached document](#) for more information.

### Homeowner DO's & DONT'S

Read these [EPA Guidelines](#): because what you don't know can hurt the environment.

### Construction Activity Discharge

Do I need NPDES Permit Coverage for Discharges Related to my Construction Activity? Find the [answer here](#).

### Other Questions?

If you have specific questions about stormwater runoff and protecting water resources in Hudson, please contact the Engineering Department at 603-886-6008.

To report surface water contamination in Hudson, contact the Hudson Fire Department business line at 603-886-6021.

**BMP #1-4**  
**2017 Annual Town Report**  
**Stormwater**



# TOWN OF HUDSON

## Engineering Department



12 School Street • Hudson, New Hampshire 03051 • Tel: 603-886-6000 • Fax: 603-816-1291

### 2017 ANNUAL REPORT

The Engineering Department is pleased to say that the Town of Hudson had a very busy construction season in 2017. I have been with the Town of Hudson for over three years alongside Doreena Stickney, Administrative Aide, who also works full time.

The ongoing function of the Engineering Department is to manage three broad categories of activities. The first is to provide technical support to the Town's governing bodies. These bodies include the Board of Selectmen, Planning Board, Municipal Utility Committee, Conservation Commission, and the Zoning Board of Adjustment. The second is to provide review and inspection of development projects, and the third is to oversee and manage infrastructure related projects such as bridge, water, drainage and sewer.

The status of major projects and programs are as follows:

- **Industrial Discharge Agreement (IDA) Program:** Hudson conducts its own Industrial Pretreatment Monitoring Program, which is similar to and coordinated with the City of Nashua Industrial Pretreatment Program. CLD Consulting Engineers, Inc. (CLD) has been retained by the Town of Hudson to provide professional engineering services relative to the Industrial Pretreatment Program. CLD assists the Town in performing industrial site inspections, coordination of industrial sampling, compliance monitoring, issuance of permits, and communication with the State and Federal authorities.

There are currently 59 participants in the program. The owner or operator of any industrial or commercial establishment, public or privately owned, which discharges or intends to discharge wastewater within the Town of Hudson, must complete an application through the Engineering Department.

- **Water Supply Wells – Environmental Monitoring Program:** This monitoring program was established through a joint effort between the Town of Hudson and the New Hampshire Department of Environmental Services (NHDES), in order to maintain the long term functionality of the Hudson owned Dame/Ducharme wells (located in Litchfield) through the preservation of the Darrah Pond aquifer. This requires on-going measurement of groundwater elevations within existing monitoring wells drilled into the aquifer, as well as surface water elevation measurements at Darrah Pond. In December of 2015, the NHDES started a program to monitor the groundwater through electronic devices using three of our monitoring wells.
- **Water Utility Maintenance and Capital Improvements:** The aging infrastructure composing the Hudson Water Utility requires routine maintenance. As well, the system continues to expand as the demands of its users increases, requiring future capital improvements including, but not limited to, the Gordon water tank rehabilitation, which is scheduled for FY19 if the budget passes. In 2017, the Engineering Department managed the routine maintenance activities conducted by the system operator, Pennichuck Water Works

Inc. The Engineering Department manages the budget on behalf of the water utility, and updates the Municipal Utility Committee on a monthly basis. SCADA upgrades are ongoing throughout the system, enhancing the system's communication with Pennichuck Water Works Inc., who observes the systems performance continuously.

- Burns Hill Road Landfill and West Road Landfill: These are closed landfills that continue to be monitored in accordance with our Groundwater Management Permits through the NHDES. The Engineering Department contracts with EnviroTrac, Inc. for this monitoring and reporting for FY18.
- NPDES Stormwater Program (MS4): The Clean Water Act authorizes states, which are delegated the authority by the USEPA, to regulate point sources that discharge pollutants into waters of the United States through the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES Program regulates discharges from municipal separate storm sewer systems (MS4s), construction activities, and industrial activities. The Town of Hudson is a MS4, and is therefore regulated under a permit issued in 2003. Annual reporting of our activities to comply with the permit is conducted by the Engineering Department. Many of the activities reported are conducted by the Highway Department.

In 2013, the EPA released a draft 2013 New Hampshire Small MS4 Permit. The draft permit requirements far exceed the requirements set forth in the 2003 permit. These requirements have the potential to cost the tax payers of Hudson a lot of money. The EPA has received comments from the affected communities and is tasked with responding to the individual concerns, which primarily focus on cost and timing. It is unclear when the final draft permit will be released and become affective, but when it does, the Town will be required to comply, and will be subject to administrative fines for non-compliance. Currently, the changes by the federal government regarding the new regulations will not be implemented until July, 2018.

In 2017, the Highway Department continued their street sweeping efforts, catch basin maintenance, and trash and hazardous waste collection activities, all in compliance with the 2003 permit. The Town Civil Engineer conducted routine inspections of all active construction projects, ensuring appropriate erosion controls were in place and maintained. As well, the Engineering Department has attended countless meetings with surrounding municipal engineers and public works directors, ensuring we receive the most up to date information available relative to the release of the pending permit revision. The Town of Hudson strictly enforces storm water management requirements and strongly encourages compliance.

#### **Project Status Update for 2017**

- Kimball Hill Additional Lane: This project was completed in July of 2017 and it consisted of adding a second lane to Kimball Hill which currently has a dedicated left turn and a straight lane. See Appendix A.
- Windham Booster Station Phase 2: This project is scheduled for completion by the end of December 2017. This project included the removal of an old gas fire pump and replacing it with a new electrical pump. Also, new communication, a standby diesel generator and electrical upgrades we included in this project. The total project cost for this upgrade is \$237,000. See Appendix B.
- Weinstein Well Development and Permit obtained by NHDES: The Engineering Department managed the development and permitting of the new well. The new well has been tested and will be operational in late 2018.
- Standby Generator for Weinstein Well: We have installed a standby 150 kw generator to provide continuous water supply during power outages. Appendix D.

