



A. Permittee Information	
1. Name of MS4: Town of Colchester	
2. Permit Number: 7023 - 9014	
B. Minimum Control Measures	
1. Public Education and Outreach	
1.1 Website address: www.colchestervt.gov; www.colchestervt.gov/1837/stormwater-utility	
1.2 Participation in Regional Outreach Strategy <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes, summary of activities attached	
2. Public Involvement and Participation	
2.1 Participation in Regional Involvement Strategy <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes, summary of activities attached	
3. Illicit Discharge Detection and Elimination	
3.1 Stormwater infrastructure mapping complete or continuing: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	
3.1 Number of stormwater outfalls inspected: 34	
3.2 Number of stormwater outfalls tested: 12	
3.3 Number of illicit discharges detected and eliminated: 1	
3.4 Additional information attached <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	
4. Construction Site Runoff Control	
4.1 Continued implementation of an Erosion Control Ordinance <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	
4.2 Additional information attached <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	
5. Post Construction Management for New Development and Redevelopment	
5.1 Continued implementation of an ordinance for disturbances of greater than one acre that are not subject to the Agency's post-construction permit program <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	
5.2 Additional information attached <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	
6. Pollution Prevention and Good Housekeeping	
6.1 Participation in the Municipal Compliance Assistance Program <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes; Participation year: 2010	
6.2 Number of catch basins inspected: 314	
6.3 Number of catch basins cleaned: 85	
6.4 Lane miles swept: 150	6.5 Cubic yards of material collected by street sweeping: 116.5
6.6 Number of staff who attended training: 2 - Town Engineer - 23 hours, Tech Services Mgr, 6 hours	
6.7 Additional information attached <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	
C. Flow Restoration Plan Implementation	
1. Summary of FRP implementation in stormwater impaired waters is attached: <input type="checkbox"/> NA <input checked="" type="checkbox"/> Yes	
D. Phosphorus Control Plan Implementation	
1. Has a Road Erosion Inventory (REI) been completed for your municipality? <input type="checkbox"/> NA <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	

E. Incorporated Previously Permitted Stormwater Systems

1. Has the municipality incorporated permitted stormwater systems into its MS4 authorization? No Yes

2. If yes, complete the following table or include this information as an attachment

Stormwater Treatment Practice Name	State Stormwater Permit No.	Date of Last Inspection	Maintenance Completed
Please See Attached Table			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes
			<input type="checkbox"/> NA <input type="checkbox"/> Yes

F. Other Reporting Requirements

1. Summary of stormwater activities planned for next reporting cycle: In addition to requirements to meet MCMs 1-6, Stormwater utility newsletter

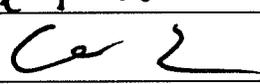
2. Proposed changes to the SWMP: None

3. Reliance on other entities to meet permit obligations: Yes, agreements in place for completion of MCM1, MCM2, and Stream Flow Monitoring requirements

G. Certification

This Annual Report shall be signed by a principal executive officer, ranking elected official or other duly authorized employee consistent with 40 CFR §122.22(b) and certified as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Aaron Frank
 Print Name

 Signature

Tom Mance
 Title
3/24/19
 Date

Attachment List for 2018 MS4 Annual Report

MCM 1- Regional Outreach Strategy Annual Report

Copy of Stormwater Utility Newsletter

MCM 2 – Regional Involvement Annual Report & Stream Monitoring Report

MCM 3 – Correspondence relating to elimination of illicit discharge

MCM4 & 5 – Letter from Planning & Zoning regarding projects in these categories

Part C – FRP Implementation Summary

Part E – List of permits and inspections incorporated into MS4 authorization

MCM #1
REGIONAL STORMWATER EDUCATION PROGRAM
RETHINK RUNOFF

JANUARY–DECEMBER 2018
ANNUAL REPORT

Prepared by:

Pluck

Introduction

Since 2003, Chittenden County's twelve MS4s have worked to pool resources to professionally engage the public in a one message, one outreach effort known as the Regional Stormwater Education Program. Through regular Spring and Summer advertisements to drive people to the program's website, www.smartwaterways.org, this cooperative approach to fulfilling their NPDES Permit Minimum Control Measure #1 (Public Education & Outreach) requirements has built a regional awareness among the public of the need for individual action to assist in fighting stormwater problems.

In the summer of 2016, the MS4s contracted with Tally Ho through their Lead Agency, the Chittenden County Regional Planning Commission, to rebrand the Smart Waterways campaign into a combined effort with the MS4's Minimum Measure #2 regional effort known as the Chittenden County Stream Team. The goal was to create one cohesive organization and outreach effort to both educate the public about stormwater and boost public participation in implementation of projects to combat the negative impacts of stormwater. In spring of 2017, Rethink Runoff was publicly launched, including a new website and revised creative.

In late 2017, Tally Ho transitioned to Pluck, retaining the same client contact. Pluck subsequently took over the creative, administration, and management of Rethink Runoff.

This 2018 Calendar Year report recaps the work done primarily related to Minimum Control Measure #1.

2018 Initiatives

Having completed the initial rebranding to Rethink Runoff and the website redesign in 2017, we focused on updating the advertising in 2018.

We revised initial digital display advertising and introduced three :30 second animations. Each animation targeted a specific action that could help reduce either stormwater runoff, or the chemicals introduced into stormwater drainage. We placed an emphasis on Lake Champlain, creating a link between the small streams throughout the Lake Champlain Basin and their larger impact on the health of the lake. The audio of the :30 second animations was also repurposed as a radio spot.

Display advertising was rolled out seasonally, with new ads appearing throughout the calendar year, according to seasonal activities, such as a swimming or fishing. In addition, we included a series of ads identifying pet waste as a contributor to pollution in Lake Champlain via stormwater discharge. Videos were uploaded to Youtube. Video advertising was targeting by subject matter, age, geographic location and other demographics. Videos were also shown on WCAX in limited quantity as well as on Comcast/Infinity cable stations. The radio spot was broadcast locally, in addition to VPR underwriting.

Print advertising in *Seven Days VT* also reflected this seasonal approach, increasing visibility for specific activities at specific times, including a smaller campaign during Clean Water Week.

In addition to advertising, we continued to work on the website. We updated content site-wide. We redesigned the stream monitoring pages, including HTML5 graphs highlighting NaCL, Phosphorus and Turbidity measurements, providing a stronger visual display of information.

We also introduced an Events portal, allowing the Stream Team representative to post events relating to outreach efforts. We also included regional events during Clean Water Week.

For Stream Team outreach, we programmed a new HTML email template for use in MailChimp, that allows monthly e-newsletters sent to our contact list.

Media Buy Breakdown

Below is a cost breakdown of media buys, compared with spring and fall 2016. Overall, we reduced our television spend and increased our online digital ad spend. Over the past two years, we've also shifted some of our advertising spending to the mid-summer. This helps to provide a longer timeframe for advertising outreach from spring into fall, when many people are focused on the rivers, lakes and streams in the area.

2016 – MEDIA BUY			
SOURCE	SPRING	SUMMER	FALL
RADIO	\$4,500	-	\$3,258
DIGITAL	\$7,500	-	\$4,985
TV	\$5,500	-	\$2,379
PRINT	\$2,500	-	
TOTAL	\$20,000	-	\$10,622

2017 – MEDIA BUY			
SOURCE	SPRING	SUMMER* 05/28–08/02	FALL
RADIO	\$3,088	-	\$1,080
DIGITAL	\$3,600	\$3,826	\$4,582
TV	\$2,015	-	\$1,833
PRINT	\$1,755	\$585	\$1,170
TOTAL	\$13,191	\$4,235	\$8,666

2018 – MEDIA BUY			
SOURCE	SPRING	SUMMER* 6/16–08/27	FALL
RADIO	\$2,675	-	\$1,044
DIGITAL	\$3,393.96	\$7,533.96	2986.82
TV	\$3,710	-	\$2,472
PRINT	\$1,755	-	\$1,006
TOTAL	\$8,140.96	\$7,533.96	\$7,509

* For 2017 and 2018, Summer was initially planned as part of the Spring 2018 budget. Moving forward, the Spring Media Buy will include all purchases made through 7/1. The Fall media buy will include any media buys made from 7/1 the end of the summer.

Creative

Advertising during 2017 included redesigned creative, incorporating existing messaging with a new visual language based on Rethink Runoff. Video and radio creative was modified to include a new URL, but otherwise remained the same.

Advertising for 2018 included 2017 creative as well as updated ads released from April-July, tied to spring/summer activities. In addition, we included a mini-campaign promoting Clean Water Week. All ads were rolled out in 8-10 different sizes.

Three :30 second videos were launched in April, May and June. A :30 second radio spot that ran in spring and fall used the voice over of the Fertilizer video spot.

2017 Creative



2018 Creative: Spring Rollout



Summer Rollout



Clean Water Week



Videos



April - Fertilizer
<https://www.youtube.com/watch?v=7gTbzJN-oeE>

May - Rain Garden
<https://www.youtube.com/watch?v=imZKTAOtD04>

June - Rain Barrel
<https://www.youtube.com/watch?v=r4-NEvelP40>

Advertising Click-through Rates

SOURCE	IMPRESSIONS	INTERACTIONS/ VIEWS	COST	COST PER CLICK
DISPLAY ADS	4,091,143	3,988	\$6,238.46	\$1.56
VIDEO (YOUTUBE)	417,346	210,979	\$3,942.31	\$0.02
WCAX DIGITAL	84,467	35	\$750	\$21.42

Google Display Ads Overview

Most Popular by Impressions

CALENDER YEAR 2018 NAME	SPRING: 4/15-MEMORIAL DAY NAME	SUMMER: MEMORIAL-LABOR DAY NAME	FALL: LABOR DAY-10/31 NAME
GENERAL CHAMP	RAIN GARDEN	WATER RECREATION	GENERAL CHAMP
PET WASTE	GENERAL CHAMP	PET WASTE	PET WASTE
WATER RECREATION	PET WASTE	GENERAL CHAMP	FERTILIZER

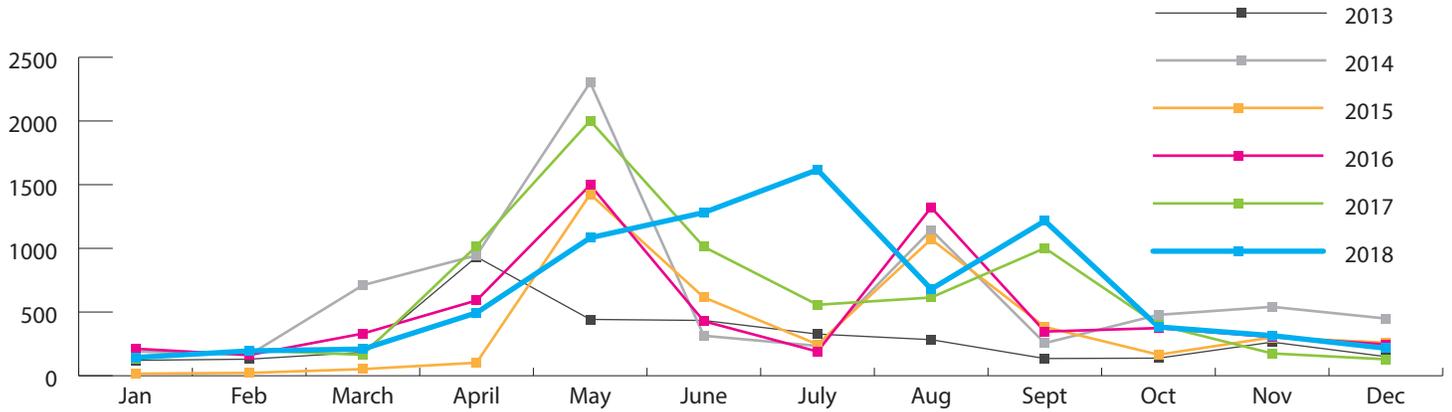
Most Popular by Interaction

CALENDER YEAR 2018 NAME	SPRING: 4/15-MEMORIAL DAY NAME	SUMMER: MEMORIAL-LABOR DAY NAME	FALL: LABOR DAY-10/31 NAME
GENERAL CHAMP	PET WASTE	WATER RECREATION	GENERAL CHAMP
PET WASTE	RAIN GARDEN	PET WASTE	PET WASTE
WATER RECREATION	GENERAL CHAMP	GENERAL CHAMP	FERTILIZER

Most Effective by Cost-per-click

CALENDER YEAR 2018		SPRING: 4/15-MEMORIAL DAY		SUMMER: MEMORIAL-LABOR DAY		FALL: LABOR DAY-10/31	
TOTAL	TIME PERIOD	TOTAL	TIME PERIOD	TOTAL	TIME PERIOD	TOTAL	TIME PERIOD
WATER REC.	\$0.45/CLICK	RAIN GARDEN	\$0.39/CLICK	WATER REC.	\$0.45/CLICK	WATER REC.	\$0.46/CLICK
RAIN GARDEN	\$0.46/CLICK	SLOW THE FLOW	\$0.39/CLICK	RAIN GARDEN	\$0.54/CLICK	FERTILIZER	\$0.54/CLICK
SLOW THE FLOW	\$0.63/CLICK	GENERAL CHAMP	\$0.39/CLICK	SLOW THE FLOW	\$0.64/CLICK	GENERAL CHAMP	\$0.65/CLICK

Website Metrics for 2013–2018



Total Sessions/Visits (1/1–12/31)

TOTAL	TIME PERIOD
7,832	2018
7,407	2017
6,004	2016
4,659	2015
7,728	2014
3,541	2013
2,787	2012

Website visits by device

DEVICE	2018	2017	2016
DESKTOP	50.1%	52.8%	65.7%
TABLET	40.6%	36.4%	24.5%
MOBILE	9.3%	10.8%	9.8%

Top Vermont Cities and Towns, 2018

TOTAL	USERS	
BURLINGTON	1318	19.25%
SOUTH BURLINGTON	767	11.34%
COLCHESTER	519	7.58%
ESSEX/ESSEX JCT.	456	6.66%
SHELBURNE	171	2.5%
WILLISTON	93	1.36%
MONTPELIER	76	1.11%
SAINT ALBANS CITY	71	1.04%
STOWE	66	.96%

New York, 149 Users

Boston, 67 Users

Most visited pages, 2018

TOTAL
HOMEPAGE
GET EDUCATED PROBLEMS & SOLUTIONS/PET WASTE
GET EDUCATED /PROBLEMS & SOLUTIONS/RAIN GARDEN
GET INVOLVED/STREAM TEAM
GET EDUCATED/FOR KIDS
GET EDUCATED/PROBLEMS & SOLUTIONS/FERTILIZER & LAWN CARE
GET EDUCATED/PROBLEMS & SOLUTIONS
ABOUT RETHINK RUNOFF
GET EDUCATED
GET EDUCATED/PROBLEMS & SOLUTIONS/REDIRECT YOUR DOWNSPOUTS

2018 Grants

The stormwater utility has received **three** grants in fiscal year 2018 (7/1/17-6/30/18) totaling over \$350,000. These grants were made possible because the utility can provide the 20% cash match needed:

Stormwater Improvements along Shore Acres / Cedar Ridge Rd

The stormwater utility was awarded \$295,200 in grant funding to design and construct stormwater improvements in the Shore Acres and Cedar Ridge neighborhoods. Engineering and design work is expected to take place in the summer/fall of 2018, with construction tentatively planned for the 2019 season. Stay tuned for more information about this project!

Phosphorus Control Planning

The stormwater utility was awarded \$40,000 to design a Phosphorus Control Plan for town properties. This Plan is a new water quality requirement of the Town's federal stormwater permit. This grant will help us plan water quality improvements for Town properties and expected to be completed by 2020.

Stormwater Utility Grant

The Vermont Agency of Transportation provides grants of \$25,000 for communities that adopt a stormwater utility. These funds will be received in both 2018 and 2019 for a total of \$50,000. Funding will be used to replace a culvert on East Road this summer. For more information about this project, please see the "Upcoming Projects" portion of this newsletter.

Stormwater Website

Visit the town's stormwater website at:
www.colchestervt.gov/1837/Stormwater-Utility

TOWN OF COLCHESTER
781 Blakely Road
Colchester, VT 05446

PRST STD
US POSTAGE
PAID
Burlington, VT
05401
Permit#478

ECRWSS

POSTAL PATRON

CLEAN WATER NEWSLETTER

Town of Colchester

CLEAN WATER NEWSLETTER SPRING 2018



Photo by Timothy Kranz

As spring brings April showers, May flowers, and the potential for flash flooding, the Town's Clean Water Spring 2018 Newsletter is here to share information regarding:

- Upcoming Events & Projects
- Grant Funding Received in 2018
- Flood Safety Tips
- Stormwater Utility Updates
- Water Quality Testing

? Did You Know ?

The Town of Colchester participates in a FEMA program known as the Community Rating System, which provides our property owners a 10% discount on Flood Insurance premiums. We are rated an "8" which is the highest level in Vermont.

Spring Flooding Safety

As the snow melts each spring, the potential for flooding increases which brings threats to property, people, and public safety. A few important things to remember as spring begins in VT:

- Just 6 inches of moving water is enough to knock you off your feet; and 2 feet of water can sweep a vehicle away.
- Colchester has over 3,000 acres designated as Special Flood Hazard Areas by FEMA.
- Flash floods are the #1 cause of weather-related deaths in the U.S.
- Flood Watch means “Be Aware” as conditions are right for flooding in your area.
- Flood Warning means “Take Action” as flooding is either happening or will shortly.

For more information, visit www.ready.gov.



A look into a Town catch basin along Granite Creek Road.

These systems collect rainwater that runs off driveways, roads, and building roofs during storms, and transports the stormwater directly to nearby rivers, streams, or Lake Champlain.

Upcoming Events & Projects

- The Town is planning to replace a culvert on East Road this summer, between Pond Brook Rd and Woodridge Rd. Final dates have not been set, but **East Road will be closed to through traffic for approximately one week this July**. More information about this project will be shared after a contractor for the project has been selected.
- On **Monday, April 16 at 6:30PM** at Bay-side Activity Center, the Conservation Commission is hosting a Rain Garden Workshop. Come learn about how certain plants absorb rainfall, filter pollutants, and provide important bird and bee habitats. The event is free but donations are accepted to support Colchester Blooms. To RSVP please call 802-264-5621 or email kadams@colchestervt.gov.

Water Quality Testing

Water quality sampling is performed each summer by Town staff. Twice a week, 12 samples from 9 different sites are tested for e. coli bacteria to ensure that levels are below VT acute health standards of 235 units per 100 milliliters.

If samples taken from swimming areas have unsafe e.coli levels, the affected beach will have signs posted, warning of high levels, until new tests come back with safe counts. We do not close our beaches, but inform the public of high e.coli readings in this way.

Additional information including maps and prior season test results can be found on the Town’s stormwater utility website.

Stormwater Utility Updates

The stormwater utility is up and running in its first year of operations. Staff has been successful in securing over \$350,000 in grants in our first year, and staff has completed over 87 hours of training related to stormwater and roadway management.

Budget

The stormwater utility budget is reviewed annually by the Board of Sewer Commissioners, which is the acting Selectboard. The Town owns 279 stormwater outfalls, 314 catch basins, and 2,282 pipelines. The utility budget also funds the following items with the ultimate goal of improving water quality:

- Summer water quality testing at 13 sites
- Street sweeping and catch basin cleaning
- 2 fulltime operations/maintenance workers
- 1 technical position that oversees the planning, design, construction, operation, and maintenance of stormwater systems
- Town stormwater permits, which cost \$20,000 annually
- Preparation of stormwater management plans
- Participation in regional educational efforts (please visit ReThinkRunoff.org for more info)
- Capital construction funding of \$300,000 annually, for use on large projects and unexpected emergencies

Right: Town staff replace a catch basin in a Colchester neighborhood last summer.