- Freedom Field 2 - Athletic Field: Freedom Field 2 was designed in house and the Engineering Department managed the project and construction of this field. The athletic field will be 235 ft. wide by 360 ft. long. It will also include a warm up field, approximately 70 ft. by 115 ft. The main field will be irrigated and it will accommodate 40 parking spaces. See Appendix E.
- Pelham Road and Lowell Road Traffic Light: The Engineering Department managed and provided quality control and quality assurance during the design and construction of this project. This project provides safer access to vehicles coming from Pelham Road to Lowell Road. In addition, we coordinated these lights with the Nottingham Plaza traffic light. This is scheduled for completion by early 2018 due to delays on mast arms production.
- Highway and Engineering now has live access to four of our most significant sewage pump stations which provides live alarms and flow data around the clock. See Appendix F
- Lowell Road widening from Wason Road to Sagamore Bridge: We have filed with the New Hampshire Department of Transportation to add another lane on Lowell Road, from Wason Road to the Sagamore Bridge. This will allow two dedicated lanes heading to the Sagamore Bridge and two lanes heading south to Massachusetts, reducing morning delays along Wason Road. See Appendix G.
- Lowell & Birch Road Utility Pole Removal: This project was in the Capital Improvements list identified by the Planning Board and it was a safety and access issue. The existing pole was removed at no expense to the Town. See Appendix H.
- Hudson Common Traffic Lights - Ferry Street/Derry Street/Library Street: We have incorporated an Adoptive Signal System to improve the traffic flow and have added state of the art cameras which provide better detection, operation, and allows the staff to get remote access to respond faster to malfunctions or emergency situations. See Appendix I.
- GIS Database infrastructure: The Engineering Department managed and oversees the GIS update for water, sewer, drainage, gas, fiber optics and fire alarms throughout the town which can be accessed through portable devices on any location in town, see Appendix J. A new GIS link is available for public use. Current, we are the only municipality in NH that has all this information available on GIS.
- The Engineering Department is currently managing approximately \$1,659,814 for the Town in performance surety bonds and Letters of Credit relating to residential and commercial developments.
- The Engineering Department has taken in, processed and inspected the following permits. See Appendix K:
  - 45 Driveway permits
  - 57 Water permits
  - 56 Sewer permits (commercial and residential)
  - 12 IDA (Industrial Discharge Agreement) Applications/Permit Modifications

The Engineering Department has two (2) full time employees. This summer, the Engineering Department hired one summer intern. He continued the work that was started in summers past and was able to update and complete Town wide sewer, water, and drainage system maps. These maps provide easy reference for us, the Highway Department, and any applicants for new development. The storm water mapping will prove invaluable upon release of the final

draft General Permit described in my text above. The Town of Hudson benefits greatly for a very low cost from our college interns. We have managed to create master plans for water, sewer, drainage, fiber optic, fire alarms and gas for the entire town and have shared information internally with the Fire and Highway Departments. Our team also continues to work closely with and provide support to the Planning, Zoning, Code Enforcement and Inspectional Services Departments, as well as the Conservation Commission.

The year 2017 was extremely busy, challenging and very exciting for the Engineering Department. The year 2018 should prove equally successful with the completion of the projects listed above. Currently, our focus has shifted toward other important improvement projects, including Bridge Street bridge repair, sewer, water utility improvements and traffic improvements throughout the town. I'm pleased to say that we are one of the few communities in NH that currently does not have a bridge on the red list. We thank the Board of Selectmen and the tax payers of Hudson for your continued support of this important office, as we work towards making Hudson number one in the state when it comes to infrastructure.

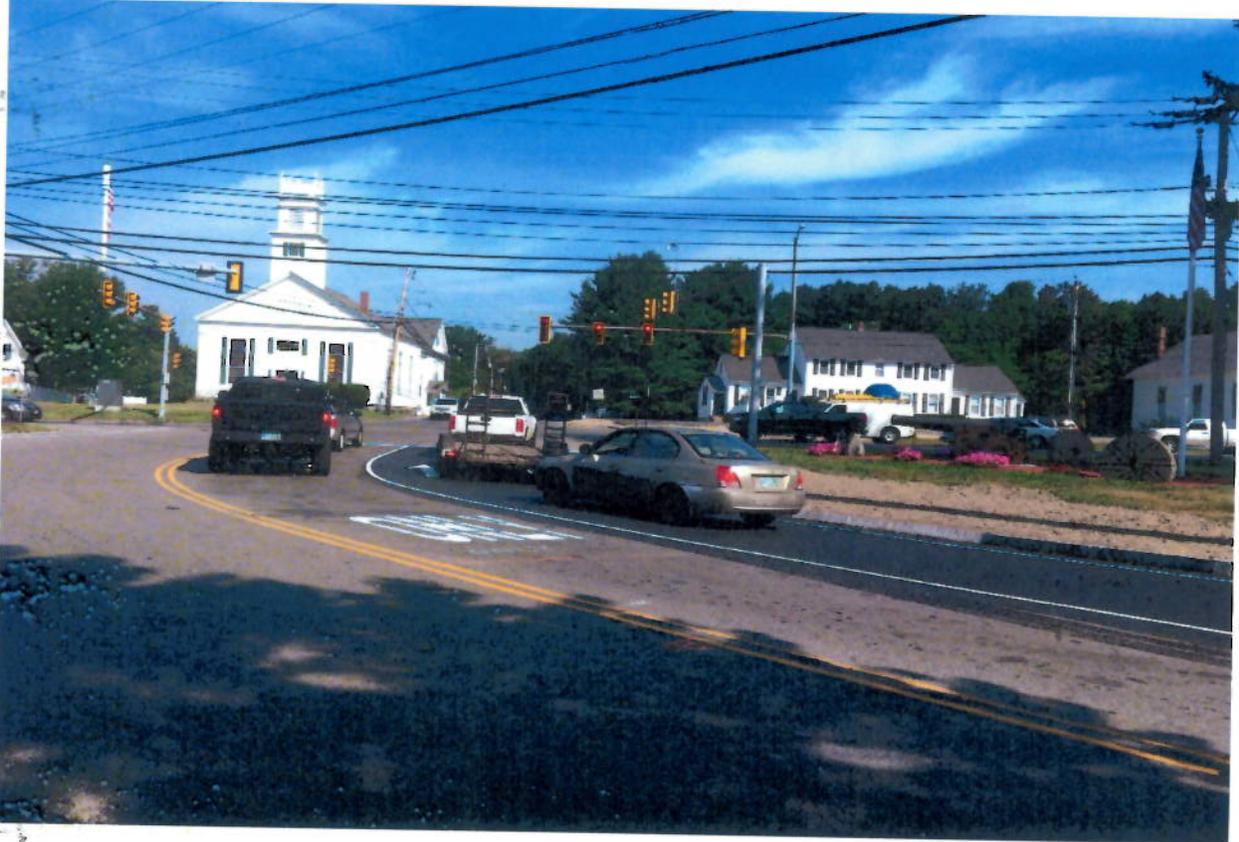
Respectfully submitted,

Elvis Dhima, P.E.

Appendix A  
Before



After



**Appendix B**  
**Before**



**After**



After



After



Before



After



After



After



Appendix D  
After



**Appendix E**  
**Before**



**After**



After



After



# Appendix F



Hudson/Bore, NH  
 Clear: 21.9°F  
 Barometer: 30.17 Hg  
 Thursday, December 21, 2017 8:56 AM  
 Wind: NW at 8 MPH  
 Hum: 65% (Dp: 12°F)  
 Rain Last Hr: None  
 Last 24 Hrs: None

## Hudson NH DPW

- Reports
  - Alert History
  - Management
  - Runtime Daily
  - Runtime Hourly
  - Runtime Variance
  - Checkin
  - Flow
  - Logins
  - Disabled Inputs
  - SD/CSO Events
  - SDWA CL Report
  - Unlabeled Events
- Current Station
  - Data
  - Quick Message
  - Setup
  - Download
  - System Revision Log
  - Logout



KEY	OK	OK
CityCorp	Alarm	
CH110	Offline	
MS00	Service	
OMH	Disabled	

Tech Support: (877)851-1311 FAX: (770)483-7913

Info: Weather

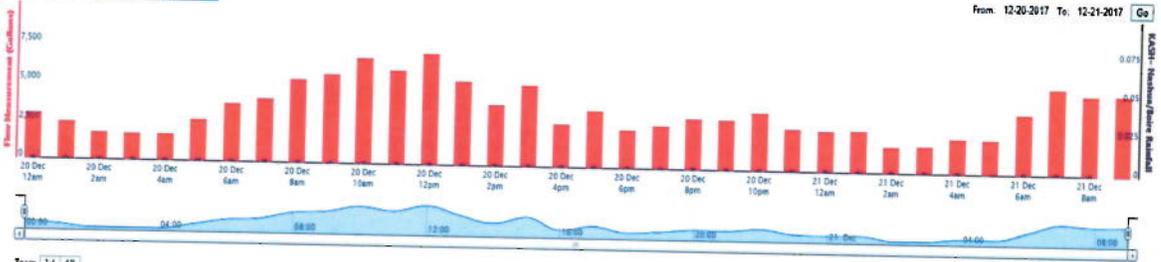
[View Old Graph](#)

### Flow Totals

Industrial Drive SPS

Choose Lift Station: Industrial Drive SPS

From: 12-20-2017 To: 12-21-2017 [Go](#)



Zoom: 1d All

- Flow Totals
- S P S Flow
- Rainfall
- KASH - Nashua Bore Rainfall

#### Industrial Drive SPS S P S Flow

	Gallons
Last Hour (21 Dec 08:00)	5,240
Since Midnight	33,958
Yesterday Total	92,200

Compared to 24hrs ago: **-8%**

[Download](#)



## Hudson NH DPW

- Reports
  - Alert History
  - Management
  - Runtime Daily
  - Runtime Hourly
  - Runtime Variance
  - Checkin
  - Flow
  - Logins
  - Disabled Inputs
  - SD/CSO Events
  - SDWA CL Report
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 Rain Last Hr: None  
 Last 24 Hrs: None

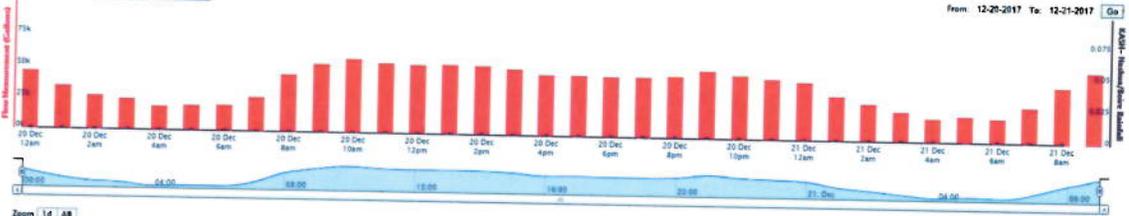
[View Old Graph](#)

### Flow Totals

Flume Building

Choose Lift Station: Flume Building

From: 12-20-2017 To: 12-21-2017 [Go](#)



Zoom: 1d All

- Flow Totals
- Combined Flow
- Rainfall
- KASH - Nashua Bore Rainfall

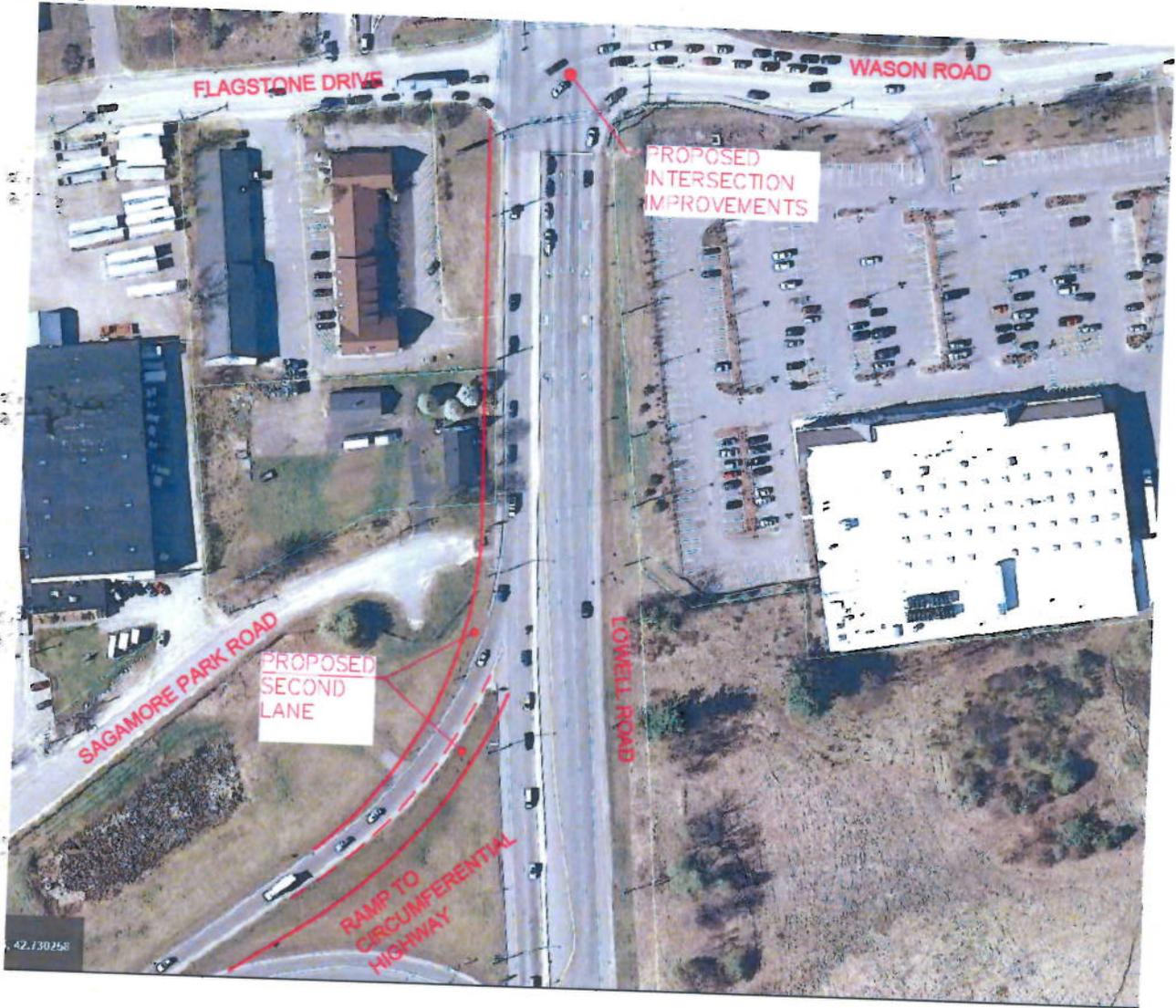
#### Flume Building Combined Flow

	Gallons
Last Hour (21 Dec 08:00)	44,700
Since Midnight	324,336
Yesterday Total	1,040,861