MCM #2

Rethink Runoff Stream Team 2018 Summary of Activities

Social Media

Facebook

- 219 total “likes”- a 23% increase from 2017 (177 in at end of 2017)
- 222 total “follows” (29 posts this year)

Instagram

- 120 total “follows” (13 posts this year)

RRST Website

- See final report from Dave Barron (Pluck Design)

Newsletter and e-correspondence

- As of 11/28/18, there were **508** subscribers to the RRST newsletter which is an 8% increase in 2018 (from 467 in 2017) It is the highest subscription to date. The average open rate for emails was 24%
- Arbor Day Volunteer Solicitation Email Published on 4/4/18 Opens: 99 Clicks: 7
- Summer Newsletter Published 9/13/18 Opens: 97 Clicks: 6
- Fall Newsletter Published on 11/18/18 Opens: 125 Clicks: 17

Organizational Partnerships

The Rethink Runoff Stream Team partnered with 18 different organizations in 2018 (15 non-municipal partners, 3 municipal partners)

- Vermont Community Garden Network (Organized state-wide Day in the Dirt event which resulted in 10 volunteers signing up to help with Rain Garden Cleanup at the Coast Guard station)
- VHB (Rain Garden Cleanup)
- Winooski Valley Parks District (Provided land for S. Burlington Arbor Day tree planting, also hosted the Conservation Field Day)
- US Fish and Wildlife (Cost share on trees for Arbor Day)
- Williston Central School (students volunteered for Arbor Day tree planting)
- Lake Champlain Basin Program (Provided funding for much of Arbor Day tree planting event)
- Intervale Conservation Nursery (Supplied trees and staff for Arbor Day tree planting)
- South Burlington NR Committee (Helped with the Trees For Stream planting on Muddy Brook)
- Community Sailing Center (Invited RRST to participate in an on-board education program during the Maritime Festival)
- Chamberlin School - S. Burlington - (A stormwater lesson was taught to Chris Provost’s 4th grade class at the as part of a field trip at the Community Sailing Center in Burlington)



This document was prepared by the Winooski Natural Resources Conservation District, who is contracted by Chittenden County’s MS4 Committee to run the RRST program.



- Milton Youth Coalition (Provided tabling opportunity for RRST at Milton Activities Fair)
- Shelburne Farms (Provided tabling opportunity for RRST at Shelburne Harvest Festival)
- VT DEC (La Rosa Program funded WQ sampling lab analysis)
- ECHO (Provided tabling opportunity for RRST in the museum during Clean Water Week)
- Colchester High School (students volunteered to stencil storm drains in Colchester as part of an AP Environmental Science project)
- Burlington Parks and Rec (Provided tabling opportunity for RRST at Kid's Day)
- Winooski Department of Recreation and Parks (Provided tabling opportunity for RRST at Winooski Wednesdays event)
- Winooski DPW (Assisted in selection of storm drain mural locations, cleaned catch basins and provided day-of support to artists)

Media

The Rethink Runoff Stream Team had **six** media appearances in 2018, exceeding the work plan goal of five articles:

- Article: Call for Tree Planting Volunteers: Williston Observer & The Other Paper (April)
<http://www.willistonobserver.com/streambank-tree-planters-needed/>
<http://otherpapersbvt.com/community-tree-planting-event-celebrate-arbor-day-with-your-friends-and-neighbors.html>
- Article: The Citizen - Survey Results (May)
<http://www.thecitizenvt.com/2018/05/03/survey-shows-increased-awareness-stormwater-runoff-problem-solutions/>
- Article: Call for Stream Team Volunteers, Williston Observer (June)
<http://www.willistonobserver.com/chittenden-county-water-quality-volunteers-needed/>
- TV Coverage: Clean Water Week (August)
<http://www.wcax.com/content/news/Lend-a-hand-with-nonpoint-water-pollution-489666141.html>
- TV Coverage: Winooski Storm Drain Mural Project (October)
<https://www.wcax.com/content/news/Winooski-mural-aims-to-educate-on-stormwater-pollution-496723301.html>
- TV Coverage: Burlington Storm Drain Stenciling (October)
<https://www.mychamplainvalley.com/news/protecting-vermont-s-water-by-rethinking-runoff/1510638055>



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Outreach

Outreach includes any educational opportunities or tabling events where resources or information are provided to the community about the RRST program. There were **seven** outreach events in 2018, with an estimated total outreach to **470** people.

Outreach events in 2018 targeted the municipalities of **Milton, Shelburne and Burlington. Winooski** carried over from last year due to a venue cancellation experienced in 2017.

- **Burlington** Kid's Day (5/5/18) 150 people reached
- **Burlington** Clean Water Week Tabling at ECHO (8/1/18 & 8/2/18) Reached 117 people total (35 from our 9-municipality area)
- **Burlington** Lake Champlain Maritime Festival. In partnership with the Community Sailing Center, Rethink Runoff took our education ON the lake. The Rethink Runoff coordinator sailed aboard a small sailboat with 4 community members and shared information about the watershed and how to get involved with Stream Team. 3 adults, 1 kid reached
- **Shelburne** Harvest Festival (9/15/17) 61 adults, 77 kids reached
- **Winooski** Wednesdays (9/5/18) Reached 12 adult Winooski residents and 8 kids
- **Milton** Activities Fair (9/27/18) Reached 40 adults and 60 kids from Milton Brought 'Build a Rain Garden' activity and information about green lawn care
- **Burlington and Colchester:** Storm Drain Stencils were loaned to Jenna Olson and Karen Adams for independent projects. 39 drains marked. 20 students reached

The 2018 work plan goal for outreach participation was 400 people, which was surpassed. A total of **470** people that were engaged in outreach and educational opportunities in 2018. Chosen outreach towns for 2019 are Essex, Essex Junction, and Colchester.

New Outreach Activity Created: Stream team coordinator, Kristen, created a new activity to bring to tabling events to engage kids and families. The activity is called "Design Your Own Rain Garden." Using a tray of dirt and laminated pictures of plants that thrive in VT rain gardens (taped on toothpicks), participants can imagine in 3-D space what a rain garden might look like in their own backyard or school. The activity has been a hit so far. To engage adults, the coordinator brought pamphlets about green lawn care and a booklet about how to build a rain garden.



Figure 1: Build-a-Rain Garden Activity at a tabling event at ECHO



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Event-Driven Tasks

There were **seven** hands-on events held in 2018. Event-Driven Tasks involve community members in some form of hands-on engagement. This most often means volunteering, but can also include hands-on education activities with school groups.

- Rain Garden Clean Up at Burlington Coast Guard Station (4/28/18)
 - Partnered with VT Community Garden Network to carry out this event
 - 10 volunteers
- Trees for Streams Arbor Day Planting: Williston (5/4/18)
 - Partnered with Winooski Valley Parks District, The Intervale Conservation Nursery, US Fish and Wildlife, The Lake Champlain Basin Program and Williston Central School to carry out this event
 - 50 volunteers (36 students, 14 adults)
 - 560 trees planted along Allen Brook
- Trees for Streams Arbor Day Planting: South Burlington (5/4/18)
 - Partnered with Winooski Valley Parks District, The Intervale Conservation Nursery, US Fish and Wildlife and The Lake Champlain Basin Program and to carry out this event
 - 22 volunteers
 - 840 trees planted along Muddy Brook
- Conservation Field Day at Ethan Allen Homestead (5/16/18)
 - Reached 71 students from S. Burlington, Colchester and Essex
 - This environmental education event was hosted by WVPD at Ethan Allen Homestead in Burlington. 5th grade students from regional schools spent the day rotating through a series of workshops focused on conservation stewardship. RRST coordinator taught a workshop about stormwater
- Stream Team Water Quality Volunteer Training Day at WNRCD office (7/9/18)
 - 14 people trained, materials distributed for stream sampling
- Stormwater Lesson with Chamberlin School at the Community Sailing Center (CSC)
 - 26 students (4th graders from S. Burlington) participated in a field trip at the CSC. Kristen provided 1.5 hours of watershed education at the end of the sailing segment. Students used markers and paper to trace the watershed around their school, sung a song about watersheds and interacted in small groups with hands-on watershed models. They experimented with what happened when “rain” from a spray bottle hit different surfaces and then distributed “pollution” (sprinkles, confetti, etc.) on the landscape to see where it would flow.
- Winooski Storm Drain Mural Project - Winooski (10/10/18)
 - Partnered with the Winooski DPW and local artists to carry out this event
 - 3 artists painted a total of 2 murals. Artists reported speaking to about 75 people about the project while they were out painting.



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Hands-on participation events in 2018 targeted the towns of Winooski, South Burlington, and Williston. Details about engagement in those communities can be seen above.

A total of 74 people participated in hands-on RRST events in 2018. A total of 94 people volunteered their time in a RRST activity in 2018; just falling short of the 100 volunteer goal. Chosen project towns for 2019 are Burlington, Milton, and Shelburne

RRST Outreach Demographic Impacts

The table on this next page displays the interaction from each of the nine MS4 communities at tabling events and 2018 project events and workshops. Please note: this is not a comprehensive list of all 703 people reached, as town residence was only acquired when offered.

Town	# of participants
Burlington	255
Colchester	25
Essex Town	20
Village of Essex Junction	10
Milton (O)	100
Shelburne (O)	58
Williston*	59
South Burlington*	81
Winooski* (O)	95
TOTAL	703

Table 1: Interaction with RRST by member town (* = 2018 project towns (O) = outreach town)



This document was prepared by the Winooski Natural Resources Conservation District, who is contracted by Chittenden County's MS4 Committee to run the RRST program.



City of Winooski Project: Storm Drain Murals

RRST coordinated a storm drain mural event for the City of Winooski in 2018. A “call for artists” was published by the Essex Reporter on May 31, 2017 and the opportunity was shared with artists involved in past RRST projects. Four concepts were submitted by two artist teams and two were selected to be painted around catch basins pre-selected with guidance from the City’s Public Works Department.

On the morning of October 10, 2018, the three artists, Holly Greenleaf, Rachael Forando, and Stephen Welter were stationed at their assigned catch basins: Holly at the catch basin outside Chick’s Market at the corner of River St and Hickock St. and Rachael and Stephen as an artist team on Winooski Falls way by the bus stop. The artists signed contracts stipulating the requirements and procedures they had to adhere to in order to participate in the project. Instead of traffic paint, self-priming porch and floor enamel was used by all artists. Public Works staff assisted with thoroughly cleaning the areas to be painted and ensuring safety of the artists by providing traffic cones and vests. All murals were completed by the end of the day. Throughout the day, the RRST coordinator checked in with the artists. Each artist was given a pack of Rethink Runoff stickers and a mailing list sign up sheet. Artists reported speaking with about 75 passers-by about the project. They gave away about 30 stickers, and 2 people signed up for the mailing list. WCAX covered the story (see link in Media list above) and Facebook likes and shares were higher for this post than any other post in RRST history. About 2,800 people digitally interacted with the post.

The total estimated cost to plan, manage, and implement this project was **\$1,411**. The approximate personnel time used to plan and execute the project was 20 hours (\$900). The artists were paid a \$250 stipend each; a total of \$500. The mileage was about \$11.



Figure 2: Winooski murals (Chick’s Market: artist Holly Greenleaf, left Winooski Falls Way: artists Rachael Forando and Stephen Welter, right)



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Town of Williston Project: Arbor Day Community Riparian Buffer Planting

On May 4, 2018, 50 community volunteers (including 36 students from Williston Central School) joined a crew from The Intervale Center at Allen Brook behind the Williston Central School soccer fields in Williston to plant native trees along the bare banks of this stretch of river. Volunteers planted 560 trees, covering 1.4 acres of river with native vegetation.

Prior to the volunteer day, RRST coordinator used funds from the Lake Champlain Basin Program (LCBP) Trees for Streams grant to scope sites and secure landowner agreements for the planting projects. RRST money was used to solicit volunteers and coordinate the volunteer work days on the day of the planting event.

The estimated cost to RRST to plan and carry out the tree planting event was approximately **\$1,530**. Supplies, including trees and tree protection, were purchased with funds from the LCBP grant and cost-share from the US Fish and Wildlife Partners. Personnel time used to plan and execute the project was roughly 33 hours or \$1,400. Refreshments were approximately \$30 and mileage was approximately \$15.



Figure 3: Volunteers in Williston plant trees along Allen Brook on Arbor Day, 2018 (5/4/18)



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Figure 4: Some major partners for both Arbor Day Riparian Buffer Planting Projects

Town of South Burlington: Arbor Day Community Riparian Buffer Planting

On May 4, 2018, 16 community volunteers joined RRST coordinator and a crew from The Intervale Center at Muddy Brook Wetland Reserve in South Burlington to plant native trees along the bare banks of this stretch of river. Volunteers planted approximately 400 trees, covering one acre of river with native vegetation.

Prior to the volunteer day, RRST coordinator used funds from the Lake Champlain Basin Program (LCBP) Trees for Streams grant to scope sites and secure landowner agreements for the planting projects. RRST money was used to solicit volunteers and coordinate the volunteer work days on the day of the planting event.

The estimated cost to RRST to plan and carry out the tree planting event was approximately **\$1,530**. Supplies, including trees and tree protection, were purchased with funds from the LCBP grant and cost-share from the US Fish and Wildlife Partners. Personnel time used to plan and execute the project was roughly 33 hours or \$1,400. Refreshments were approximately \$30 and mileage was approximately \$15.



Figure 5: Volunteers in S. Burlington plant trees along Muddy Brook on Arbor Day, 2018 (5/4/18)

Water Quality Monitoring Program Summary

RRST has maintained an ongoing water quality monitoring program since 2012. These urban or suburban streams are impacted by sedimentation, excessive nutrient loading, high temperatures, bacteria, and other pollution. With another year of support from VT DEC's LaRosa program, RRST collected biweekly water quality samples at twenty three sites on twelve streams in 2018 (an increase by five sites and three streams from 2017). Thirteen volunteers and one intern helped collect grab samples on five, biweekly Tuesdays from 7/10 - 9/4. Grab samples were analyzed for turbidity, total phosphorus, and chloride. These parameters were also sampled at five of the sites during one rain event on 8/18. See the 2018 Water Quality Monitoring



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Report in Appendix A for more information.

The training day for citizen science samplers took place on 7/9/18. RRST coordinator demonstrated sampling procedures, described the data collection sheets and answered questions. Throughout the season, volunteers returned their samples to the WNRCD office after sampling, and the RRST coordinator ensured all samples were accounted for and delivered to the UVM lab. All volunteers received a hand-written thank-you card at the end of the sampling season. A volunteer appreciation event is planned for spring 2019. Volunteers expressed an interest in having an educational experience, rather than a pizza party, so the plan is to host a tour of the Essex Wastewater Treatment Plant, followed by snacks.

New this year, the RRST coordinator sent bi-weekly emails to WQ volunteers to check in about sampling procedure and share interesting local water tidbits. This frequent communication was well received by the volunteers. The coordinator also solicited feedback on the training materials and field data sheets and made significant edits for 2019 to improve clarity.

WNRCD sponsored an (unpaid) water quality intern for the sampling season. James Mazzola, a recent graduate, helped collect 5-8 samples each sampling day. He also helped the RRST coordinator scope the five new sampling sites for safety and suitability and helped update directions for all sites, adding pictures and more descriptive landmarks.

<i>Stream</i>	<i>Location</i>	<i>Site ID</i>	<i>Lat / Long</i>
Centennial Brook	Grove Street in Burlington (by the parking lot for Schmanska Park)	Centennial 10	44.48453, -73.18423
	Patchen Road in South Burlington (through cemetery)	Centennial 20	44.47402, -73.17334
Indian Brook	Parking lot B of Essex High School	Indian 10	44.49668, -73.11093
	Lang Farm in Essex	Indian 20	44.50442, -73.09190
Malletts Creek	McMullen Road	Milton 10	44.60855, -73.10693
Munroe Brook	Route 7 and Bay Road (by Red Apple Motel)	Munroe 10	44.40532, -73.21735
	Spear & Webster Intersection (just south of Kwiniaska Golf Course)	Munroe 20	44.38984, -73.20103
Morehouse Brook (one old site: 10 one new site: 20)	Landry Park Winooski (Eastern trib)	Morehouse 10	44.50035, -73.19226
	Landry Park Winooski (main branch - west of Morehouse 10)	Morehouse 20	44.50041, -73.19444
Muddy Brook (20- site changed for safety)	River Cove Road in Williston	Muddy 10	44.47293, -73.13505
	S. Brownell Road Williston	Muddy 20	44.44196, -73.13228
	Van Sicklen Road in Williston	Muddy 30	44.42823, -73.14622
Potash Brook (40 - site changed for safety)	Kindness Court in South Burlington near Humane Society	Potash 10	44.44572, -73.21348
	Farrell Street in South Burlington near	Potash 20	44.44660, -73.20415



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	Klinger's Bakery		
	Dorset Street in South Burlington	Potash 30	44.45150, -73.17849
	Kimball Ave South Burlington	Potash 40	44.45394, -73.14809
Engelsby Brook	Pine St in Burlington near Champlain Elementary Community Gardens	Engelsby 10	44.45627, -73.21394
	Behind UVM Redstone Campus in Burlington	Engelsby 20	44.46654, -73.19741
Alder Brook (new)	Off Chapin Road in Essex	Alder 10	44.51742, -73.06559
Bartlett Brook (new)	By Shearer Chevrolet in South Burlington	Bartlett 10	44.42596, -73.21345
Sunnyside Brook (new)	Mountain View Drive in Colchester	Sunnyside 10	44.50654, -73.17823
Sunderland Brook (new)	In Pearl Street Park in Essex Junction	Sunderland 10	44.50179, -73.12983
	Off Pine Island Road in Colchester	Sunderland 20	44.51685, -73.20421

Table 2: 2018 Stream Sampling Site Locations



Figure 6: Volunteers sampling at Indian 10, Indian 20 and Muddy 30 on 8/7/18

Town	Number of Stream Team Volunteers
Essex Junction	3
Colchester	2
S. Burlington	2
Burlington	2
Williston	2
Shaftsbury	1
Hinesburg	1

Table 3: Stream Team Water Quality Sampling Volunteers by town



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Adopt-a Rain Garden Program Summary

The Stream Team's Adopt-a-Rain Garden program is an opportunity for individuals to assist in keeping Chittenden County's public rain gardens functional and attractive. This involves basic maintenance activities like picking up trash, pruning, pulling weeds, installing new mulch, and informing the coordinator of non-functioning gardens. There are currently eleven public rain gardens managed by RRST. In 2018, there were four official adopters, but about 10 community members volunteered time to clean the Coast Guard Station garden this year as part of the Vermont Community Garden Network's Day in the Dirt event. Efforts will be made in 2019 to find individuals or groups to adopt all gardens.

This summer, the RRST coordinator visited all the gardens to remove out of date signage. The signs will be re-laminated with the current RRST logos and information and will be returned next spring. The re-branding of the signs has been organized by Dave Barron of Pluck Designs.

An assessment of each garden was conducted in summer 2018 and the status of each is provided below.:

Callahan Park Rain Garden

Location: 45 Locust St., Burlington

This garden has been functioning well for some time thanks to efforts by Brad Ketterling, who has adopted this garden for several years. In 2017, Burlington Public Works brought a load of mulch to the garden and Brad spread the mulch and kept up with weeding and monitoring the garden. Several, understory shrubs and flowers have been shaded out by larger, over-story plants that need to be thinned. There are several locations that also need to be replanted, so efforts will be made to locate surplus plants that can be added in 2019.

Chamberlain School

Location: 262 White Street, South Burlington

This garden was installed in partnership with WNRCD and the Let it Rain Program in 2013. This is one of several rain gardens on the grounds of Chamberlain Elementary. School teacher Chris Provost adopted this garden again in 2018 and has actively maintained it for several years.