Compared to 24hrs ago: **+2%**

[Download](#)

Appendix G  
Proposal



Appendix H  
Before



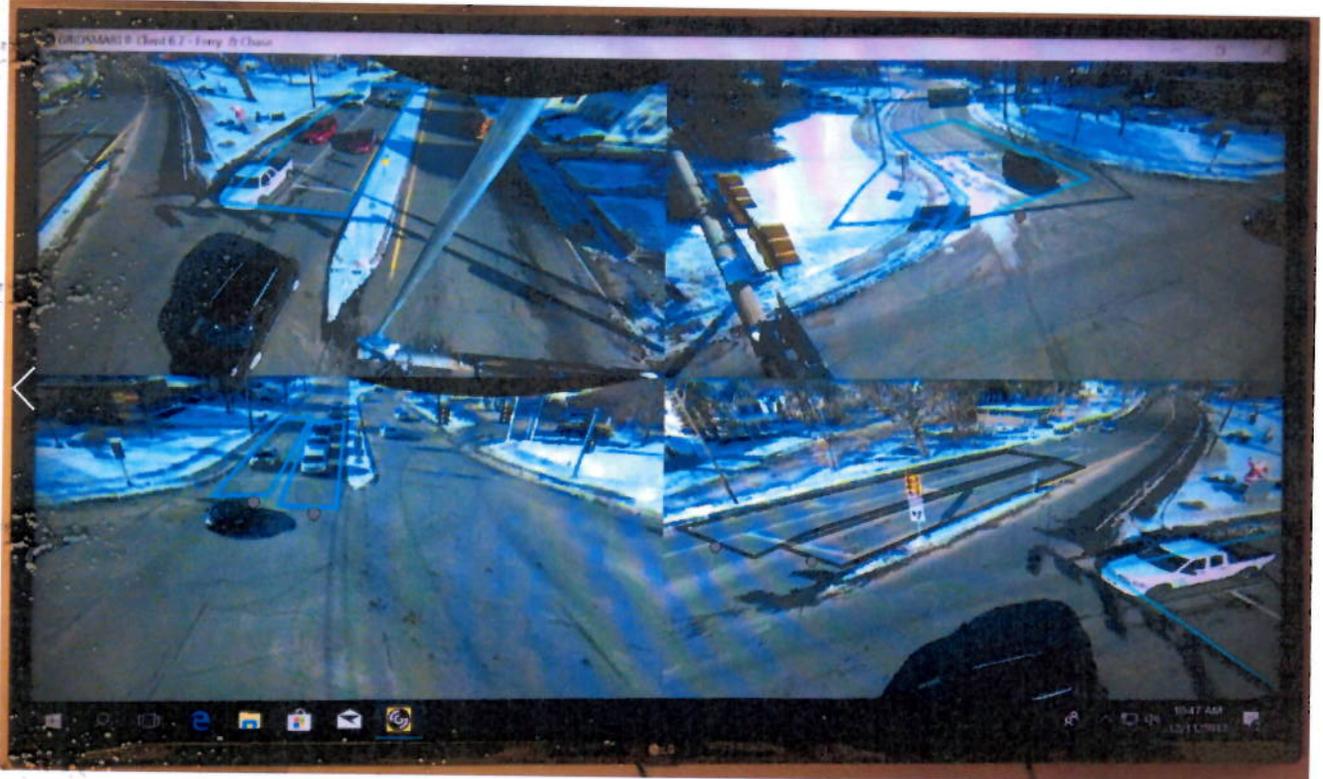
After



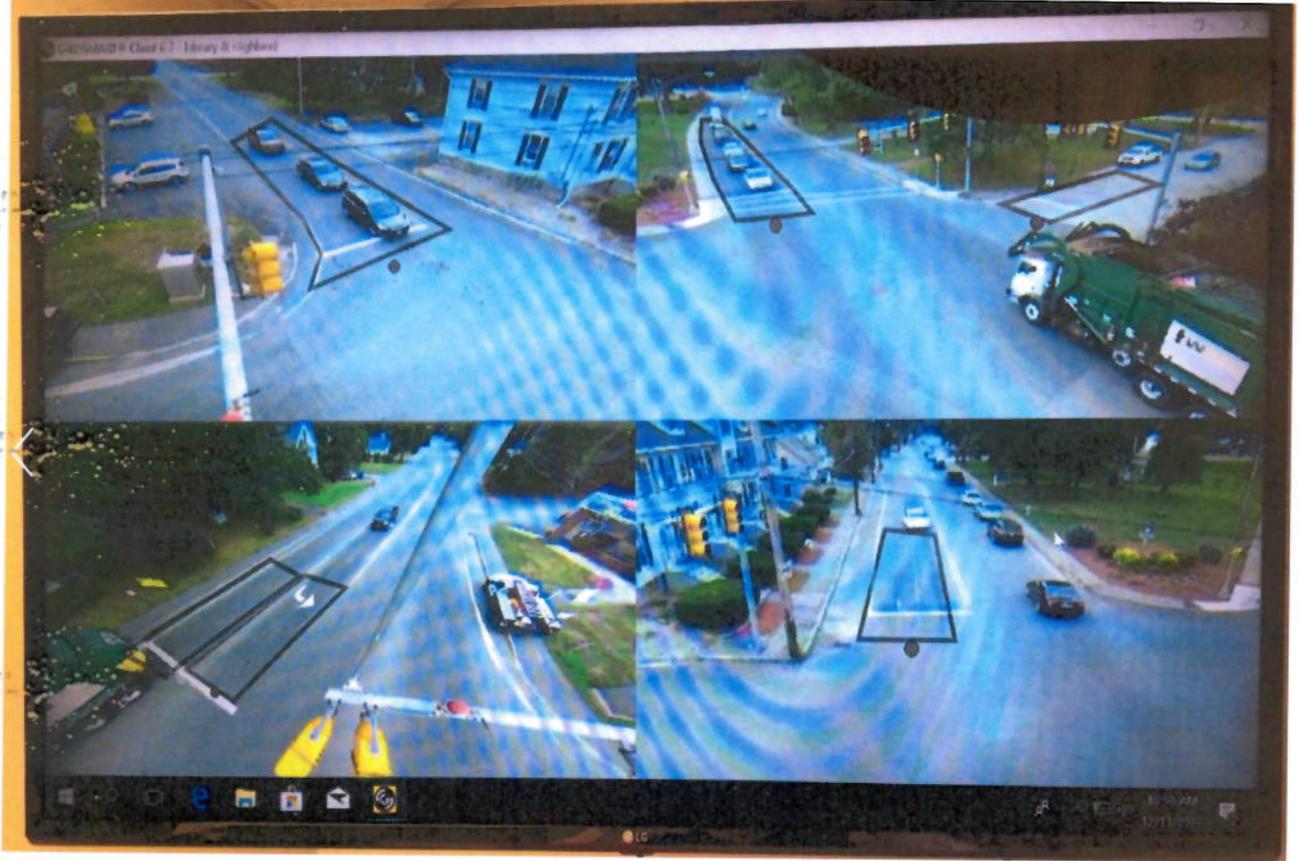
**Appendix I**  
**Library & Ferry**



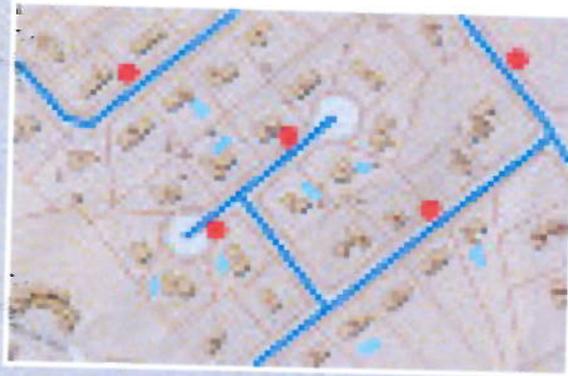
**Ferry/Chase/ RT 102/Bridge Street**



Appendix I  
Highland Street



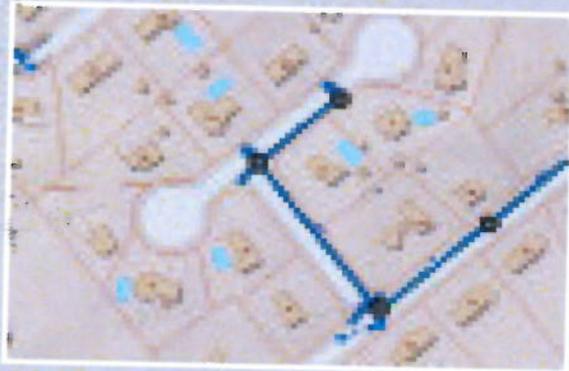
Appendix J



**Water System**



**Wastewater System**



**Stormwater System**



**Gas System**

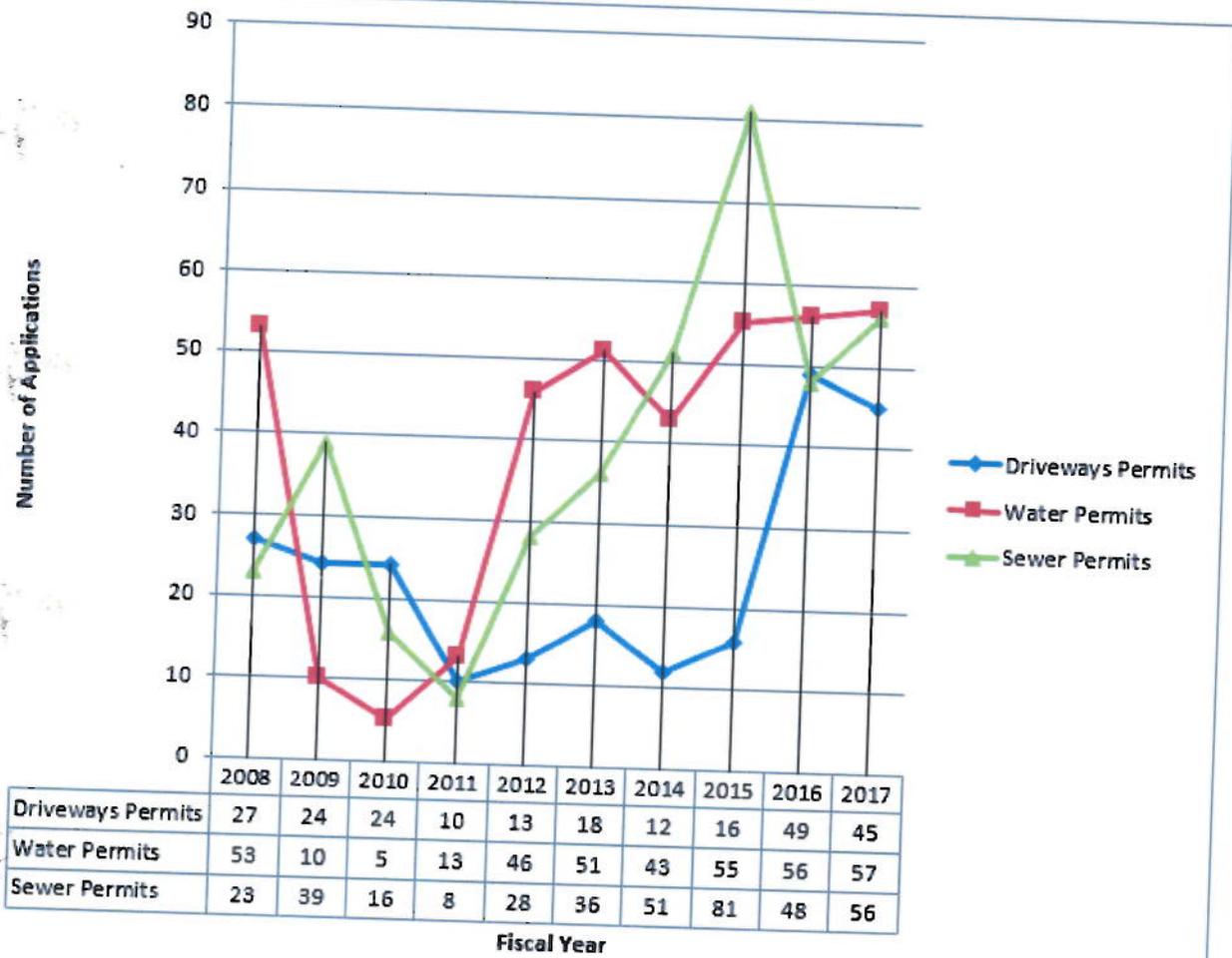


**Fire Alarm System**



**Traffic Counts**

Appendix K



**BMP #1-5**  
**Robinson & Otternick Pond**



**Volunteer Lake Assessment Program Individual Lake Reports**  
**ROBINSON POND, HUDSON, NH**

**MORPHOMETRIC DATA**

Watershed Area (Ac.):	832	Max. Depth (m):	9	Flushing Rate (yr <sup>-1</sup> ):	1.3
Surface Area (Ac.):	88	Mean Depth (m):	3.3	P Retention Coef:	0.68
Shore Length (m):	2,900	Volume (m <sup>3</sup> ):	1,189,000	Elevation (ft):	211