Coast Guard Station

Location: Depot Street, Burlington

This small garden is located in the parking lot abutting the bike path next to the Burlington Coast Guard Station. In 2014, RRST worked with the ECHO summer kids program to engage elementary school children in cleaning the garden and in 2015 a local resident, Wiley Reading, adopted the garden. The garden did not



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have an adopter from 2016-2018, but this garden got a “boost” of energy from 10 community volunteers through the Day in the Dirt event hosted by the Vermont Community Garden Network in spring of 2018. It is in good condition. Efforts will be made to find a volunteer for 2019.

Correctional Facility

Location: 7 Farrell St., South Burlington

This garden is visible from the road and appears to be functioning well. Originally, employees of the prison adopted this garden and would occasionally clean the garden with inmates. There has been a lot of staff turnover in the past few years without a clear adopter. No formal adoption of this garden was made in 2018. MS4 representative, Tom DiPietro, has been in communication with Correctional Facility staff about proper maintenance. He will continue to be the main contact for 2019, with support offered from The Stream Team as needed. There is not a RRST garden sign at this garden, but one will not be installed here as visiting the area is discouraged.

Farrell Park

Location: Swift Street, South Burlington

This garden is unique in terms of its design. It is called an “advanced wetland stormwater filter” and was installed in 2012. Stormwater enters the garden through an inlet, flows through the gravel wetland filter media, is cleaned and exits through other end. The garden requires very little maintenance because it has a flushing system that prevents sediment from building up. This garden had an active adopter for its entire life, until 2015 when the adopter moved away. The garden was never in need of additional plants or maintenance. It would not be appropriate to add mulch to this garden. RRST would like to find another adopter in 2019, primarily to weed the site and to bring any issues to our attention.

Landry Park

Location: North St., Winooski

This garden was constructed in 2006 as two, separate gardens along the narrow strip of grass between a fence at Landry Park and the road. Over the years, the gardens have become overgrown, but Winooski DPW officials believe it still functions well, even with the tall, dense shrubs. A few years ago, nearby road construction altered the slope of the road carrying larger volumes of water into the garden. The increased flows have killed some of the vegetation and caused gullies to form, but the vegetation seems to have rebounded. It would be beneficial to the functionality of the garden to have the sediment vacuumed out and RRST has spoken with the City of Winooski DPW about this maintenance task. It is expected to be completed in spring 2019. In 2016, a group of UVM students in an Ecosystem Design course developed recommendations to repair the garden. There is no current adopter; and RRST coordinator will attempt to find one for the 2019 season.

Williston Town Hall Annex

Location: 7900 Williston Rd, Williston



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This small garden near the entrance walkway to the Annex building and the parking lot has had an active adopter since 2014: Rita Desseau. Rita maintained the garden in 2018, but additional work needs to be done at this site to weed, thin larger shrubs, re-plant in bare spots, and mulch the garden.

Williston Library (aka. Dorothy Alling Memorial Library)

Location: 21 Library Lane, Williston

The Williston Library garden is in good condition and is primarily being cared for by the staff of the library. The flowering plants may need to be thinned out in 2019. This garden was previously cared for by Andrew Wolf.

South Burlington High School (formerly the location of the South Burlington Library)

540 Dorset St., South Burlington

WNRCD received a grant to construct a rain garden at the entrance to what was the South Burlington Library (now South Burlington High School) in 2013. The rain garden received minimal maintenance by the library staff over the years, and was formally adopted in 2016 by Amy Niggel’s Cub Scout 678 pack. The pack’s leadership changed hands in 2018 and the new cubmaster Bill Kett agreed to continue maintenance of the garden with his pack.

South Burlington Fire Department

575 Dorset St., South Burlington

The City of South Burlington installed this bioretention area/rain garden in 2015 to improve stormwater management at the Fire Department. Cub Scout pack 678 volunteered to adopt this rain garden as well in 2019.

Rain Garden	Adopter 2018	Previous adopters
Chamberlin School, South Burlington	Chris Provost and students	Chris Provost
Coast Guard Station, Burlington	None	Wily Reading
Landry Park, Winooski	None	None
Williston Annex	Rita Dessau	Rita Dessau
Williston Town Library	Town Library Staff	Andrew Wolf
Callahan Park, Burlington	Brad Ketterling	Brad Ketterling
Farrell Park, South Burlington	None	None
Department of Corrections, South Burlington	None	Dana Scofield and Lori Farley
Brownell Library, Essex Junction	None	None



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South Burlington Fire Station	Cub Scouts 678 (Bill Kett)	Cub Scouts 678 (Amy Niggel)
South Burlington Library	Cub Scouts 678 (Bill Kett)	None

Table 4: 2018 Rain Garden Adopters

2018 Staffing Notes

In 2018, WNRCD experienced a full staff turnover. At the end of May 2018, Holly Kreiner left her position with WNRCD and was replaced by Kristen Balschunat. In July 2018, District Manager Corrina Parnapy left her position, and was replaced by Gianna Petito. Kristen has taken primary responsibility for Stream Team activities.



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2018 Water Quality Monitoring Report

Monitoring Team

The Rethink Runoff Stream Team (formerly known as the Chittenden County Stream Team) is a program that engages citizens across a nine-municipality region to implement projects that reduce non-point source pollution and stormwater volume at the local level. The participating towns are Burlington, Colchester, Essex, Essex Junction, Milton, Shelburne, South Burlington, Williston, and Winooski. The Water Quality Monitoring program is managed by the Chittenden County Regional Planning Commission Clean Water Advisory Committee MS4 subcommittee, coordinated by the Winooski Natural Resources Conservation District, and made possible through the support of the Vermont Department of Environmental Conservation LaRosa program. This report describes the results from the 2018 collection season; the seventh, consecutive year data was collected by this volunteer-led stream water quality monitoring effort in Chittenden County.

When, Where, and What the Stream Team Monitors

The Rethink Runoff Stream Team (RRST) has collected biweekly water quality samples at several pollutant “impaired” or “stressed” stream sites in Chittenden County since 2012. These urban or suburban streams suffer from excessive nutrient loads, sodium chloride, sedimentation, high temperatures, bacteria, and/or other pollutants. Samples were collected on six different dates in 2018: on five, scheduled bi-weekly dates and on one unscheduled “high-flow” date (i.e. during a rain event). High-flow sampling provides a snapshot of the potentially, elevated or diluted pollutant-loads moving through these systems when it rains. Samples were analyzed for turbidity, total phosphorus, and chloride at all 23 sites.

Biweekly sampling dates occurred on July 10th, July 24th, August 7th, and August 21st and September 4th, and all regular bi-weekly sampling occurred during dry/baseflow conditions. The proposed sampling dates (originally 6/26/18-8/21/18) were pushed two weeks later due to staff turnover within WNRCD to give the new Stream Team coordinator time to prepare for the volunteer training and sampling season. One rainy day sampling event occurred on August 18th at sites on Indian, Muddy, Potash, Centennial and Morehouse brooks. Table 1 indicates total rainfall in inches for the day of sampling and the day immediately preceding sampling. While baseflow sampling days all had less than 0.5 inches of rainfall, freshet sampling on August 18th had 1.65 inches.



Report prepared by: Kristen
Balschunat & Gianna Petito
Winooski Natural Resources
Conservation District



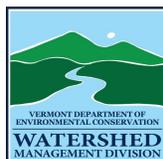
Funded by: LaRosa Partnership, VT
Department of Environmental Conservation
Watershed Management Division

Table 1. Average regional rainfall, in inches, for the preceding day and day of sampling. Rainfall data for each day was gathered from several station sites across the sampling region (Burlington, Colchester, and Essex) and a daily mean was calculated. Daily means were then summed for the preceding and day-of sampling events. Rainfall data was collected from the National Oceanic and Atmospheric Administration through their daily summaries maps: <https://gis.ncdc.noaa.gov/maps/ncei/summaries/daily> The specific sampling sites and their locations are listed in Table 2. A map of the sites is shown in Figure 1.

Date	Total Rainfall (inches)
07/10/18	0.4
07/24/18	0.3
08/07/18	0.362
08/18/18	1.65 (freshet)
08/21/18	0
09/04/18	0.2

Table 2. Rethink Runoff Stream Team 2018 Water Quality Sampling Sites. Note that sites located further up a streamshed are labeled with high numbers except at Sunderland where this labeling was switched and Sunderland 20 is actually downstream of Sunderland 10. Stream Team will look into fixing this labeling anomaly with our records and those of the lab starting next field season.

Stream	Location	Site ID	Lat / Long
Centennial Brook	Grove Street in Burlington (by the parking lot for Schmanska Park)	Centennial 10	44.48453, -73.18423
	Patchen Road in South Burlington (through cemetery)	Centennial 20	44.47402, -73.17334
Indian Brook	Parking lot B of Essex High School	Indian 10	44.49668, -73.11093
	Lang Barn in Essex	Indian 20	44.50442, -73.09190
Malletts Creek	McMullen Road	Milton 10	44.60855, -73.10693
Munroe Brook	Route 7 and Bay Road (by Red Apple Motel)	Munroe 10	44.40532, -73.21735
	Spear & Webster Intersection (just south of Kwiniaska Golf Course)	Munroe 20	44.38984, -73.20103
Morehouse Brook (One new site: 20)	Landry Park Winooski (Eastern trib)	Morehouse 10	44.50035, -73.19226
	Landry Park Winooski (main branch - west of Morehouse 10)	Morehouse 20	44.50041, -73.19444



Muddy Brook (20- site changed)	River Cove Road in Williston	Muddy 10	44.47293, -73.13505
	S. Brownell Road Williston	Muddy 20	44.44196, -73.13228
	Van Sicklen Road in Williston	Muddy 30	44.42823, -73.14622
Potash Brook (40 - site changed)	Kindness Court in South Burlington near Humane Society	Potash 10	44.44572, -73.21348
	Farrell Street in South Burlington near Klinger's Bakery	Potash 20	44.44660, -73.20415
	Dorset Street in South Burlington	Potash 30	44.45150, -73.17849
	Kimball Ave South Burlington	Potash 40	44.45394, -73.14809
Engelsby Brook	Pine St in Burlington near Champlain Elementary Community Gardens	Engelsby 10	44.45627, -73.21394
	Behind UVM Redstone Campus in Burlington	Engelsby 20	44.46654, -73.19741
Alder Brook (new)	Off Chapin Road in Essex	Alder 10	44.51742, -73.06559
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Sunnyside Brook (new)	Mountain View Drive in Colchester	Sunnyside 10	44.50654, -73.17823
Sunderland Brook (new)	In Pearl Street Park in Essex Junction	Sunderland 10	44.50179, -73.12983
	Off Pine Island Road in Colchester	Sunderland 20	44.51685, -73.20421

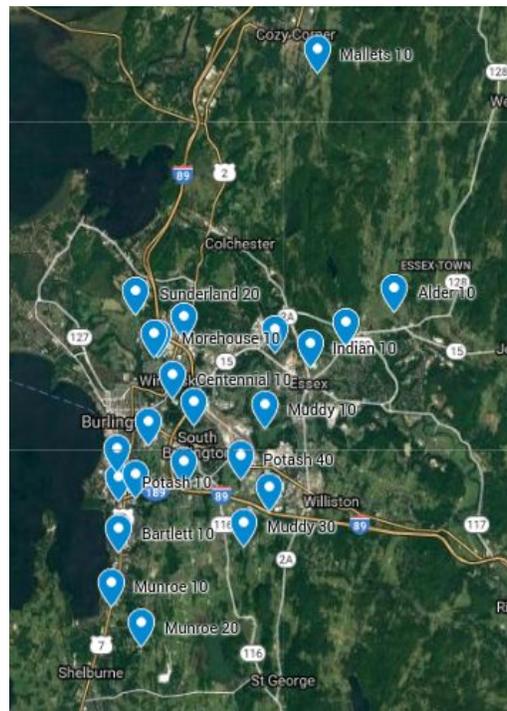


Figure 1: 2018 Rethink Runoff Stream Team Sample Sites. An interactive version of this map is available here: [\[Link\]](#)



Phosphorus Results

Phosphorus is an essential nutrient for plants and animals that is naturally limited in most freshwater systems. Even a modest increase can set off a chain of undesirable events, such as algal blooms, accelerated plant growth, low dissolved oxygen, and the subsequent die off of aquatic life. Although phosphorus occurs naturally in soils and rocks, additional phosphorus enters waterways through runoff from sources such as fertilized lawns and cropland, pet waste, failing septic systems, animal manure from storage areas or livestock access, wastewater treatment plants, and streambank erosion.

Phosphorus sample results continue to be high across all sampling sites. The VT 2016 water quality standard for phosphorus in Class B warm water medium-gradient streams is 27 µg/L but the mean 2018 phosphorus level for every site exceeded this standard (see Table 2).

Table 3. 2018 RRST Phosphorus Results Summary: Mean phosphorus levels in µg/L during both baseflow (dry) and high-flow (rain) sampling events in 2018. Values exceeding the Vermont chronic chloride standard of 27 µg/L are shown in red. Sites denoted with an * had at least one sampling date in which blank or dupe results were flagged. Recalculated means with this data removed resulted in very similar values such that it was decided to keep them for descriptive statistics reporting purposes. Raw data is presented in Appendix C.

Location	Mean Phosphorus during Baseflow - Dry Conditions	Phosphorus during Rain Event
Alder 10*	102.06	--
Bartlett 10	57.02	--
Centennial 10	50.94	88.9
Centennial 20*	62.44	--
Englesby 10*	82.12	--
Englesby 20	98.56	--
Indian 10	41.66	180
Indian 20	97.48	--
Mallets Creek 10	39.68	--
Morehouse 10	30.9	48.8
Morehouse 20	35.86	76.5
Muddy 10	50.4	--
Muddy 20	41.6	--



Muddy 30	116.46	92.3
Munroe 10*	60.86	--
Munroe 20	88.96	--
Potash 10	44.66	--
Potash 20	35.82	--
Potash 30	89.58	--
Potash 40	318.54	--
Sunderland 10	92.94	--
Sunderland 20	55.26	--
Sunnyside 10	27.36	--

Phosphorus levels in Chittenden County Streams 2012-2018

Since the onset of this monitoring program in 2012, mean concentrations of phosphorus during baseflow have remained notably above the 27 µg/L standard at all stream sites. In fact only 7 out of the 23 sites sampled have ever exhibited phosphorus concentrations below this standard (Indian 20, Malletts 10, Morehouse 10 and 20, Potash 10 and 20, and Sunnyside 10). Out of these 7, only one site (Sunnyside 10) reports a median below the standard but the 1-yr sampling mean still falls above the standard (see Table 2 above). Sites of notable historic levels include Engelsby 20, Muddy 10, 20 and 30, Munroe 20, Potash 40, and Sunderland 10.



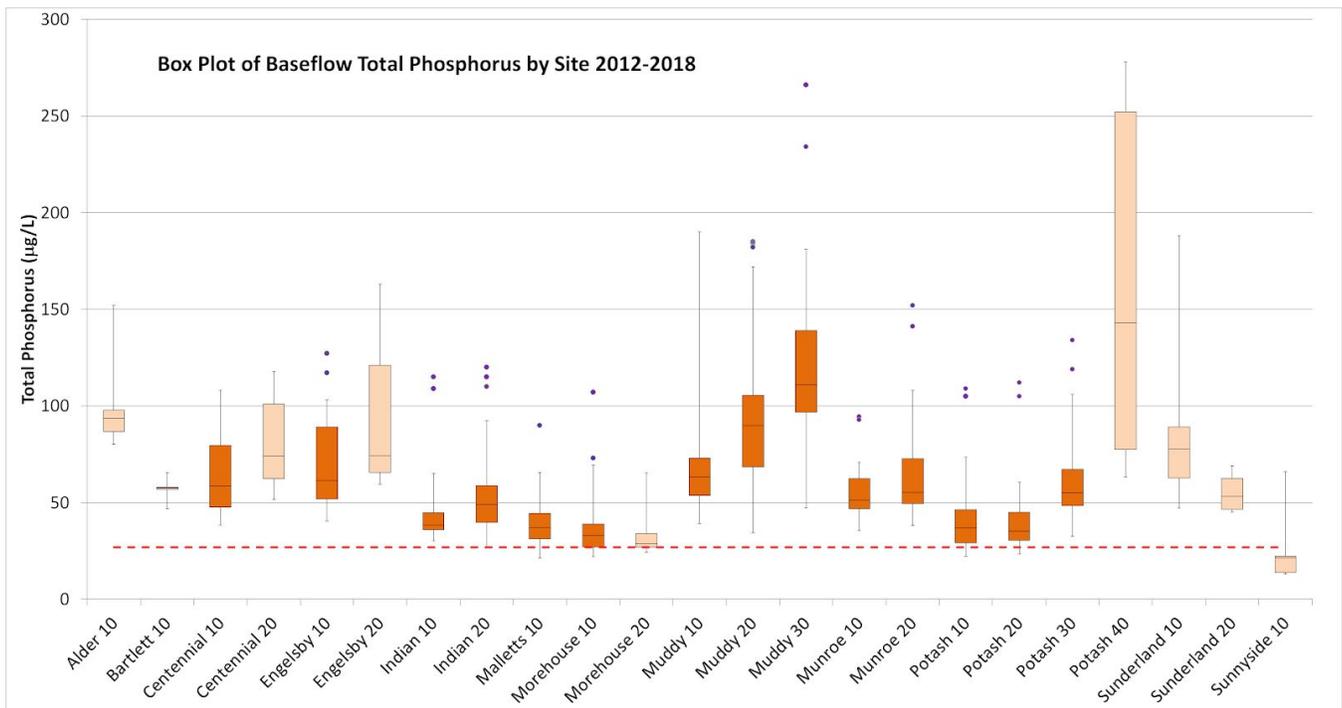


Figure 2. Comparison of total phosphorus levels across sites 2012-2018. Box plots indicate first and third quartiles and median values of total phosphorus concentrations for all sites. These values were calculated including sampling dates that may or may not have associated flagged dupe or blank samples. Lighter colored boxes indicate 1-2 years of sampling data, darker boxes indicate 6-7 years of sampling data. Dots indicate outliers which were identified as equal to or greater than 2 times the site’s standard deviation. Red line indicates Vermont’s 2016 Water Quality Standard of 27 micrograms/L.

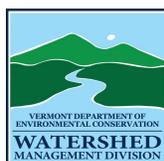
Figure 2 suggests that phosphorus levels increase as sampling moves upstream. To test this hypothesis, RRST used scatter plots to graph phosphorus data over time by stream and ran statistical analyses on 8 streams that had more than one sampling site. Of the 8 streams that have more than one sampling location, 6 indicated a statistically significantly different value of phosphorus between sites, all of which presented statistically significantly higher concentrations of total phosphorus upstream. Table 4 summarizes the results of these tests. Appendix D summarizes statistics and graph visualizations. This result was somewhat surprising and merits more consideration since we assumed that total phosphorus increased in concentration as water moves downstream and more inputs are introduced.



Table 4 Statistical Results of Phosphorus trends along stream lengths. Statistical tests selected because data either had too small a sample size or was not normally distributed and therefore it was not appropriate to do a Paired T-test. While Wilcoxon Signed Rank recognizes dependent samples as could be the case up and down the same stream, the Kruksal-Wallis was the best tool available to reporter but it assumes independent samples so results should be seen with caution. Location of higher concentration was estimated through graphing. Note that all values and sampling dates were included in analysis as long as they could be paired (in the case of the Wilcoxon Signed Rank), including outliers and those flagged with dupe or blank concerns.

Stream	# of Sites	Statistical Test Used	Statistically significant difference?	Location of higher concentration?
Centennial	2	Wilcoxon Signed Rank	Y	Upstream
Engelsby	2	Wilcoxon Signed Rank	N	--
Indian	2	Wilcoxon Signed Rank	Y	Upstream
Morehouse	2	Wilcoxon Signed Rank	N	--
Munroe	2	Wilcoxon Signed Rank	Y	Upstream
Sunderland	2	Wilcoxon Signed Rank	Y	Upstream
Muddy	3	Kruksal-Wallis	Y	Upstream
Potash	4	Kruksal-Wallis	Y	Upstream

Figure 2 also suggests that Muddy Brook has shown consistently high levels of Phosphorus as compared to other sites including some extremely high outliers. Interestingly, temporal data is suggesting a non-significant downward trend of Phosphorus concentrations at sites Muddy 20 and Muddy 30 with Muddy 10 holding relatively constant. This is unique to Muddy Brook and it’s not clear what land use changes or restoration efforts could have contributed to this. Figures 3 and 4 show the suggested trends for Muddy 20 and 30 respectively.



exposed for one hour once every 3 years. 860 mg/L is the highest concentration of chloride to which aquatic life can safely be exposed for four consecutive days once every 3 years.

Table 5. 2018 RRST Chloride Results Summary: This table depicts mean chloride levels in mg/L during baseflow (dry) and high-flow (rain) sampling events in 2018. Values exceeding the Vermont chronic chloride standard of 230 mg/L are shown in red. No sites had a sampling date in which blank or dupe results were flagged for chloride. Raw data is presented in Appendix C.

Location	Mean Chloride in Dry Conditions Only	Chloride during Rain Events
Alder 10	10.93	--
Bartlett 10	256	--
Centennial 10	728	248
Centennial 20	176.2	--
Englesby 10	401.8	--
Englesby 20	711.8	--
Indian 10	257.6	41.55
Indian 20	180.5	--
Mallets Creek 10	50.09	--
Morehouse 10	133.17	38.65
Morehouse 20	490.1	111
Muddy 10	231.2	--
Muddy 20	596	--
Muddy 30	34.2	35.7
Munroe 10	341.4	--
Munroe 20	169.54	--
Potash 10	570.4	--
Potash 20	600.2	--
Potash 30	330	--



Potash 40	737.1	--
Sunderland 10	187.2	--
Sunderland 20	168.2	--
Sunnyside 10	773	--

While in 2017 only three sampled brooks presented mean values above of 230 mg/L, in 2018 nine brooks presented exceedances although this increase is partially attributed to the addition of new sampling sites of concern. Similar to 2017, chloride levels were higher during baseflow conditions in the majority of cases which is suspected to be due to dilution. Chloride grab sample levels exceeded 860 mg chloride/L, in Centennial 10 and Engelsby 20 in 2018. Both streams exceeded this value on 7/10/18 and 7/24/18. This is the first time this value was surpassed in any individual sample over this seven year period. This could result in a need for more continuous monitoring at these sites to gain continuous-flow data.

Chloride levels in Chittenden County Streams 2012-2018

Since the onset of this monitoring program, mean chloride levels at Centennial 10 and Potash 10, 20 and 30 have remained notably above 230 mg/L standard. Recently added sampling sites have also presented alarmingly high data including Engelsby 20, Morehouse 20, Potash 40, and Sunnyside 10.

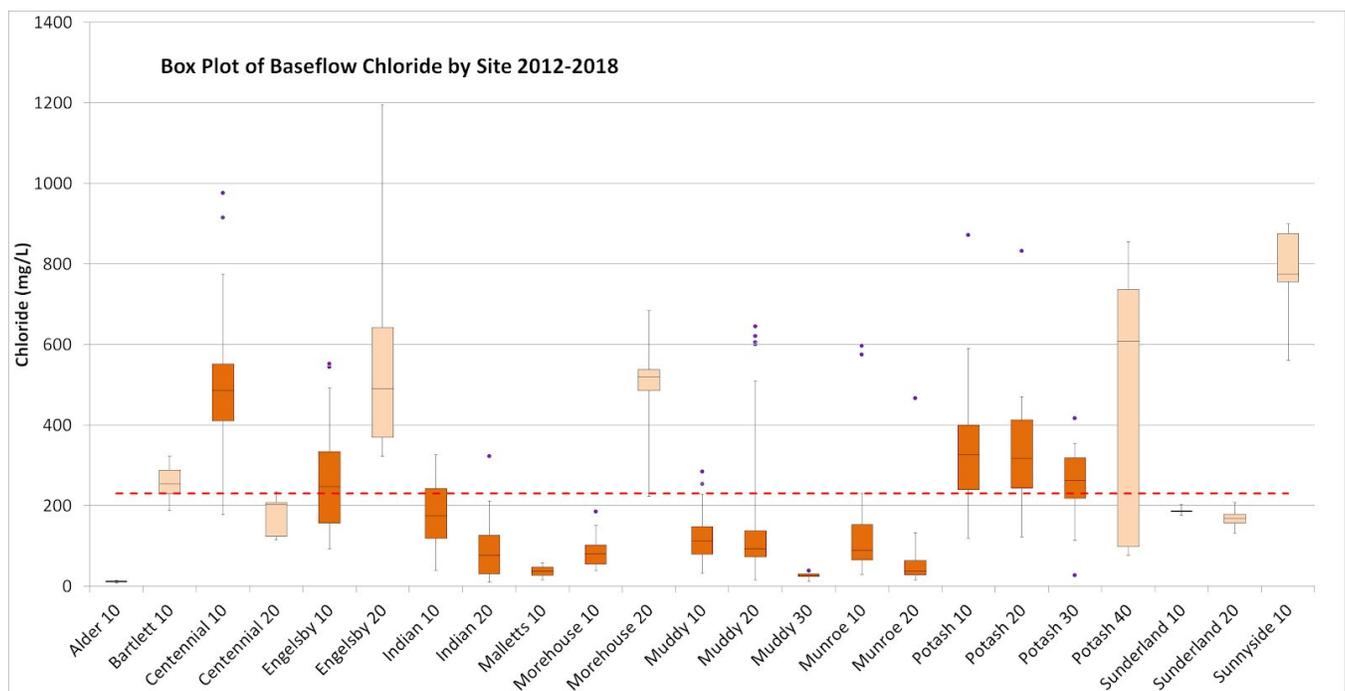
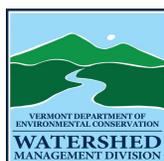


Figure 5 - Comparison of Chloride levels across sites 2012-2018. Box plots indicate first and third quartiles and median values of chloride levels (mg/L) for all sites. Lighter colored boxes indicate 1-2 years of sampling data, darker boxes indicate 6-7 years of sampling data. Dots indicate outliers which were identified as equal to or greater than 2 times the site's standard deviation. EPA's and Vermont's standard for 4-day average chloride levels (230 mg/L) is shown by the red line.



There is not as clear a link between location in the watershed and chloride levels as there is for phosphorus levels but several streams presented statistically significantly different chloride levels across sampling sites. Of the 8 streams that have more than one sampling location, 7 indicated a statistically significantly different value of Chloride between sites. This information could be useful in pin-pointing chloride pressure points along the stream length for intervention purposes. Table 6 summarizes the results of these statistical tests. Appendix E summarizes statistics and graph visualizations.

Table 6 Statistical Results of Chloride trends along stream lengths. See Table 4 note for details.

Stream	# of Sites	Statistical Test Used	Statistically significant difference?	Location of higher concentration?
Centennial	2	Wilcoxon Signed Rank	Y	Downstream
Engelsby	2	Wilcoxon Signed Rank	Y	Upstream
Indian	2	Wilcoxon Signed Rank	Y	Downstream
Morehouse	2	Wilcoxon Signed Rank	Y	Upstream
Munroe	2	Wilcoxon Signed Rank	Y	Downstream
Sunderland	2	Wilcoxon Signed Rank	N	--
Muddy	3	Kruksal-Wallis	Y	Midstream (site 20)
Potash	4	Kruksal-Wallis	Y	Unclear

Chloride data from this sampling program suggests that of the 14 sites that have been sampled for 6 or more years, chloride levels are trending upwards in 10 of them (Centennial 10, Engelsby 10, Indian 10 and 20, Malletts 10, Muddy 30, Munroe 10 and 20, and Potash 10 and 20). These trends are not statistically significant but highlight an important stressor to monitor closely. Appendix F documents graphs of these trends.

Aggregated data also suggests a general increasing trend in chloride. Figure 6 below shows that the mean, median, and standard deviation values have all increased slightly over time.



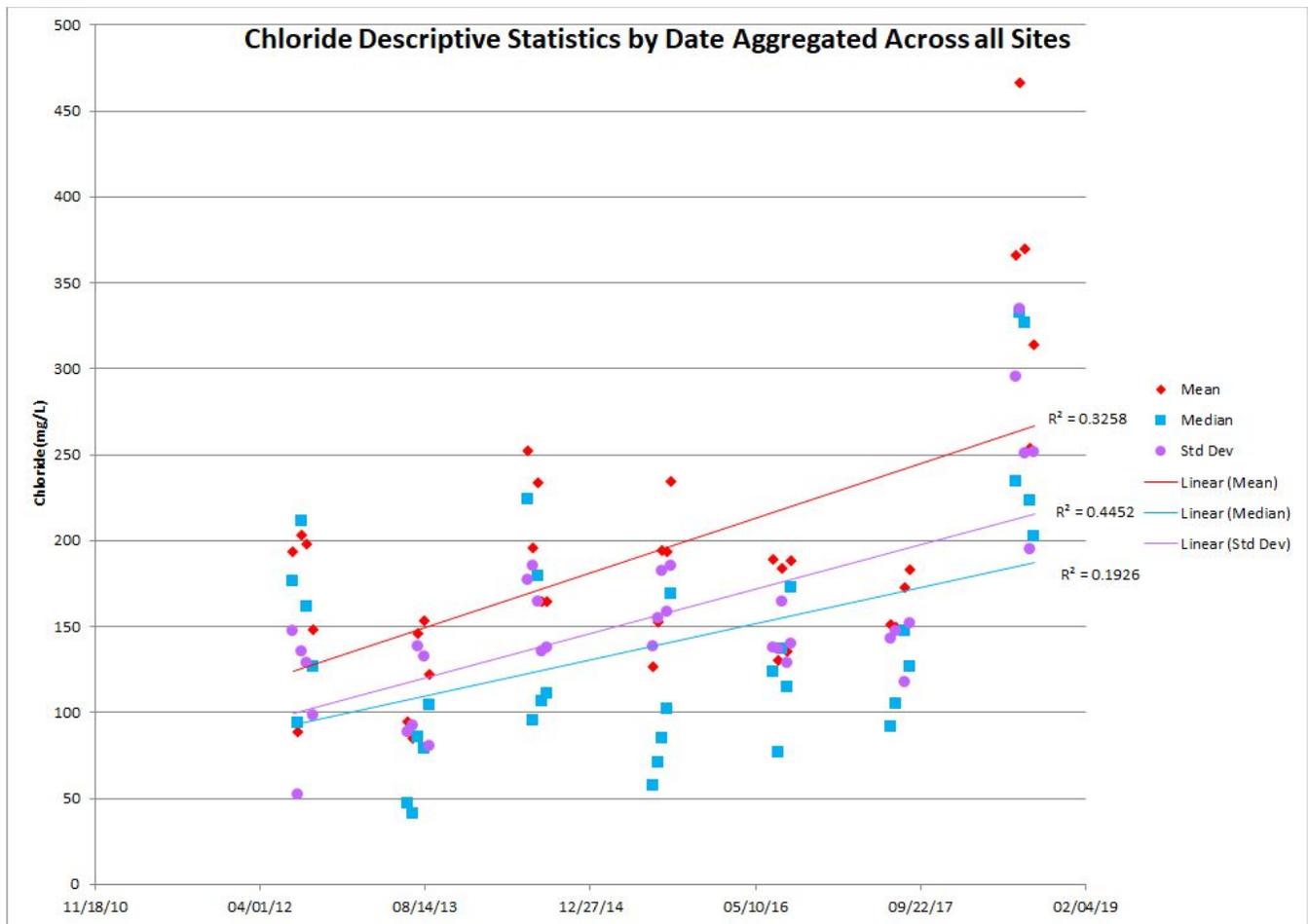


Figure 6. Descriptive Statistics for chloride data gathered across sites aggregated by date. Each sampling date since June 2016 had chloride values across sites averaged to determine mean, median, and standard deviation for the entire sampling area.

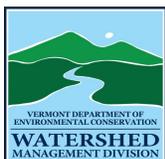
Turbidity Results

The turbidity of a water sample refers to its cloudiness. This measurement is based on the amount of algae, microbes, and sediment suspended in the water. High turbidity levels can negatively impact aquatic life by raising water temperature, decreasing forage and cover, and harming gill function, and has the potential to increase the presence and number disease-causing organisms. Turbidity measurements can also be used as an indicator for erosion and increased nutrient levels in streams. The Vermont Water Quality Standards state that turbidity should not exceed 10 NTU (nephelometric turbidity units) in cold-water fish habitat and 25 NTU in warm-water fish habitat.



Table 7. 2018 RRST Turbidity Results Summary. Mean turbidity levels in NTU baseflow (dry) and high-flow (rain) sampling events in 2018. Overall mean values exceeding the Vermont standard of 25 NTU are shown in red. Raw data is presented in Appendix C.

Location	Mean Turbidity in Dry Conditions Only	Turbidity during Rain Event
Alder 10	30.9	--
Bartlett 10	11.402	--
Centennial 10	5.198	18.2
Centennial 20	3.462	--
Englesby 10	6.92	--
Englesby 20	2.242	--
Indian 10	7.738	64.9
Indian 20	9.104	--
Mallets Creek 10	4.772	--
Morehouse 10	5.938	8.52
Morehouse 20	2.816	21.3
Muddy 10	6.252	--
Muddy 20	5.928	--
Muddy 30	17.68	11.5
Munroe 10	6.724	--
Munroe 20	18.9	--
Potash 10	4.868	--
Potash 20	1.488	--
Potash 30	10.782	--
Potash 40	39.32	--
Sunderland 10	8.032	--



Sunderland 20	10.106	--
Sunnyside 10	11.044	--

Mean baseflow turbidity levels did not exceed the VT Water Quality standard for turbidity of 25 nephelometric units (NTU) for warm-water fish habitat in 2018 except at Potash 40 and Alder 10. This represents an increase of two sites as compared to 2017 but one of these sites was newly added in 2018. As suspected, turbidity concentrations were mostly higher during rain events, and surpassed standards on Indian Brook alone.

Turbidity Levels in Chittenden County Streams 2012-2018

Mean, baseflow turbidity values have only rarely exceeded the VT standard for warm-water streams of 25 NTU over the seven year sampling period. Of note, however, is the high turbidity recorded for new sampling sites Alder 10 and Potash 40. Higher turbidity in Alder 10 is not surprising because the site is comparatively more agricultural with a couple farms and potential field runoff nearby. Turbidity has not been included in sampling support requests for the 2019 field season but will be revisited in 2020.

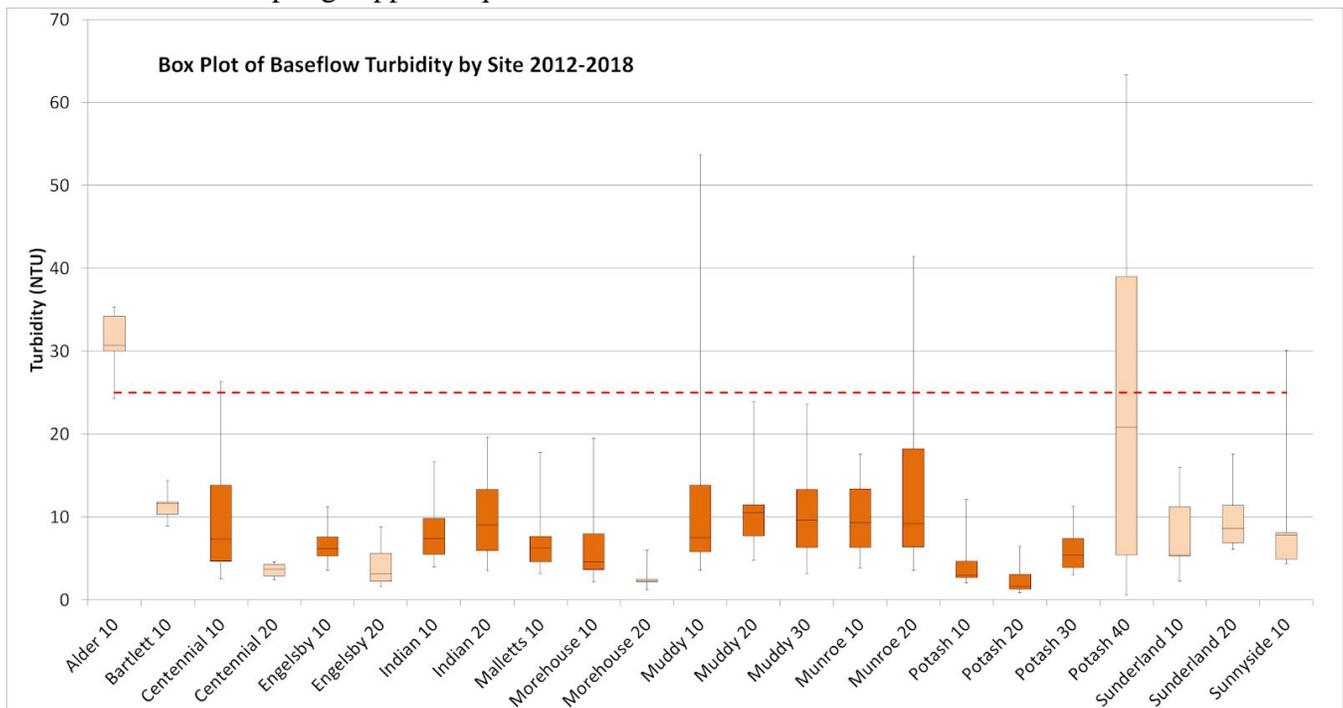


Figure 7 - Comparison of turbidity levels 2012-2018 during baseflow (dry) conditions. The standard proposed by the State of Vermont for mean turbidity at baseflow in medium gradient, warm water streams (25 NTU) is indicated by the red line. These values were calculated including sampling dates that may or may not have associated flagged dupe or blank samples.

Importantly, it was challenging to secure valid turbidity data for the 2018 sampling season. Appendix A will reveal a mean relative percent difference between duplicate and actual samples above the acceptable 15%. Some but not all of this was due to having very low sample values in relation to test sensitivity.



This adds to the Stream Team’s resolve to remove this parameter from future sampling activities for the time being.

Turbidity was statistically significantly different along only two streams (Morehouse and Potash). The Morehouse site results, while significant, both fell under the water quality standards such that the difference is of less interest to the research team. In contrast, Potash 40 presented turbidity levels which both exceeded water quality standards and were significantly different from other sites along that brook. The sampling team suspects this could be due to the unique hydrology of Potash 40 which is located among a complex of artificial wetlands within an industrial park. The water has no noticeable flow rate or direction and presents less as a stream and more as a marsh. It is suspected that in-stream sampling practices might disturb a lot of bottom sediment in such a setting thereby leading to higher turbidity readings. Considering this, Potash 40 has been removed from the 2019 sampling program.

Visualization revealed no notable trends in turbidity data over time and it is therefore not currently recognized as a high priority threat.

Conclusion

The Rethink Runoff Stream Team has monitored chloride, phosphorus, and turbidity in various, stormwater impaired streams in Chittenden County for the past seven consecutive years (2012-2018). The 2018 season’s results are similar to those obtained over the past six years, and indicate that all stream sites have sustained phosphorus levels well above the Vermont standard and that chloride is becoming a prevalent and growing concern.

Phosphorus levels in almost all sampled streams have remained two to four times the Vermont water quality standard of 27 µg/L. Muddy Brook continues to maintain high levels of phosphorus although values are potentially trending downwards. Six streams sampled also showed statistically significantly higher concentrations of total phosphorus upstream as opposed to downstream which presents an opportunity to explore localized stressors. It’s important to consider that while phosphorus levels are presenting high in many sites, turbidity levels are low. This provides some clues as to sources of phosphorus and should inform phosphorus reduction efforts. For example, it is possible these high phosphorus values can be attributed to more urban-like runoff such as car wash detergents, liquid lawn fertilizers, and pet waste.