**TROPIC CLASSIFICATION**

Year	Trophic class
1979	EUTROPHIC
1988	MESOTROPHIC

**KNOWN EXOTIC SPECIES**

Variable Milfoil
Fanwort

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at [www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm](http://www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm)

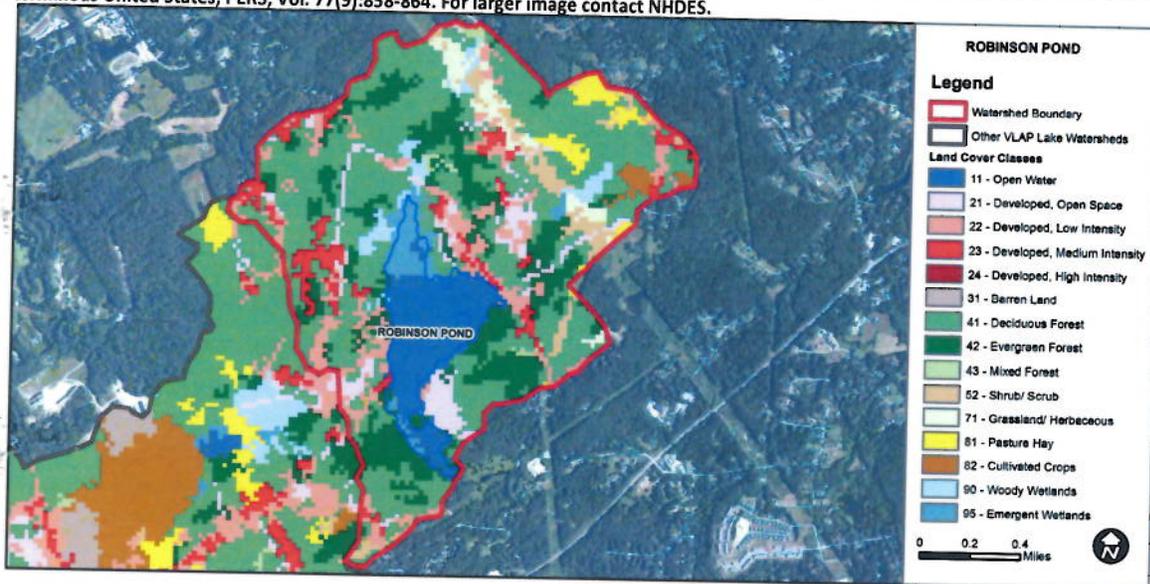
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	Data exceed water quality standards or thresholds for this parameter by a small margin.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Oxygen, Dissolved	Encouraging	Limited data for this parameter predicts water quality standards or thresholds are being met; however more data are necessary to fully assess the parameter.
	Dissolved oxygen saturation	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Chlorophyll-a	Slightly Bad	Data exceed water quality standards or thresholds for this parameter by a small margin.
Primary Contact/ Recreation	Escherichia coli	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.

**BEACH PRIMARY CONTACT ASSESSMENT STATUS**

Location	Parameter	Category	Comments
ROBINSON POND - CAMP WINAHOPE BEACH	Escherichia coli	No Data	No data for this parameter.
ROBINSON POND - TOWN BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
ROBINSON POND - TOWN BEACH	Cyanobacteria	Bad	Cyanobacteria bloom(s).

**WATERSHED LAND USE SUMMARY**

Fry, J., Mian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	8.96	Barren Land	0	Grassland/Herbaceous	2.54
Developed-Open Space	5.36	Deciduous Forest	41.72	Pasture Hay	2.24
Developed-Low Intensity	9.13	Evergreen Forest	15.64	Cultivated Crops	0.88
Developed-Medium Intensity	4.33	Mixed Forest	0.64	Woody Wetlands	2.29
Developed-High Intensity	0	Shrub-Scrub	3.66	Emergent Wetlands	2.63



# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

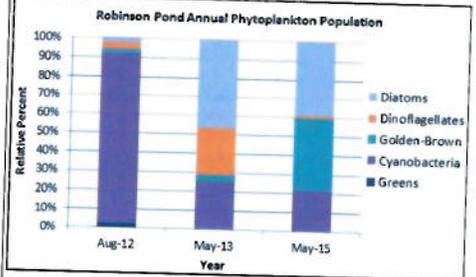
## ROBINSON POND, HUDSON

### 2016 DATA SUMMARY

**RECOMMENDED ACTIONS:** The drought conditions in 2016 and lack of stormwater runoff and tributary flow likely contributed to the lowest measured epilimnetic phosphorus and home owners to use phosphate free fertilizers on lawns and in gardens as phosphorus levels from Stations 5, 6 and 7 indicate elevated phosphorus from residential areas. Internal phosphorus loading likely fuels cyanobacteria growth during the summer and highlights the importance of minimizing external phosphorus loading to the pond. Aquatic plant management activities may also provide internal sources of phosphorus and turbidity. Development of a watershed management plan can help to estimate phosphorus loads from different sources, make recommendations on management actions to reduce loading, and potentially garner grant funding to implement management actions. It is recommended to apply for Section 319 Grant funds through the DES Watershed Assistance Section to develop a watershed management plan to restore impaired waters. Keep an eye out for the announcement of the 2018 grant cycle in the fall of 2017. Keep up the great work!

**OBSERVATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)**

- ▲ **CHLOROPHYLL-A:** Chlorophyll levels were slightly elevated in June, increased to elevated levels in July, decreased slightly in August, and then increased back to elevated levels in September. The 2016 average chlorophyll level increased slightly from 2015 and remained much greater than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- ▲ **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and chloride levels remained elevated and much greater than the state medians. Tributary chloride levels were measured in May and indicate Sta. 2, 6 and 7 have higher levels with likely greater impacts from road salting. Historical trend analysis indicates highly variable epilimnetic conductivity levels since monitoring began.
- ▲ **E. COLI:** Sta. 2 and 3 E. coli levels were elevated in May and greater than the state standard of 406 cts/100 mL for surface waters. Sampling was conducted during a short rain event following a long period of dry conditions suggesting wildlife as a source.
- ▲ **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer) phosphorus was slightly above average in May and June, and then decreased to average levels in July, August and September. Average epilimnetic phosphorus level decreased from 2015, was the lowest measured since 2000, and was slightly greater than the state median. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Metalimnetic (middle water layer) phosphorus levels were average in May and September and elevated from June through August. Hypolimnetic (lower water layer) phosphorus levels were average in May and increased to elevated levels from June through September as dissolved oxygen levels decreased and phosphorus typically bound to bottom sediments was released into the water column. Tributary sampling occurred in May during low/moderate flows and a short rain event. Phosphorus was elevated in Stations 2, 3, 5, 6, and 7. Turbidity was also elevated at Sta. 2, 3, 5, and 6.
- ▲ **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope fluctuated between 2.25 and 3.0 meters and was lowest in September when algal growth was highest. Average NVS transparency decreased slightly from 2015 and was less than the state median. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.
- ▲ **TURBIDITY:** Epilimnetic turbidity was slightly elevated in June and September when algal growth was elevated. Metalimnetic turbidity was slightly elevated on each sampling event, and Hypolimnetic turbidity was elevated and increased as the summer progressed due to the accumulation and formation of organic compounds under anoxic conditions. Sta. 2, 3, 5, and 6 turbidity levels were elevated in May during low to moderate flows and following a significant dry period. Volunteer noted sediment at Sta. 3 and other samples may be impacted by sediment, organics and/or mineral content during dry weather.
- ▲ **pH:** Epilimnetic, Metalimnetic, Hypolimnetic, Stations 2, 3 and 5 experienced pH levels within the desirable range 6.5-8.0 units, however deep spot pH levels have historically fluctuated above or below the desirable range. Sta. 4, 6 and 7 pH levels were slightly less than desirable. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began.



**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

**Chloride:** > 230 mg/L (chronic)

**E. coli:** > 88 cts/100 mL – public beach

**E. coli:** > 406 cts/100 mL – surface waters

**Turbidity:** > 10 NTU above natural level

**pH:** between 6.5-8.0 (unless naturally occurring)

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.

**Alkalinity:** 4.9 mg/L

**Chlorophyll-a:** 4.58 mg/m<sup>3</sup>

**Conductivity:** 40.0 uS/cm

**Chloride:** 4 mg/L

**Total Phosphorus:** 12 ug/L

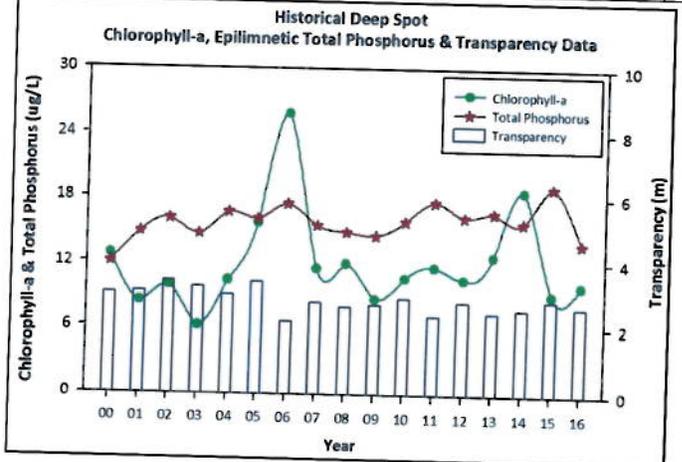
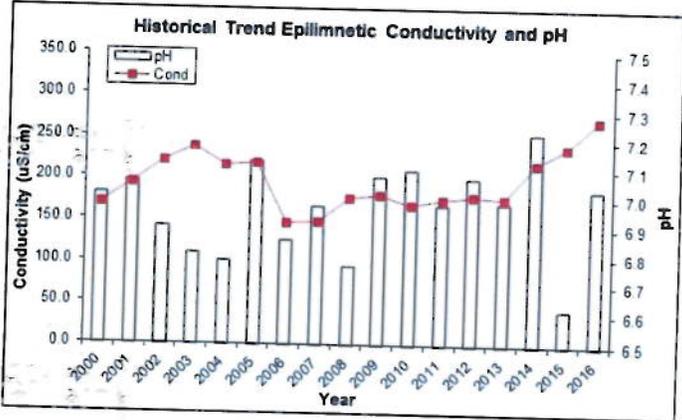
**Transparency:** 3.2 m

**pH:** 6.6

Station Name	Alk.	Chlor-a	Chloride	Cond.	E. Coli	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	#/100ml	ug/l	NVS	VS	ntu	
Epilimnion	15.6	9.80	59	271.6		14	2.60	2.69	1.87	7.03
Metalimnion				263.0		23			4.44	6.72
Hypolimnion				274.6		52			9.67	6.55
Sta. 2 Leach Brook			83	356.0	2000	65			5.41	7.14
Sta. 3 Howard Brook			26	142.5	660	108			14.10	6.73
Sta. 4 Juniper Brook			57	249.0	10	17			0.67	6.41
Sta. 5 Stoney Lane Drainage			40	219.0	10	230			32.20	6.51
Sta. 6 Woodcrest Brook			110	401.0	10	364			13.50	6.15
Sta. 7 Row			110	412.0	10	87			2.96	6.38

### HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.





**Volunteer Lake Assessment Program Individual Lake Reports**  
**OTTERNICK POND, HUDSON, NH**

**MORPHOMETRIC DATA**

Watershed Area (Ac.):	2,752	Max. Depth (m):	3.7	Flushing Rate (yr <sup>1</sup> ):	20.5
Surface Area (Ac.):	34	Mean Depth (m):	1.9	P Retention Coef:	0.4
Shore Length (m):	1,800	Volume (m <sup>3</sup> ):	261,500	Elevation (ft):	170

**TROPIC CLASSIFICATION**

Year	Trophic class
1979	EUTROPHIC
1998	EUTROPHIC

**KNOWN EXOTIC SPECIES**

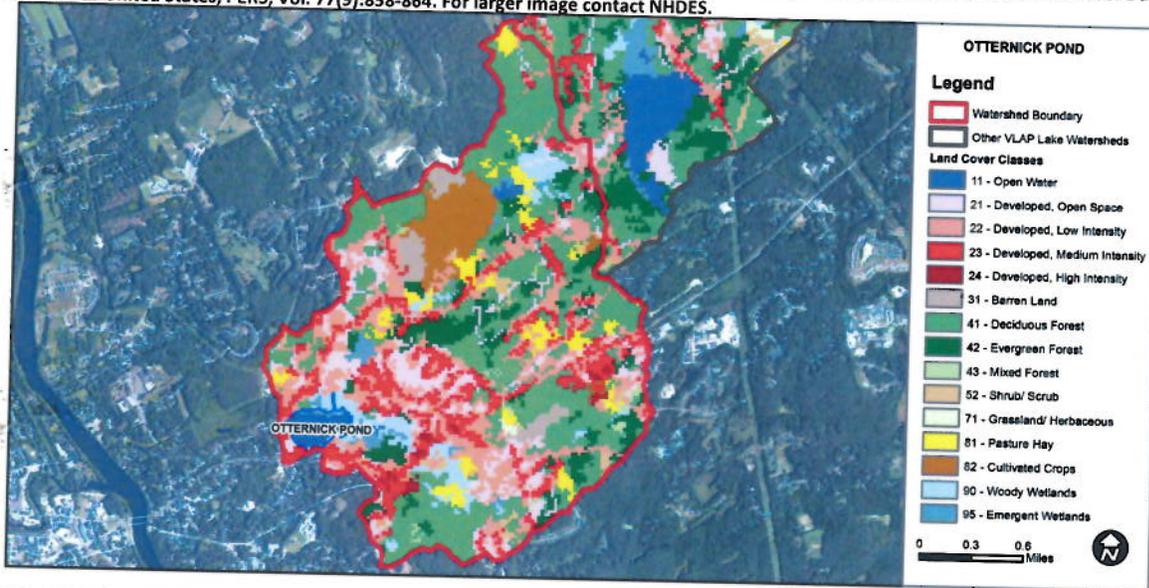
Variable Milfoil
Fanwort

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at [www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm](http://www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm)

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Oxygen, Dissolved	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
	Dissolved oxygen satura	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a large margin.