Chloride levels continue to surpass standards in several streams, most notably at Centennial 10, Engelsby 20, Morehouse 20, Potash 40, and Sunnyside 10. For the first time in Stream Team’s sampling history, chloride levels exceeded the EPA’s and VT’s acute standard of 860 mg chloride/L on the same two sampling dates at both Centennial 10 and Engelsby 20. As mentioned in prior year reports it is suspected that Engelsby’s high levels are due to a nearby parking lots on the UVM campus but further assessments should consider rising stressors across the sampling region at all sites of concern.

Low turbidity values in most sites reveal this does not appear to be a significant stressor in the Chittenden County area although research team should consider potential sediment inputs upstream of



Alder 10 for remediation. After seven years of showing minimal concern, turbidity will be abandoned at most locations in the 2019 season.

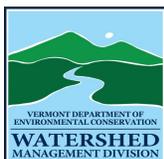
There will be a few sampling adjustments made to the 2019 sampling effort. Potash 40 will be removed because of its unique and confounding hydrological conditions that complicates data analysis. Munroe 10 seems to be located physically too close to Munroe 20 to be giving any valuable information on landscape impacts so it will similarly be abandoned. Munroe 20 will be kept, however as a valuable data point because a housing development is planned and will be implemented upstream soon. Finally, Bartlett 10 will be removed because it is already sampled by a team from UVM.

It became clear this year that, moving forward, the Stream Team needs explicit guidance and documented practices in the QAPP for dealing with outliers and data points whose duplicates or blanks were flagged. For 2018 analysis all data points were included because those whose duplicates or blanks were flagged, still had values less than two standard deviations from the mean. Outliers, similarly, only presented when multi-year data was assessed such that for 2018-specific descriptive statistics, all data points were included. Given the small sampling sizes, however, (5 - 6 data points per site per year) this may not be a reliable practice for future analysis and consultation will be sought from the La Rosa Partnership for technical guidance on this practice.

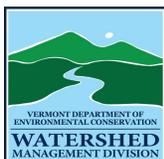
Finally, it is the goal of this team to improve outward reporting of these data such that each stream could eventually receive some type of scorecard and summary sheet across the multiple parameters evaluated. We expect that scoring, and then ranking streams holistically is one step towards simplifying where to direct remediation efforts. This may be attempted in the 2019 report.



Appendix A. Quality Assurance Measures for phosphorus, chloride, and turbidity sampling in 2018.



RPD Analysis			
Date	Location	Test	RPD (%)
07/10/18	Munroe 20	Chloride (mg/L)	0.00
		TP(ug P/L)	17.52
		Turbidity (NTU)	7.92
	Muddy 10	Chloride (mg/L)	0.59
		TP(ug P/L)	4.96
		Turbidity (NTU)	3.79
	Engelsby 10	Chloride (mg/L)	1.61
		TP(ug P/L)	71.28
		Turbidity (NTU)	1.00
07/24/18	Potash 20	Chloride (mg/L)	0.48
		TP(ug P/L)	0.00
		Turbidity (NTU)	18.62
	Muddy 30	Chloride (mg/L)	1.20
		TP(ug P/L)	0.98
		Turbidity (NTU)	2.96
	Indian 10	Chloride (mg/L)	3.28
		TP(ug P/L)	0.78
		Turbidity (NTU)	2.57
08/07/18	Potash 30	Chloride (mg/L)	0.00
		TP(ug P/L)	0.91
		Turbidity (NTU)	7.76
	Munroe 10	Chloride (mg/L)	0.87
		TP(ug P/L)	10.23
		Turbidity (NTU)	20.16
	Indian 20	Chloride (mg/L)	0.49
		TP(ug P/L)	4.08
		Turbidity (NTU)	20.61
08/21/18	Potash 40	Chloride (mg/L)	0.70
		TP(ug P/L)	2.81
		Turbidity (NTU)	52.12
	Malletts 10	Chloride (mg/L)	1.94
		TP(ug P/L)	0.60
		Turbidity (NTU)	4.62
	Bartlett 10	Chloride (mg/L)	0.78
		TP(ug P/L)	1.69
		Turbidity (NTU)	5.22
09/04/18	Sunderland 10	Chloride (mg/L)	1.00
		TP(ug P/L)	9.52
		Turbidity (NTU)	33.93
	Morehouse 10	Chloride (mg/L)	2.80
		TP(ug P/L)	12.66
		Turbidity (NTU)	89.69
	Centennial 20	Chloride (mg/L)	0.81
		TP(ug P/L)	24.39
		Turbidity (NTU)	38.43
Mean RPD	Parameter	Actual	Target
	Chloride (mg/L)	1.10	≤5
	TP(ug P/L)	10.83	≤30
	Turbidity (NTU)	20.63	≤15



Appendix B. Project Completeness

Project proposal anticipated 5 dates for baseflow sampling across 23 sites (115 samples per parameter) as well as 2 rain dates sampling across 5 sites (10 samples per parameter). This is a total of 125 samples per parameter not including duplicates and blanks.

Parameter	Number of Samples Anticipated (not including blanks and Dupes) = 23 sites*5 sampling dates	Number of Valid Samples* Collected and Analyzed	Percent Complete
Chloride	125	121	97%
Total Phosphorus	125	116	93%
Turbidity	125	117	94%

*“Valid sample” includes all samples not flagged by issues that arose from blank or dupe results

Appendix C. Individual Sample Results. Boxes highlighted in yellow indicate issue flagged by inconsistent blank result. Boxes highlighted in red indicate sample whose duplicate is notably different in value. All values included in graphing and statistical analyses of 2018 report.

Sample Number	Location	Date	Chloride (mg/L)	TP(ug P/L)	Turbidity (NTU)
181280-01	Alder 10	7/10/2018	12	152	35.3
181398-01	Alder 10	7/24/2018	13.4	97.8	24.3
181538-01	Alder 10	8/7/2018	9.73	86.7	30
181652-01	Alder 10	8/21/2018	7.82	80.1	34.2
181809-01	Alder 10	9/4/2018	11.7	93.7	30.7
181280-02	Alder 10 Blank	7/10/2018	< 2	5.48	< 0.2
181280-03	Bartlett 10	7/10/2018	229	57.8	11.6
181398-02	Bartlett 10	7/24/2018	322	56.8	10.3
181538-02	Bartlett 10	8/7/2018	288	65.7	14.4



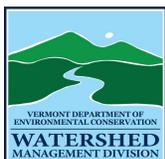
181652-02	Bartlett 10	8/21/2018	254	46.9	11.8
181809-02	Bartlett 10	9/4/2018	187	57.9	8.91
181652-03	Bartlett 10 Field Dup	8/21/2018	256	47.7	11.2
181398-04	Centennial 10 Blank	7/24/2018	< 2	< 5	< 0.2
181280-04	Centennial 10	7/10/2018	915	46.4	3.79
181398-03	Centennial 10	7/24/2018	976	57.7	7.39
181538-03	Centennial 10	8/7/2018	775	40.9	3.2
181629-01	Centennial 10	8/18/2018	248	88.9	18.2
181652-04	Centennial 10	8/21/2018	430	47.7	6.08
181809-03	Centennial 10	9/4/2018	544	62	5.53
181280-05	Centennial 10 Blank	7/10/2018	< 2	< 5	< 0.2
181280-06	Centennial 20	7/10/2018	234	74.1	2.88
181398-05	Centennial 20	7/24/2018	202	62.3	3.7
181538-04	Centennial 20	8/7/2018	207	51.6	2.43
181652-05	Centennial 20	8/21/2018	114	66.6	3.74
181809-05	Centennial 20	9/4/2018	124	57.6	4.56
181538-05	Centennial 20 Blank	8/7/2018	< 2	9.17	0.5
181809-04	Centennial 20 Dup	9/4/2018	123	73.6	3.09
181280-07	Engelsby 10	7/10/2018	492	102	6.05
181398-06	Engelsby 10	7/24/2018	544	44.4	5.94
181538-06	Engelsby 10	8/7/2018	480	51.9	4.36
181652-06	Engelsby 10	8/21/2018	296	117	14.1



181809-06	Engelsby 10	9/4/2018	197	95.3	4.15
181398-07	Engelsby 10 Blank	7/24/2018	< 2	< 5	< 0.2
181280-08	Engelsby 10 Field Dup	7/10/2018	500	48.4	5.99
181280-09	Engelsby 20	7/10/2018	1030	103	3.12
181398-08	Engelsby 20	7/24/2018	1195	121	2.56
181538-07	Engelsby 20	8/7/2018	642	129	1.58
181652-07	Engelsby 20	8/21/2018	370	74.2	2.25
181809-07	Engelsby 20	9/4/2018	322	65.6	1.7
181538-08	Engelsby 20 Blank	8/7/2018	< 2	< 5	< 0.2
181280-10	Indian 10	7/10/2018	288	38.9	14.5
181398-09	Indian 10	7/24/2018	300	38.5	3.94
181538-09	Indian 10	8/7/2018	326	37.8	5.46
181629-02	Indian 10	8/18/2018	41.55	180	64.9
181652-08	Indian 10	8/21/2018	140	43.2	4.96
181809-08	Indian 10	9/4/2018	234	49.9	9.83
181652-09	Indian 10 Blank	8/21/2018	< 2	< 5	< 0.2
181398-10	Indian 10 Field Dup	7/24/2018	310	38.8	3.84
181280-11	Indian 20	7/10/2018	131	115	13.6
181398-11	Indian 20	7/24/2018	322	110	6.63
181538-10	Indian 20	8/7/2018	206	120	5.92
181652-10	Indian 20	8/21/2018	55.5	68.3	11.8
181809-09	Indian 20	9/4/2018	188	74.1	7.57



181809-10	Indian 20 Blank	9/4/2018	< 2	< 5	0.23
181538-11	Indian 20 Field Dup	8/7/2018	205	125	7.28
181809-11	Malletts 10	9/4/2018	54.5	44.4	4.61
181280-12	Malletts 10	7/10/2018	48.15	41.2	6.25
181398-12	Malletts 10	7/24/2018	57	36.7	3.22
181538-12	Malletts 10	8/7/2018	47.35	42.6	4.28
181652-11	Malletts 10	8/21/2018	43.45	33.5	5.5
181652-12	Malletts 10 Field Dup	8/21/2018	44.3	33.7	5.76
181280-13	Morehouse 10	7/10/2018	136	32.9	10.2
181398-13	Morehouse 10	7/24/2018	185	26.2	6.18
181538-13	Morehouse 10	8/7/2018	150	26	2.18
181629-03	Morehouse 10	8/18/2018	38.65	48.8	8.52
181652-13	Morehouse 10	8/21/2018	49.85	32.4	3.59
181809-12	Morehouse 10	9/4/2018	145	37	7.54
181280-14	Morehouse 10 Blank	7/10/2018	< 2	< 5	< 0.2
181809-13	Morehouse 10 Dup	9/4/2018	141	42	19.8
181280-15	Morehouse 20	7/10/2018	537.5	27.1	5.99
181398-14	Morehouse 20	7/24/2018	684	24.4	1.23
181538-14	Morehouse 20	8/7/2018	486	65.3	2.48
181629-04	Morehouse 20	8/18/2018	111	76.5	21.3
181652-14	Morehouse 20	8/21/2018	223	28.5	2.18
181809-14	Morehouse 20	9/4/2018	520	34	2.2



181629-05	Morehouse 20 Blank	8/18/2018	< 2	< 5	0.22
181280-16	Muddy 10	7/10/2018	170	55.1	7.5
181398-15	Muddy 10	7/24/2018	220	51.8	6.87
181538-15	Muddy 10	8/7/2018	228	43.1	4.11
181652-15	Muddy 10	8/21/2018	254	49.8	6.31
181809-15	Muddy 10	9/4/2018	284	52.2	6.47
181398-16	Muddy 10 Blank	7/24/2018	< 2	< 5	0.23
181280-17	Muddy 10 Field Dup	7/10/2018	171	57.9	7.79
181280-18	Muddy 20	7/10/2018	645	34.5	4.97
181398-17	Muddy 20	7/24/2018	620	36.9	4.77
181538-16	Muddy 20	8/7/2018	600	41.8	5.9
181652-16	Muddy 20	8/21/2018	510	50.2	7.72
181809-16	Muddy 20	9/4/2018	605	44.6	6.28
181538-17	Muddy 20 Blank	8/7/2018	< 2	< 5	< 0.2
181280-19	Muddy 30	7/10/2018	31.2	107	21.1
181398-18	Muddy 30	7/24/2018	33.4	102	13.3
181538-18	Muddy 30	8/7/2018	34	114	13.9
181629-06	Muddy 30	8/18/2018	35.7	92.3	11.5
181652-17	Muddy 30	8/21/2018	38.25	84.3	16.5
181809-17	Muddy 30	9/4/2018	34.15	175	23.6
181652-18	Muddy 30 Blank	8/21/2018	< 2	< 5	< 0.2
181398-19	Muddy 30 Field Dup	7/24/2018	33	103	13.7



181280-20	Munroe 10	7/10/2018	230	54.4	5.25
181398-20	Munroe 10	7/24/2018	596	69.5	8.69
181538-19	Munroe 10	8/7/2018	575	64.9	8.25
181652-19	Munroe 10	8/21/2018	152	52.6	5.28
181809-18	Munroe 10	9/4/2018	154	62.9	6.15
181809-19	Munroe 10 Blank	9/4/2018	< 2	7.58	< 0.2
181538-20	Munroe 10 Field Dup	8/7/2018	570	71.9	10.1
181280-21	Munroe 20	7/10/2018	92.9	108	30.2
181398-21	Munroe 20	7/24/2018	466	88.8	33.9
181538-21	Munroe 20	8/7/2018	132	116	9.2
181652-20	Munroe 20	8/21/2018	63	55.2	6.7
181809-20	Munroe 20	9/4/2018	93.8	76.8	14.5
181280-22	Munroe 20 Field Dup	7/10/2018	92.9	90.6	27.9
181280-23	Potash 10	7/10/2018	490	32	2.84
181398-22	Potash 10	7/24/2018	872	31.6	2.39
181538-22	Potash 10	8/7/2018	484	41.4	4.09
181652-21	Potash 10	8/21/2018	416	74.3	12.1
181809-21	Potash 10	9/4/2018	590	44	2.92
181280-24	Potash 20	7/10/2018	470	31.7	0.98
181398-23	Potash 20	7/24/2018	832	30.3	1.12
181538-23	Potash 20	8/7/2018	416	33.8	1.02
181629-07	Potash 20	8/18/2018	187	74	8.71



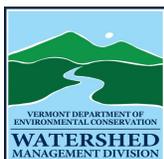
181652-22	Potash 20	8/21/2018	460	37.8	1.39
181809-22	Potash 20	9/4/2018	823	45.5	2.93
181398-24	Potash 20 Field Dup	7/24/2018	828	30.3	1.35
181280-25	Potash 30	7/10/2018	338	104	3.13
181398-25	Potash 30	7/24/2018	332	98	3.39
181538-24	Potash 30	8/7/2018	416	55.1	4.09
181652-23	Potash 30	8/21/2018	348	71.8	32
181809-23	Potash 30	9/4/2018	216	119	11.3
181538-25	Potash 30 Field Dup	8/7/2018	416	54.6	4.42
181280-26	Potash 40	7/10/2018	607.5	252	50.2
181398-26	Potash 40	7/24/2018	736	277.8	39
181538-26	Potash 40	8/7/2018	855	847.8	23.3
181652-24	Potash 40	8/21/2018	720	72.1	20.8
181809-24	Potash 40	9/4/2018	767	143	63.3
181652-25	Potash 40 Field Dup	8/21/2018	715	70.1	12.2
181280-27	Sunderland 10	7/10/2018	176	77.8	11.2
181398-27	Sunderland 10	7/24/2018	185	62.7	5.41
181538-27	Sunderland 10	8/7/2018	186	188	16
181652-26	Sunderland 10	8/21/2018	187	89.2	2.24
181809-25	Sunderland 10	9/4/2018	202	47	5.31
181652-27	Sunderland 10 Blank	8/21/2018	< 2	< 5	< 0.2
181809-26	Sunderland 10 Dup	9/4/2018	200	51.7	7.48



181280-28	Sunderland 20	7/10/2018	208	45.1	6.07
181398-28	Sunderland 20	7/24/2018	156	62.4	11.4
181538-28	Sunderland 20	8/7/2018	178	53.3	8.57
181652-28	Sunderland 20	8/21/2018	131	68.9	17.6
181809-27	Sunderland 20	9/4/2018	168	46.6	6.89
181809-28	Sunderland 20 Blank	9/4/2018	< 2	< 5	< 0.2
181280-29	Sunnyside 10	7/10/2018	900	21.5	4.91
181398-29	Sunnyside 10	7/24/2018	875	22.3	8.07
181538-29	Sunnyside 10	8/7/2018	775	13	4.37
181652-29	Sunnyside 10	8/21/2018	560	13.9	7.77
181809-29	Sunnyside 10	9/4/2018	755	66.1	30.1

Appendix D. Statistically Different Phosphorus Up and Downstream

Stream	Test statistic, Critical Value, Two-tailed Alpha Value	Visualization
Centennial	0,6,0.05	<p>Phosphorus Up and Downstream Centennial</p> <p>The chart displays phosphorus concentration (P in µg/L) on the y-axis (0.00 to 180.00) against dates on the x-axis (06/27/17, 10/27/17, 02/27/18, 06/27/18). A horizontal green line represents the P Limit at approximately 25 µg/L. Blue diamonds represent Centennial 10 data points, and red squares represent Centennial 20 data points. Centennial 20 values are generally higher than Centennial 10 values, with several points exceeding the P Limit.</p>



<p>Indian</p> <p>159, 187, 0.05</p>		<h3 style="text-align: center;">Phosphorous Up and Downstream Indian</h3> <p style="text-align: center;">Date</p>
<p>Munroe</p> <p>90,127,0.05</p>		<h3 style="text-align: center;">Phosphorus Up and Downstream Munroe</h3> <p style="text-align: center;">Date</p>
<p>Sunderland</p> <p>0,1, 0.1</p>		<h3 style="text-align: center;">Phosphorus Up and Downstream Sunderland</h3> <p style="text-align: center;">Date</p>

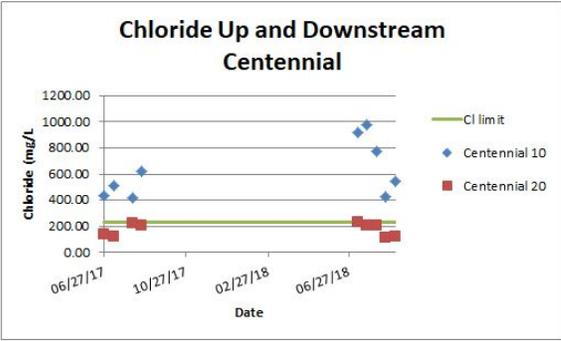
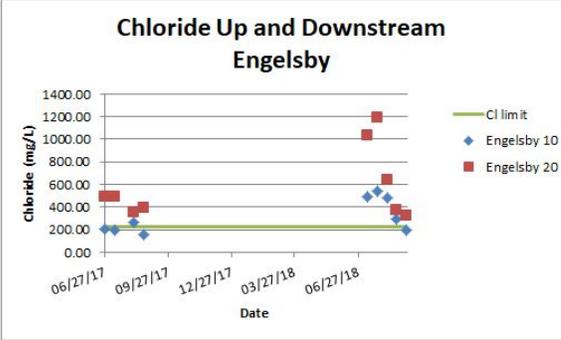
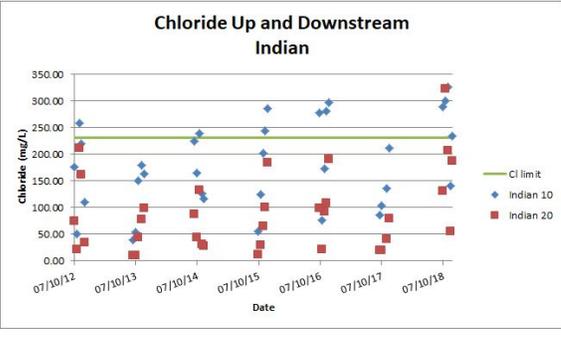
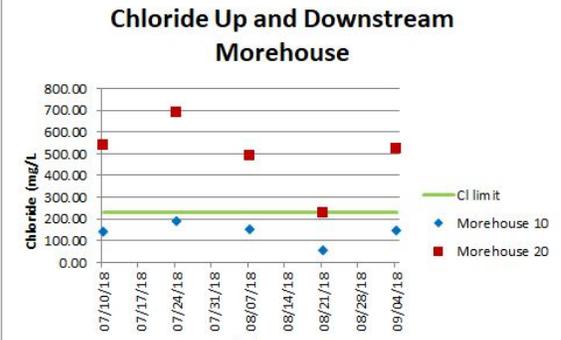


Site	K, Critical Value, Two tailed Alpha Value	Visualization
Muddy	26.85, 5.99, 0.05	
Potash	43.94, 7.81, 0.05	

Appendix E. Statistically Different Chloride Up and Downstream

Stream	Test statistic, Critical Value, Two-tailed Alpha Value	Visualization



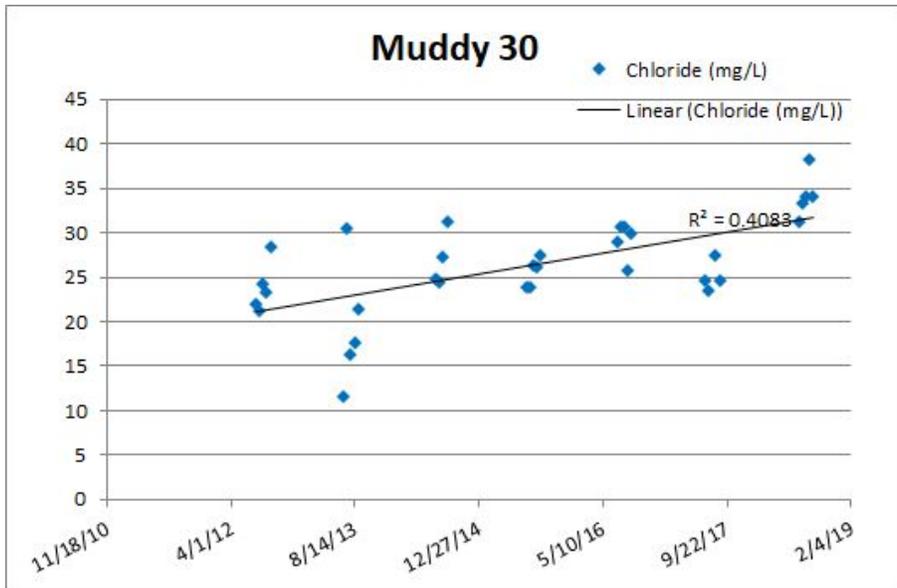
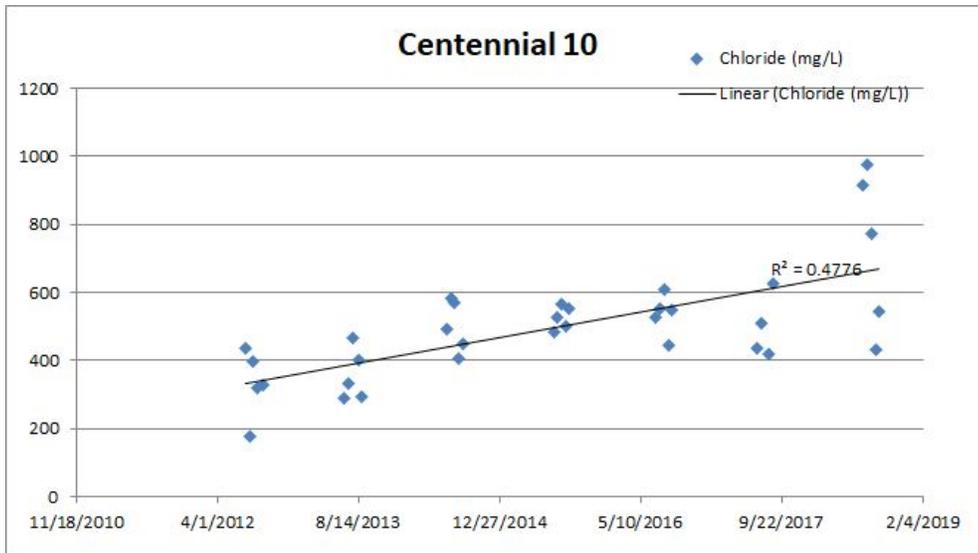
Centennial	0, 6, 0.05	 <p>Chloride Up and Downstream Centennial</p> <p>This scatter plot shows chloride levels (mg/L) from 06/27/17 to 06/27/18. The y-axis ranges from 0.00 to 1200.00. A green horizontal line represents the 'Cl limit' at approximately 200 mg/L. Blue diamonds represent 'Centennial 10' and red squares represent 'Centennial 20'. Most data points are below the limit, with a notable spike for Centennial 10 in early 2018.</p>
Engelsby	0, 6, 0.05	 <p>Chloride Up and Downstream Engelsby</p> <p>This scatter plot shows chloride levels (mg/L) from 06/27/17 to 06/27/18. The y-axis ranges from 0.00 to 1400.00. A green horizontal line represents the 'Cl limit' at approximately 200 mg/L. Blue diamonds represent 'Engelsby 10' and red squares represent 'Engelsby 20'. There is a significant spike for Engelsby 20 in early 2018, reaching over 1000 mg/L.</p>
Indian	1, 187, 0.05	 <p>Chloride Up and Downstream Indian</p> <p>This scatter plot shows chloride levels (mg/L) from 07/10/12 to 07/10/18. The y-axis ranges from 0.00 to 350.00. A green horizontal line represents the 'Cl limit' at approximately 250 mg/L. Blue diamonds represent 'Indian 10' and red squares represent 'Indian 20'. Data points fluctuate around the limit, with several points for Indian 10 exceeding it.</p>
Morehouse	0, 1, 0.1	 <p>Chloride Up and Downstream Morehouse</p> <p>This scatter plot shows chloride levels (mg/L) from 07/10/18 to 09/04/18. The y-axis ranges from 0.00 to 800.00. A green horizontal line represents the 'Cl limit' at approximately 200 mg/L. Blue diamonds represent 'Morehouse 10' and red squares represent 'Morehouse 20'. There are several spikes for Morehouse 20, with one reaching nearly 700 mg/L.</p>

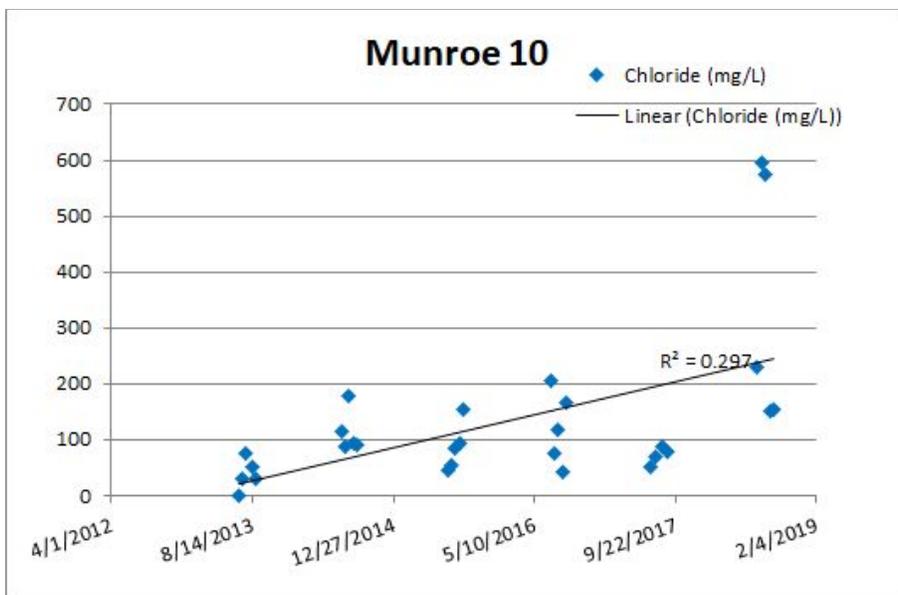
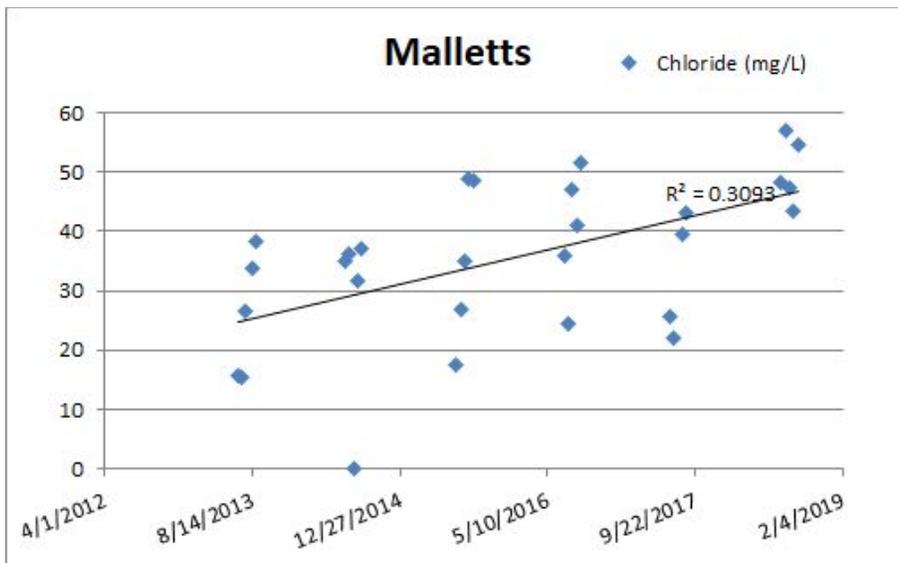


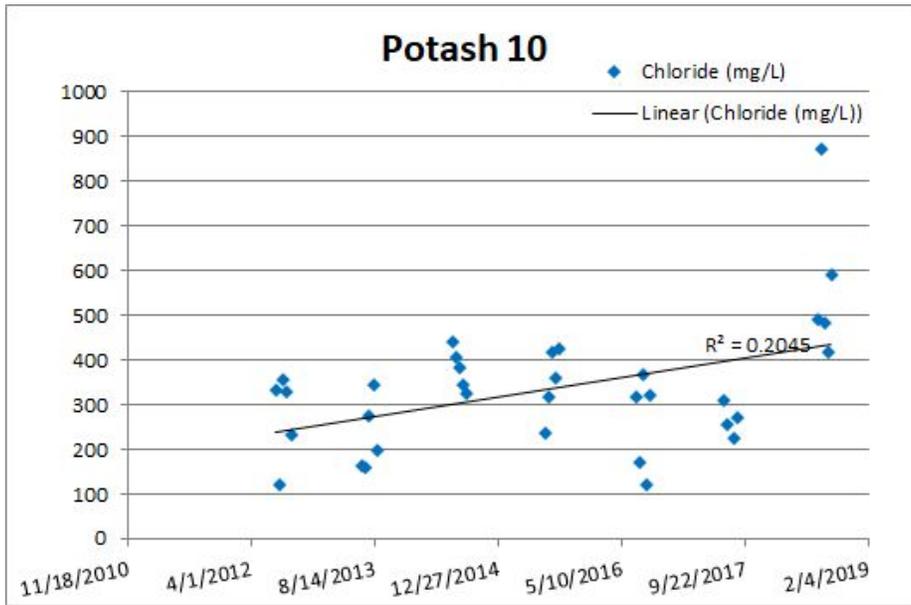
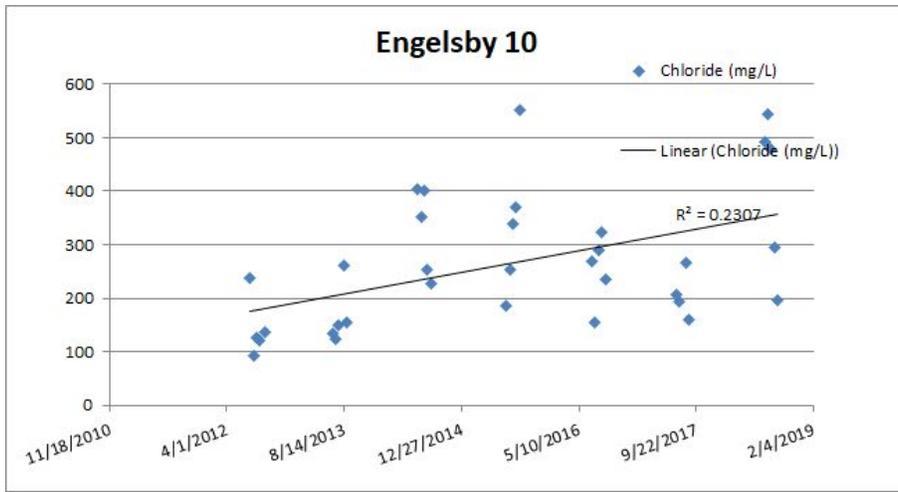
Munroe	9, 117, 0.05	
Site	K, Critical Value, Two tailed Alpha Value	Visualization
Muddy	57.23, 5.99, 0.05	
Potash	8.33, 7.81, 0.05	

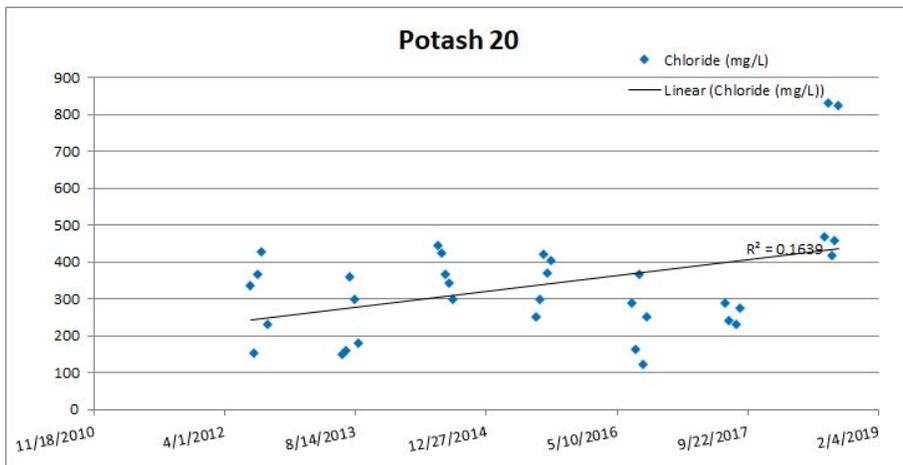
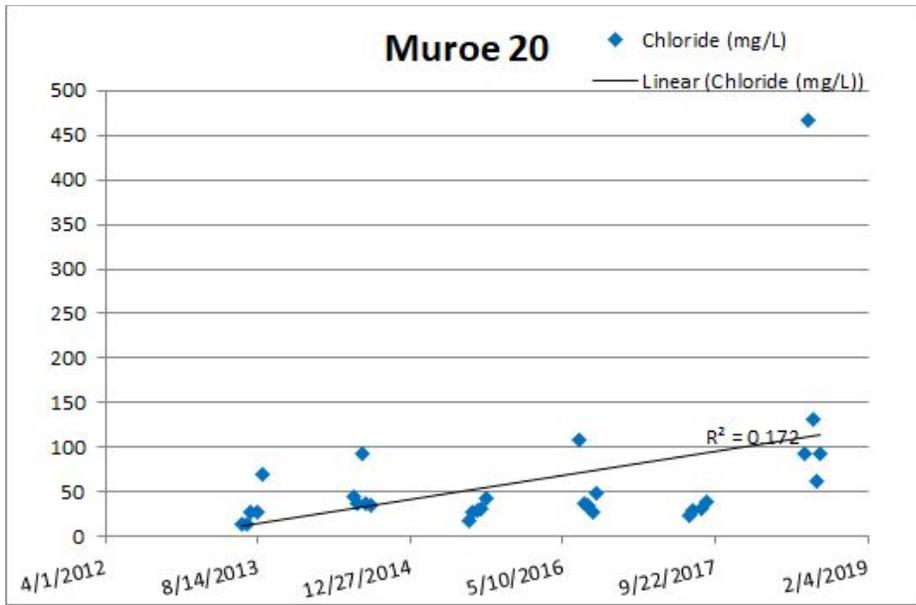
Appendix F. Notable Trends in Chloride Increases Over Time By Site. Sorted in descending order by R2 values.

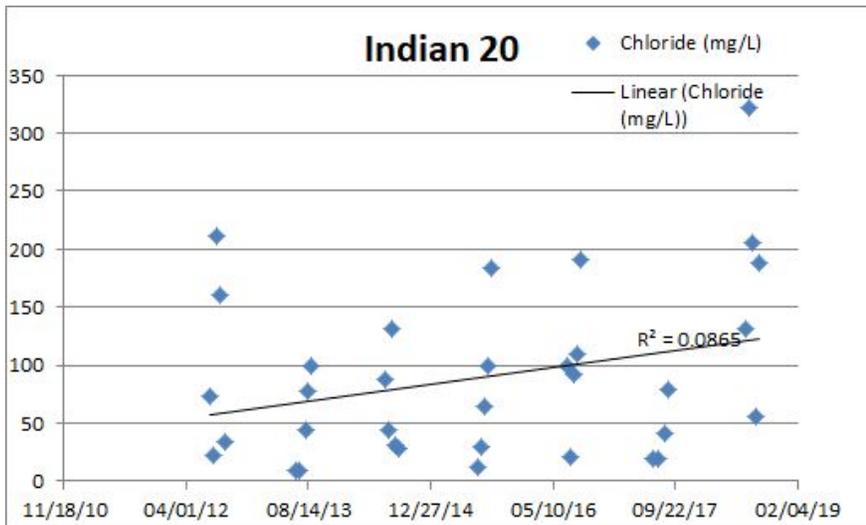
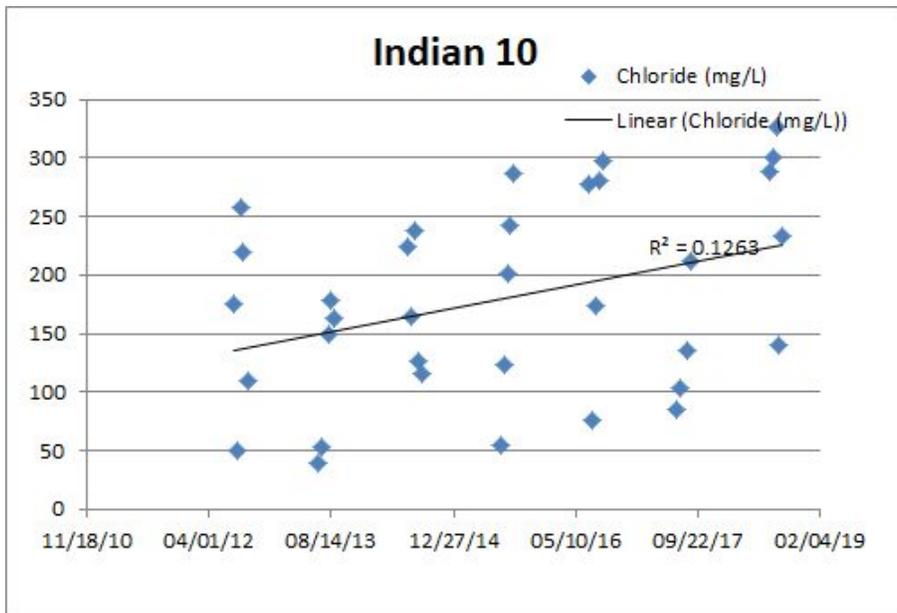