**WATERSHED LAND USE SUMMARY**

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	1.74	Barren Land	2.35	Grassland/Herbaceous	0.13
Developed-Open Space	8.68	Deciduous Forest	30.87	Pasture Hay	5.06
Developed-Low Intensity	19.2	Evergreen Forest	7.43	Cultivated Crops	4.99
Developed-Medium Intensity	11.1	Mixed Forest	0.71	Woody Wetlands	4.48
Developed-High Intensity	0.63	Shrub-Scrub	1.15	Emergent Wetlands	1.53



# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

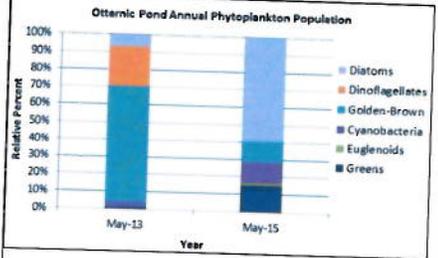
## OTTERNIC POND, HUDSON

### 2016 DATA SUMMARY

**RECOMMENDED ACTIONS:** Pond phosphorus and turbidity levels have remained elevated since 2014. Investigate the relationship between aquatic plant management activities and phosphorus and turbidity levels in pond. Algal and aquatic plant growth and annual die-off add to the organic layer at the bottom of the pond which can deplete dissolved oxygen levels and further add to nutrient loading in the pond. Maintaining flow through the Outlet, when possible, is important in helping to flush nutrients out of the pond. Be alert for potential cyanobacteria bloom and contact the DES Cyanobacteria Hotline if a bloom occurs. Keep up the great work!

**OBSERVATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)**

- **CHLOROPHYLL-A:** Chlorophyll levels were low in June and then increased steadily to elevated levels indicative of an algal bloom in September. The 2016 average chlorophyll level remained stable with 2015 and was much greater than the state median. Historical trend analysis indicates highly variable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and chloride levels remained elevated and much greater than the state median. The 2016 epilimnetic (upper water layer) conductivity level was the highest measured since monitoring began and historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels in the pond.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus was average for the pond in May, June and August, and increased to elevated levels in July and September suggesting algal and/or cyanobacteria blooms were occurring. Average epilimnetic phosphorus levels remained elevated and stable with 2015. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Benson Inlet phosphorus levels were elevated in July and September. Glover Inlet phosphorus levels were elevated in June, July and September, and Outlet phosphorus levels were elevated in June and July.
- **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in May and then fluctuated between 1.0 and 1.75 meters between June and September due to high levels of algal growth combined with low water levels. Average NVS transparency remained stable with 2015 and was much less than (worse than) the median. Historical trend analysis indicates relatively stable transparency since monitoring began.
- **TURBIDITY:** Epilimnetic, hypolimnetic and tributary turbidity levels were generally elevated in 2016 and have remained elevated since 2014.
- **PH:** Epilimnetic and hypolimnetic pH levels were within the desirable range 6.5-8.0 units. Benson and Glover Inlets and Outlet pH levels fluctuated above the desirable range in July indicating an algal bloom was occurring. Historical trend analysis indicates highly variable epilimnetic pH levels since monitoring began.



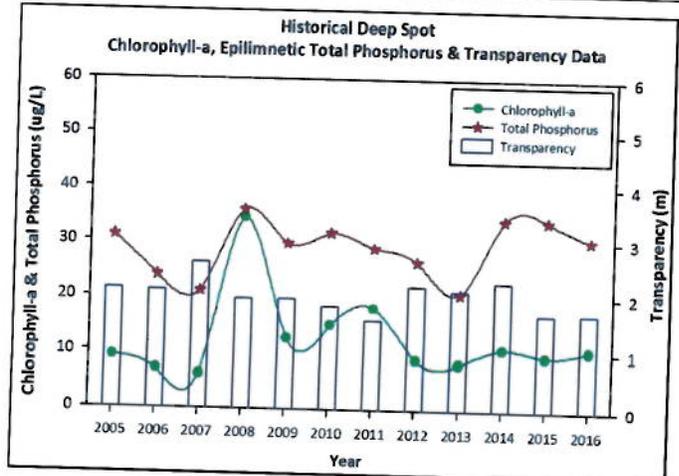
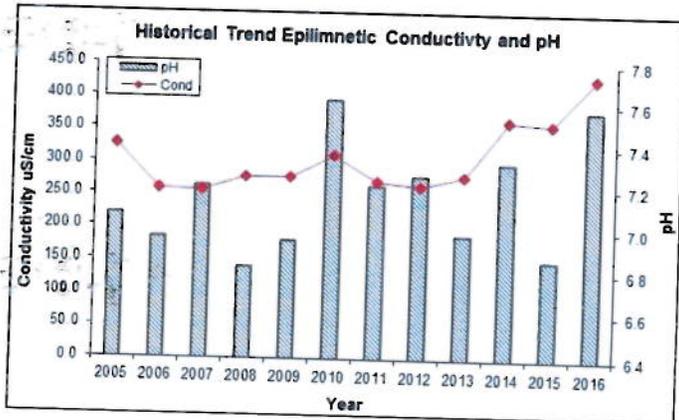
Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	48.8	10.49	89	428.2	30	1.70	1.72	2.06	7.58
Hypolimnion				432.0	31			4.57	7.35
Benson Inlet			90	435.0	26			2.68	7.82
Glover Inlet			88	420.4	25			2.94	7.91
Outlet			89	428.2	25			3.17	8.06

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.  
**Alkalinity:** 4.9 mg/L  
**Chlorophyll-a:** 4.58 mg/m<sup>3</sup>  
**Conductivity:** 40.0 uS/cm  
**Chloride:** 4 mg/L  
**Total Phosphorus:** 12 ug/L  
**Transparency:** 3.2 m  
**pH:** 6.6

**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.  
**Chloride:** > 230 mg/L (chronic)  
**E. coli:** > 88 cts/100 mL – public beach  
**E. coli:** > 406 cts/100 mL – surface waters  
**Turbidity:** > 10 NTU above natural level  
**pH:** between 6.5-8.0 (unless naturally occurring)

### HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.



**BMP #1-6**  
**Stormwater Committee Members**