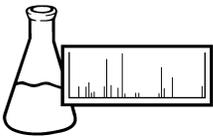




Lesage Lane Possible Illicit Discharge Investigation Communications Log

(PO = Property Owner, Patrick Miller, KA = Karen Adams, DPW Staff, BKO = Bryan Osborne, DPW Director, DS = Derek Shepardson, Building Inspector)

Date	Activity (* indicates attachment)
7/20/2017	KA & Intern deploy optical brightener pads in catch basin
7/26/2017	OB pads collected and processed with positive result for 15 Lesage Lane
7/31/2017	KA & Intern deploy optical brightener pads in catch basin for second time
8/9/2017	OB pads collected and processed with positive result for 15 Lesage Lane
8/9/2017*	Water quality sample collected at Lesage Ln catch basin processed by Endyne shows no indication of presence of E.coli
9/1/2017	Determined that property under condo ownership
9/7/2017	Meeting of P&Z and DPW staff to discuss next steps
9/15/2017*	Letter mailed to each of four condominium shareholders with 15 days to respond
9/21/2017	KA contacted by Mr. Miller indicating he has foundation drains connected to his home that he was advised of when he purchased approx 10 years ago. He was not aware of any connections to wastewater plumbing and suggested the problem be solved by capping the pipe. KA indicates still early in investigation and waiting to hear from other property owners to make decision about next step with all available information.
9/22/2017	KA contacted by Raymond Trahan, one of four owners, indicating he knows nothing but wanting to respond to letter
9/25/2017	Given owner response, BKO & KA discuss next steps of scheduling plumbing inspection and notify P&Z of intent to bring BS
10/12/2017	KA leaves message for PO re: inspection
10/14/2017	PO leaves message for KA
10/16/2017	KA leaves message for PO re: inspection
10/17/2017	KA and PO agree on inspection at noontime on 10/23/2017
10/23/2017*	BKO and DS inspect property plumbing with PO. A second wastewater line serving washer and potentially upstairs bathroom is identified as being directed to different area than other wastewater pipes.
10/24/2017	Staff agrees next step is a dye test to determine where washer line is draining to. No sump in catch basin means staff will have to monitor catch basin. Supplies ordered by WW official.
10/25/2017*	Staff locates prior wastewater plans for the site showing foundation drains entering drywell under current driveway location. A septic permit from 1978 indicates the wastewater system consists of a septic tank, dry well, and singleleach line.
10/31/2017	KA spoke with PO on the phone, offered to share found WW plans, and requested a time to perform a dye test. PO requested procedure be written down and mailed to his home for review. PO Indicated Drummac Septic had recently been out to the site but could not produce a copy of the report and indicated that KA should contact Drummac.
10/31/2017	KA contacted Drummac Septic of Highgate VT where they had no record of a recent inspection on site within the last 5 years.
11/2/2017	KA followed up with Drummac Septic, who confirmed they had no record of a visit to 15 Lesage Lane in the past 5 years.
11/15/2017	Staff discussion of WW plans and why dye test likely to be inconclusive, and instead suggest that capping the pipe best way to eliminate discharge
11/18/2017*	Mailing to Mr. Miller to indicate dye test likely to be inconclusive and thanking for cooperation
11/29/2017*	CERTIFIED MAIL to 3 property owners who we had not yet heard from, indicating again looking for information
12/1/2017	BKO Spoke with Edward Bramond from 33 Lesage Lane. Indicated that the only property that has perimeter drains is Mr. Millers. Believes the pipe discharging to the Town's basin goes directly to Mr. Millers house. This is based on the direction of the pipe and having witnessed it flowing several times, yet only while someone was home at the Millers house. Has no concerns with the Town capping the pipe.
12/4/2017*	Certified mail "green cards" returned from 33 and 41 Lesage Lane, 1260 E Lakeshore
12/4/2017	Raymond Trahan of 41 Lesage Lane came to town offices to discuss letter. KA gave status update and indicated that if pipe is capped notice would be given.
12/5/2017*	Chad Ransom came to DPW offices to discuss letter (1260 E Lakeshore). Indicated there would be no issues with capping the pipe. He provided an as-built drawing of his recently constructed home showing where his footing drain daylights. It is not in proximity to the catch basin/discharge in question.
12/20/2017*	CERTIFIED MAIL sent to all four property owners that barring any additional information, staff will cap the pipe on or about 7/1/18.
12/26/17*	Return receipts received from 3 properties
1/14/2018*	Certified Mailing returned for 1 property, Return to Sender Unclaimed
6/14/2018*	Notice sent to all four property owners that pipe will be capped during week of 6/22/18.
6/22/2018*	Operations confirms to DPW technical staff that the pipe has been capped.
7/31/2018*	Staff inspects pipe to confirm cap still in place.



ENDYNE INC.

Laboratory Services

160 James Brown Drive
Williston, VT 05495
(802) 879-4333
FAX 879-7103

INVOICE

Invoice Number: 239737

Date: 8/10/2017

PO#:

Facility: W

Bill To: Town of Colchester PO Box 55 Colchester, VT 05446 Attn: Robin Parry	100580	Ship To: Colchester, Town of PO Box 55 Colchester, VT 05446 Attn: Karen Adams
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W.O Number	COC #	Project	Date Received	Payment Due
1708-18416		Lesage Lane	8/9/2017	09/09/2017

Test	Method	Unit Price	Qty.	Amount
E. coli	SM20 9223B(97)	25.00	1.00	25.00

Please write your account # on payment and note the Invoice Number(s) the payment should be applied to.

For your convenience, Master Card and Visa are accepted. Thank You for your Business.

Total	\$25.00
Paid	0.00
Balance	25.00



Colchester, Town of
PO Box 55 100580
Colchester, VT 05446

Atten: Karen Adams

PROJECT: Lesage Lane
WORK ORDER: **1708-18416**
DATE RECEIVED: August 09, 2017
DATE REPORTED: August 10, 2017
SAMPLER: Karen Adams

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

www.endynelabs.com



160 James Brown Dr., Williston, VT 05495
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766
Ph 603-678-4891 Fax 603-678-4893



Laboratory Report

DATE REPORTED: 08/10/2017

CLIENT: Colchester, Town of

WORK ORDER: **1708-18416**

PROJECT: Lesage Lane

DATE RECEIVED 08/09/2017

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
001	Site: Lesage Lane			Date Sampled: 8/9/17	Time: 14:02		
e. coli	< 1.0	MPN/100ml	SM20 9223B(97)	8/9/17 17:23	W RJL	A	



Colchester

VERMONT

September 12, 2017

781 Blakely Road • Colchester, Vermont • 05446 • 802.264.5500

www.colchestervt.gov

Patrick and Fay Miller
15 Lesage Lane
Colchester, VT 05446

RE: Illicit Connection –Lesage Lane– Colchester, VT
Parcel 69-015003-0040000

Dear Property Owner:

During routine maintenance activities by Town staff, it was observed that a pipe is connected to the catch basin at the intersection of Lesage Lane and East Lakeshore Drive. Testing has concluded that this pipe is discharging wastewater to the Town's stormwater system. Under Chapter 18 of the Colchester Code of Ordinances, Section 18-12 (enclosed), this would be considered a prohibited illicit connection. An inspection of the Town's catch basin on September 6, 2017 showed the pipe to be coming from the overall parcel of land where your home and three others exist.

Our goal is to eliminate the illicit discharge into the Town's stormwater system as we are required to do so under the Town's federal stormwater permit. To do this, we are hoping for your cooperation. We are asking that you provide any information you may have regarding this connection within 15 days of the receipt of this letter so that we can work toward eliminating this discharge.

In the event we do not hear from you, or cannot determine with your assistance where the discharge is coming from, we will need to pursue this further under the authority of our stormwater ordinance. The ordinance allows us to request entry into your property to conduct a thorough inspection in an attempt to locate the source of the discharge. You would have the right to refuse this request. However this would require that the Town seek injunctive relief through the courts to gain access. In the event that the discharge is found to be originating from your property, we will then need to take enforcement action. This would include fines as provided for in 18-10 B of the ordinance, and the recovery of all related expenses to eliminate the discharge, including attorney fees.

Again, our goal is to eliminate the discharge with your help and cooperation. Should you have any questions, I can be contacted at 264-5620, Monday through Friday from 7:30 a.m. to 4:30 p.m., or in person at the Municipal Offices at 781 Blakely Road.

Sincerely,

Bryan Osborne
Colchester Director of Public Works

From: Karen Adams
To: [Sarah Hadd](#)
Cc: [Bryan Osborne](#)
Subject: FW: Lesage Letter
Date: Monday, September 18, 2017 11:56:00 AM
Attachments: [Lesage Lane Letter.docx](#)
[image001.png](#)
[image002.png](#)
[image003.png](#)

Hi Bryan,

These went in the mail this morning with the excerpt from Chapter 18 included. A copy when in the MS4 file for documentation as well.

Sarah FYI I found out this morning that the last address on Lesage Lane (51 Lesage) is no longer active. When they rebuilt the fourth condo unit they accessed directly from E Lakeshore and they are now 1260 E Lakeshore.

Thank you both,

Karen

From: Bryan Osborne
Sent: Friday, September 15, 2017 3:33 PM
To: Karen Adams
Subject: RE: Lesage Letter

Karen. Yes please generate letter for each property. I have made some additional very minor but important tweaks.

Thanks, Bryan

From: Karen Adams
Sent: Friday, September 15, 2017 12:59 PM
To: Bryan Osborne
Subject: RE: Lesage Letter

Hi Bryan,

I think that looks great as a first communication - cleaned up some of the formatting and checked the ordinance references in the attached version. Once you've reviewed, let me know if you'd like me to generate a letter for each property which I'd be happy to do. I spoke with Sarah yesterday and while we can certainly share the letter with her she indicated whatever you came up with would be fine as you are the signatory.

Karen

From: Bryan Osborne
Sent: Friday, September 15, 2017 12:48 PM

To: Karen Adams
Subject: RE: Lesage Letter

Karen, here is my whack at it. May need a little cleaning up, Let me know what you think.

bko

From: Karen Adams
Sent: Friday, September 15, 2017 10:09 AM
To: Bryan Osborne
Subject: Lesage Letter



Karen Adams
Technical Services Manager
Department of Public Works

Town of Colchester
781 Blakely Rd.
Colchester, Vermont 05446
P: 802.264.5621 | F: 802.264.5503

We have eliminated our post office box as of July 12, 2017; for US mail and package deliveries please use the street address above.

colchestervt.gov

From: Karen Adams
To: [Sarah Hadd](#)
Subject: Lesage Lane
Date: Monday, September 25, 2017 12:10:00 PM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)

Hi Sarah,

We've heard back from two of the four property owners on the Lesage Lane property. One of them (Mr. Miller of the closest home to the storm drain) indicated that there is likely a foundation drain connected to his home that leads into the pipe. He wasn't aware of other connections to Lesage Ln units and was told of this connection when he purchased in 2007.

A foundation drain wouldn't be producing the optical brighteners, but its possible they have something like a floor drain in the garage that is also hooked in. I think I remember seeing such a drain. Bryan would like to start with a physical inspection of the plumbing of the property, to rule out other greywater connections, and suggested that Derek and him go out sometime next week to do this. I'm going to try and find some time on both of their schedules before contacting the owner so please let me know if this approach doesn't work for you.



Karen Adams
Technical Services Manager
Department of Public Works

Town of Colchester
781 Blakely Rd.
Colchester, Vermont 05446
P: 802.264.5621 | F: 802.264.5503

We have eliminated our post office box as of July 12, 2017; for US mail and package deliveries please use the street address above.

colchestervt.gov

◀ ▶ October 23, 2017

23	
12 am	
1:00	
2:00	
3:00	
4:00	
5:00	
6:00	
7:00	
8:00	
9:00	
10:00	
11:00	
12 pm	Bryan & Derek, inspection of Lesage Lane stormwater connection, meet Pat Miller 15 Lesage Lane Karen Adams
1:00	
2:00	



Colchester
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781 Blakely Road • Colchester, Vermont • 05446 • 802-264-5500

www.colchestervt.gov

November 16, 2017

Patrick and Fay Miller
15 Lesage Lane
Colchester, VT 05446

RE: Illicit Discharge –Lesage Lane– Colchester, VT
Parcel 69-015003-0040000

Dear Mr. and Mrs. Miller:

First and foremost, I want to thank you for taking the time to meet with myself and Derek Shepardson back on October 23, 2017, and allowing us to inspect your property including the internal plumbing in your basement. From our discussions, it is evident that we share a common interest in preventing any pollutants from entering into Lake Champlain, and your interest in working cooperatively toward this goal is greatly appreciated. I know at this point you must have many questions about the Town's assessment of this illicit discharge, and how you and your property may be affected. This is certainly understandable, and I would like to take this time to update you on the assessment, and answer as many of the questions that you may have. I would also like to extend my apologies for taking so long to get back to you. This is a very busy time of year for us as we wind up summer construction projects, prepare for winter snow and ice removal, and develop both our proposed operating and capital budgets for next year.

As outlined previously in my letter of September 12, 2017, an inspection of the stormwater catch basin at the end of Lesage Lane was performed on September 6, 2017. The inspection revealed a 4" pipe coming from the overall parcel of land where your home and three others exist. Testing of the flows coming from this pipe has detected the presence of optical brighteners. These are chemical additives that are often used to enhance the appearance of fabric, or paper, causing a whitening effect. These chemicals are commonly found in materials such as laundry detergents, cosmetics, shampoos, paper, and other household products. The presence of these chemicals indicates that a household is the likely source, as opposed to groundwater, foundation drains, or sheet stormwater flow from the adjacent roadway or hillside. Under the Town's federal stormwater permit, we are required to eliminate all such connections when identified.

In an effort to determine where the pipe was coming from, or what may be connected to it, a video camera was inserted into the pipe. Unfortunately a blockage of large stones was encountered at approximately 12 feet into the pipe, and we were unable to advance the camera any further. We then mailed letters to yourself and the three other property owners the week of September 12, 2017. These letters provided notice of the illicit discharge, and requested cooperation in providing any information regarding the connection, and ultimately the elimination of the discharge. In response, you contacted our

Technical Services Manager, Karen Adams, and advised her that while you are aware your home is served by foundation/footing drains, you do not believe they are connected to the piping seen in the catch basin. To date, one other neighbor has contacted the Town indicating they had no knowledge of the connection or source of the pollutants. We are continuing to make contact with all of the property owners on this parcel.

During our inspection on October 23, 2017, we observed two separate waste pipes exiting your home. Within the rear or easterly foundation wall, a standard 4" wastewater pipe exits the building toward an area where the homes septic tank is located. We also observed a smaller 1 ½"-2" pipe exiting the northerly foundation wall which is connected directly to the washing machine in the basement, as well as an upstairs bathroom sink and shower. This 1 ½"-2" pipe appears to be directed to a drywell located just outside of the northern foundation wall. While this "grey water" connection would be considered highly unusual under today's standards, this approach would have been acceptable in the 1970's and in many cases, may have been common.

Through a search of our archived files, we were able to locate the wastewater plans on file for this property from 1977-1978. They indicate that 1) the home is served by both a septic tank and dry well which drain into a single leach line, and 2) that a permit was also approved for the construction of new footing drains connected to a new dry well. The dry well approved as part of that permit is shown in an area that is now under the current driveway, and not the Town's stormwater catch basin. None of these permits authorize any connection to the Towns stormwater catch basin.

Based upon this information, I do not think that a dye test will likely reveal any conclusive results, and therefore see no need to pursue this further. We will continue to work with the remaining property owners to investigate this illicit discharge. In the event we are unable to locate any illicit connections or approvals or other information relating to the 4" pipe connected to the Town's catch basin, we will likely simply proceed to disconnect the pipe from the Town's catch basin. This disconnection will eliminate the illicit discharge and stop pollutants from entering into Malletts Bay.

Again, thank you for all of your help, cooperation, and patience during our assessment of this issue. I hope you have a great winter.

Sincerely,



Bryan K. Osborne

Colchester Director of Public Works

TOWN OF COLCHESTER

APPLICATION FOR SEWAGE SYSTEM PERMIT

No. 1448

Colchester, Vt. June 12, 1978

69-015003

STREET Lakeshore Dr. HOUSE NO. LOT SIZE: Ft. of Frontage 40

Ft. of Depth 150 MAP NO. 69 LOT NO. 15 OWNER M. Lesage

TYPE OF FACILITY: SINGLE X DUPLEX MULTIPLE DWELLING INDUSTRIAL COMMERCIAL OTHER

NO. OF BEDROOMS 3 REQUIRED AREA OF LEACH FIELD Square Feet

REQUIRED SEPTIC TANK SIZE 1000 Gallons

Plot to scale lot, building(s), septic tank, and leach field showing width of front, side, and rear yards. Also indicate distances to nearby wells, drainage ditches, water courses, and water lines.

Replace existing septic tank w/new 1000 gal tank - Replace existing leach line and dry well as shown

PERCOLATION RATE _____ DEPTH OF LEDGE _____

DEPTH OF GROUND WATER _____ SOIL TYPE _____

The undersigned hereby applies for permission to make certain improvements as described above. All construction to be completed in accordance with the Health Regulations of the Town of Colchester and the State of Vermont.

I certify the above information to be true and correct and complies with all Town and State regulations governing subsurface disposal systems.

X Maurice G Lesage Signature of Owner or Contractor

3 Lakeshore Drive Address

ALL SYSTEMS MUST BE INSPECTED BY TOWN ENGINEER PRIOR TO COVERING.

Fee Paid \$ 500 APPLICATION: APPROVED X REJECTED

ISSUED TO: MAURICE LESAGE

C. O. Snowie Authorized Signature

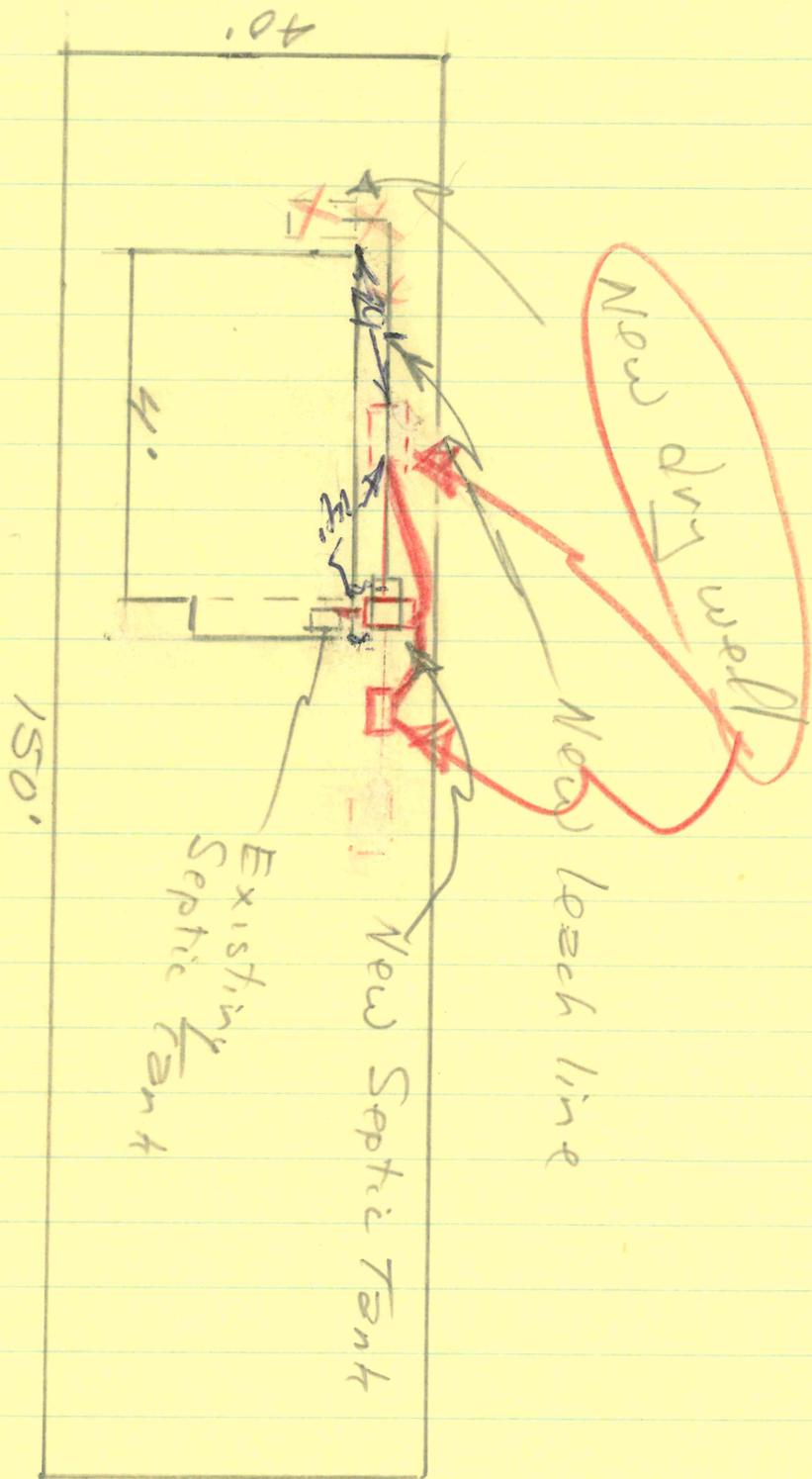
Inspected by the undersigned representative of the Town of Colchester on the 15th day of June, 1978.

C. O. Snowie

NOTICE OF PENALTY: Owner and/or Contractor are hereby ordered that all construction is to be completed and inspected in accordance with the Health Regulations of the Town of Colchester as duly adopted by the Colchester Board of Health on June 27, 1972, as provided in Title 18, Chapter 11, of the Vermont Statutes Annotated, and any person who neglects or refuses to so comply shall be subject to a fine of not more than \$500 as provided by said chapter.

PERMIT VALID SIX MONTHS FROM DATE OF APPLICATION

Lake Shore Dr



First Copy
To
Zoning Administrator

TOWN OF COLCHESTER

69-015003-015
No. 4476

Application for Building Permit

Zone Classification R-1

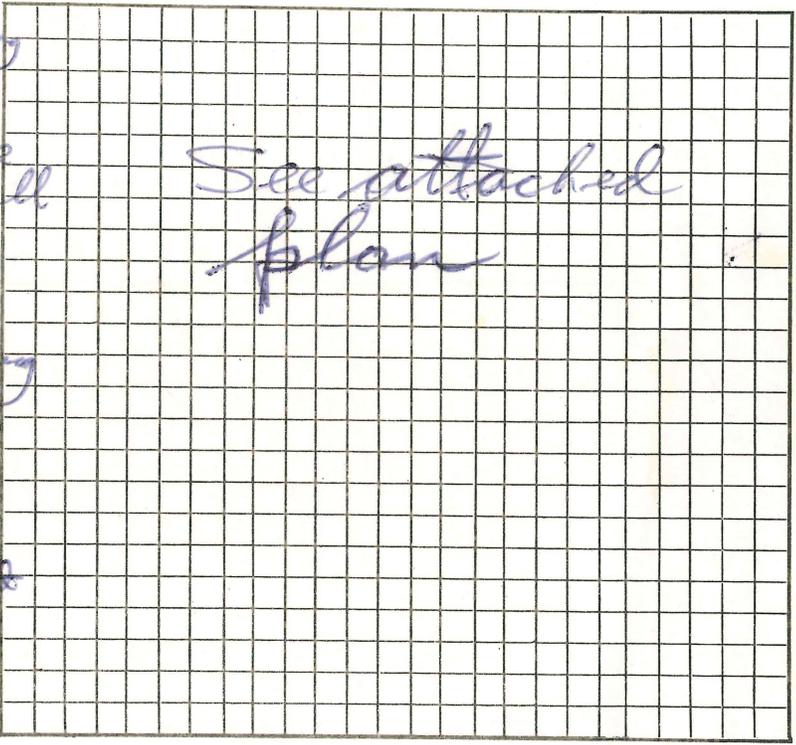
Colchester, Vermont, July 27, 1977

The undersigned hereby applies for permission to make certain improvements as described below. All construction to be completed in accordance with the Zoning Laws of the Town of Colchester and the State of Vermont.

STREET Lakeshore Dr. NUMBER LOT SIZE: Ft. Frontage 40' Ft. Depth 150' Lot No. 15 #4
OWNER Maurice Lesage BUILDER Ray Reynolds B139
ESTIMATED COST \$ 6,500.00 Construction to be started, 19
SINGLE DUPLEX..... MULTIPLE DWELLING..... COMMERCIAL..... INDUSTRIAL.....

Plot to scale Lot and Building Improvements, showing width of Front, Side and Rear Yards. Mark N at Compass point indicating North.

Remarks: ① Jack up building
Type of construction
foundation ② Construct new foundation footings & concrete block wall
siding ③ Install footing
roofing drains
number of bedrooms ④ Connect footing drains into
number of bathrooms new dry well
heating system
water source ⑤ new concrete
fireplace floor in basement
garage



Maurice G. Lesage
Signature of Owner

Address of Owner

Signature of Builder

Address of Builder

Remarks or reasons for rejection.

This is to certify that the proposed use of this structure and/or land conforms to the requirements of the Colchester Zoning By-laws. This permit shall take effect on Aug 16, 1977

Fee Paid \$ 6.00

APPLICATION: REJECTED APPROVED

PERMIT NO. 4476

ISSUED TO Maurice Lesage

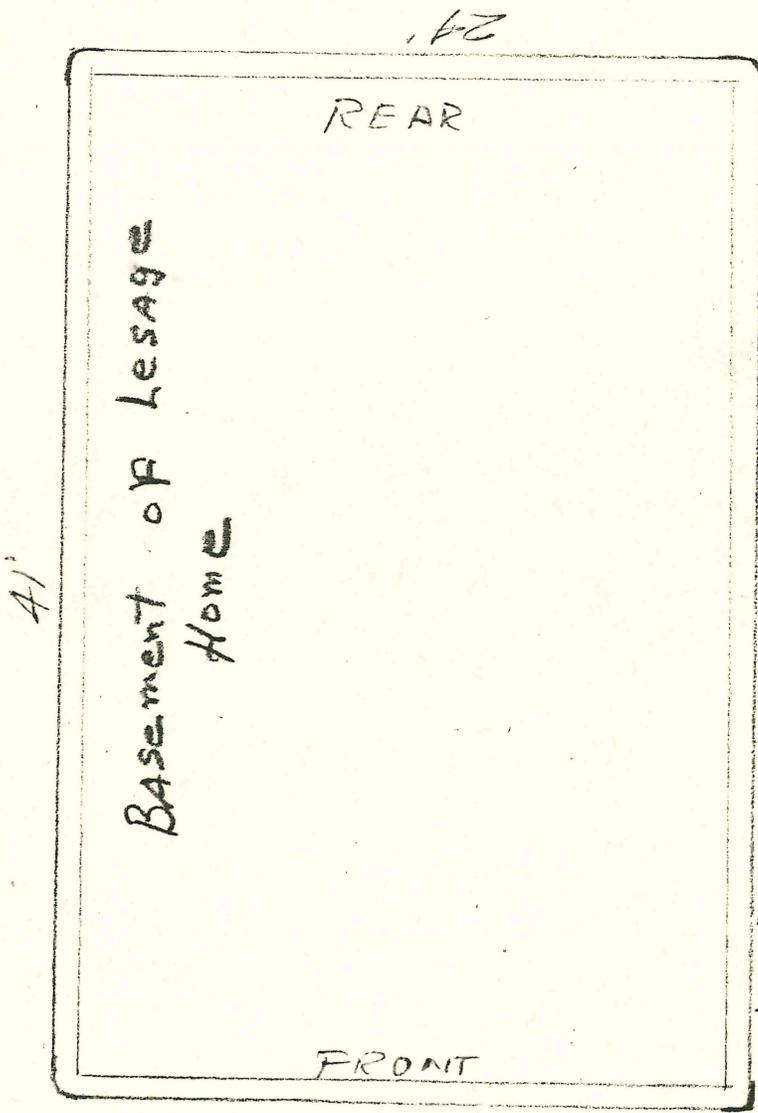
Date July 27, 1977

C. D. Sweeney
Zoning Officer

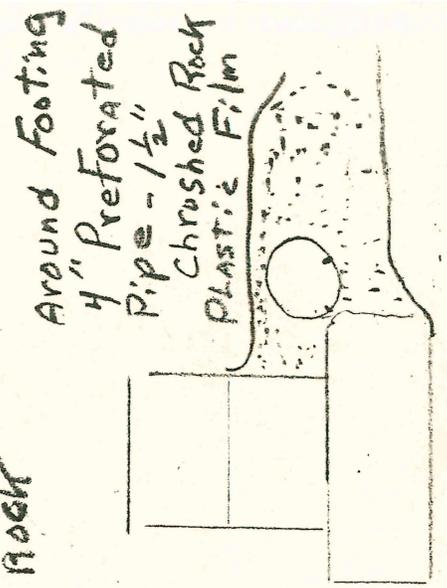
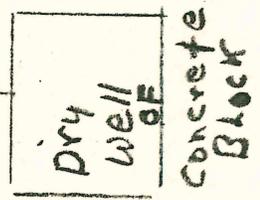
Zoning Board Hearing stipulations

Planning Commission Hearing stipulations

PERMIT VALID SIX MONTHS FROM DATE OF APPLICATION



4" Preforated Pipe - In Crushed Rock



NOT TO SCALE

Lake shore DR

69-015013-



Colchester

VERMONT

November 27, 2017

781 Blakely Road • Colchester, Vermont • 05446 • 802.264.5500

www.colchestervt.gov

Chad Ransom & Tara Potts
1260 East Lakeshore Drive
Colchester, VT 05446

RE: Illicit Discharge –Lesage Lane– Colchester, VT
Parcel 69-015003-0040000
CERTIFIED MAILING

Dear Property Owner:

During routine maintenance activities by Town staff, it was observed that a 4-inch pipe is connected to the catch basin at the intersection of Lesage Lane and East Lakeshore Drive. To our knowledge, this connection was not permitted or otherwise approved by the Town. Testing has concluded that this pipe is discharging wastewater to the Town's stormwater system. Under Chapter 18 of the Colchester Code of Ordinances, Section 18-12 (enclosed), this would be considered a prohibited illicit discharge. An inspection of the Town's catch basin on September 6, 2017 showed the pipe to be coming from the overall parcel of land where your home and three others exist. A letter was mailed to this address asking for any information you may have related to this connection the week of September 18, 2017. To date we have not heard from you and are therefore resending this letter.

Our goal is to eliminate the illicit discharge into the Town's stormwater system as we are required to do so under the Town's federal stormwater permit. To do this, we need your cooperation. We are asking that you contact our office to schedule an inspection of your property's plumbing within 15 days of receipt of this letter.

In the event we do not hear from you, or cannot determine with your assistance where the discharge is coming from, we will need to pursue this further under the authority of our stormwater ordinance. This may include simply disconnecting the pipe from the Town's catch basin with reasonable notice being provided to property owners. This disconnection will eliminate the illicit discharge, achieve permit compliance for the community, and stop pollutants from entering into Malletts Bay.

Again, our goal is to eliminate the discharge with your help and cooperation. Should you have any questions, I can be contacted at 264-5620, Monday through Friday from 7:30 a.m. to 4:30 p.m., or in person at the Municipal Offices at 781 Blakely Road.

Sincerely,

Bryan K. Osborne
Director of Public Works

7017 1070 0000 4304 3366

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee	\$
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$
Total Postage and Fees	\$

1ST RD
Postmark
Here

Sent To Gena Lakin
 Street and Apt. No., or PO Box No. 33 Lesage Ln
 City, State, ZIP+4® Colch. 11-28-17

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

Certified
Mail
Receipts
11-28-17

7017 1070 0000 4304 3373

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OFFICIAL USE

Certified Mail Fee	\$
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$
Total Postage and Fees	\$

Postmark
Here

Sent To Debra LaChance
 Street and Apt. No., or PO Box No. 34 Stone Dr
 City, State, ZIP+4® Colch. 11-28-17

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 1070 0000 4304 3359

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OFFICIAL USE

Certified Mail Fee	\$
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$
Postage	\$
Total Postage and Fees	\$

Postmark
Here

Sent To Chad Ransom + Tara Potts
 Street and Apt. No., or PO Box No. 1260 E Lakeshore Dr
 City, State, ZIP+4® Colch. 11-28-17

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

99EE 40EH 0000 020T 2T02

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Gena Lakin
 33 Lesage Lane
 Colchester, VT 05446



9590 9402 2803 7069 0283 42

2. Article Number (Transfer from service label)

7017 1070 0000 4304 3366

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

- A. Signature
 X *[Signature]* Agent Addressee
- B. Received by (Printed Name) *Ed Boyman* C. Date of Delivery *11/30*
- D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

Domestic Return Receipt

99EE 40EH 0000 020T 2T02

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Debra LaChance
 34 Stone Dr
 Colchester VT
 05446



9590 9402 2803 7069 0283 35

2. Article Number (Transfer from service label)

7017 1070 0000 4304 3373

PS Form 3811, July 2015 PSN 7530-02-000-9053

- A. Signature
 X *[Signature]* Agent Addressee
- B. Received by (Printed Name) *Debra LaChance* C. Date of Delivery *12/17*
- D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Chad Ransom + Tara Potts
 1260 E. Lakeshore DR
 Colchester, VT 05446



9590 9402 2803 7069 0283 28

2. Article Number (Transfer from service label)

7017 1070 0000 4304 3359

PS Form 3811, July 2015 PSN 7530-02-000-9053

- A. Signature
 X *[Signature]* Agent Addressee
- B. Received by (Printed Name) *Chad Ransom* C. Date of Delivery *12/5/17*
- D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
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Domestic Return Receipt



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www.colchestervt.gov

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 20, 2017

Gena Lakin
33 Lesage Lane
Colchester, VT
05446

RE: Illicit Discharge –Lesage Lane– Colchester, VT
Parcel 69-015003-0040000

Dear Gena:

As you are aware, we have identified a pipe discharging into a Town stormwater structure. Testing of the flows coming from this pipe has detected the presence of optical brighteners. These are chemical additives that are often used to enhance the appearance of fabric, or paper, causing a whitening effect. These chemicals are commonly found in materials such as laundry detergents, cosmetics, shampoos, paper, and other household products. Under the Town's federal stormwater permit, we are required to eliminate all such connections when identified.

Over the past several months we have been working with you and other property owners in an attempt to identify the source of this pipe and the pollutants discharging from it. Based upon our field inspections, review of all permit files relating to your property, and discussions with you about this pipe, we have been unable to determine its origin or purpose. We have also noted that there are no permits or approvals on record authorizing this prohibited connection, and have been advised from you and other property owners that there are no concerns with the pipe simply being disconnected.

Based upon these events, we intend to disconnect and cap this pipe from the Town's stormwater system on or about July 1, 2018. This will eliminate this prohibited discharge and stop pollutants from entering Malletts Bay. If you should have any questions or concerns about this plan, please let us know. I can be contacted at 264-5620, Monday through Friday from 7:30 a.m. to 4:30 p.m., or in person at the Municipal Offices at 781 Blakely Road.

Thank you for all of your help, cooperation, and patience during our assessment of this issue. I hope you have a great winter.

Sincerely,



Bryan Osborne

Colchester Director of Public Works

7017 1070 0000 4304 3304

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OFFICIAL USE

Certified Mail Fee \$	2nd Rd Postmark Here
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy) \$	
<input type="checkbox"/> Return Receipt (electronic) \$	
<input type="checkbox"/> Certified Mail Restricted Delivery \$	
<input type="checkbox"/> Adult Signature Required \$	
<input type="checkbox"/> Adult Signature Restricted Delivery \$	
Postage \$	
Total Postage and Fees \$	
Sent To Ciena Lakin Street and Apt. No., or PO Box No. 33 Lesage City, State, ZIP+4®	

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

Certified
mail
Receipts

12-20-17

7017 1070 0000 4304 3296

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OFFICIAL USE

Certified Mail Fee \$	Postmark Here
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy) \$	
<input type="checkbox"/> Return Receipt (electronic) \$	
<input type="checkbox"/> Certified Mail Restricted Delivery \$	
<input type="checkbox"/> Adult Signature Required \$	
<input type="checkbox"/> Adult Signature Restricted Delivery \$	
Postage \$	
Total Postage and Fees \$	
Sent To Debra Lachance Street and Apt. No., or PO Box No. 34 Stone Dr City, State, ZIP+4®	

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 1070 0000 4304 3261

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Certified Mail Fee \$	Postmark Here
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy) \$	
<input type="checkbox"/> Return Receipt (electronic) \$	
<input type="checkbox"/> Certified Mail Restricted Delivery \$	
<input type="checkbox"/> Adult Signature Required \$	
<input type="checkbox"/> Adult Signature Restricted Delivery \$	
Postage \$	
Total Postage and Fees \$	
Sent To Chad Ranson Street and Apt. No., or PO Box No. 1240 E Lakshore City, State, ZIP+4®	

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7017 1070 0000 4304 3274

U.S. Postal Service™
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Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee \$	Postmark Here
Extra Services & Fees (check box, add fee as appropriate)	
<input type="checkbox"/> Return Receipt (hardcopy) \$	
<input type="checkbox"/> Return Receipt (electronic) \$	
<input type="checkbox"/> Certified Mail Restricted Delivery \$	
<input type="checkbox"/> Adult Signature Required \$	
<input type="checkbox"/> Adult Signature Restricted Delivery \$	
Postage \$	
Total Postage and Fees \$	
Sent To Pat Miller Street and Apt. No., or PO Box No. 15 Lesage City, State, ZIP+4®	

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Debra Lachance
34 Stone Dr
Colchester, VT 05446



9590 9402 2803 7069 0283 80

2. Article Number (Transfer from service label)

7017 1070 0000 4304 3298

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

[Signature] Agent
 Addressee

B. Received by (Printed Name)

Debra Trahan

C. Date of Delivery

12/21/17

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

Domestic Return Receipt

702E 40E4 0000 0207 2702

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Chad Ransom + Tara Potts
1260 E Lakeshore Dr
Colchester, VT 05446



9590 9402 2803 7069 0284 03

2. Article Number (Transfer from service label)

7017 1070 0000 4304 3281

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

[Signature] Agent
 Addressee

B. Received by (Printed Name)

Tara Ransom

C. Date of Delivery

12/26/17

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
- Return Receipt for Merchandise
- Signature Confirmation™
- Signature Confirmation Restricted Delivery

Domestic Return Receipt

422E 40E4 0000 0207 2702

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Patrick + Fay Miller
15 Lesage Lane
Colchester, VT 05446



9590 9402 2803 7069 0283 97

2. Article Number (Transfer from service label)

7017 1070 0000 4304 3274

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

[Signature] Agent
 Addressee

B. Received by (Printed Name)

LC Campbell

C. Date of Delivery

12/21

D. Is delivery address different from item 1? Yes
If YES, enter delivery address below: No

3. Service Type

- Adult Signature
- Adult Signature Restricted Delivery
- Certified Mail®
- Certified Mail Restricted Delivery
- Collect on Delivery
- Collect on Delivery Restricted Delivery
- Insured Mail
- Insured Mail Restricted Delivery (over \$500)
- Priority Mail Express®
- Registered Mail™
- Registered Mail Restricted Delivery
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- Signature Confirmation™
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CERTIFIED MAIL



7017 1070 0000 4304 3304

JRRLINGTON VT 05446
19 DEC 2017 PM 1



ZIP 05446
01E1674237

19 DEC 2017 PM 1

USPS® \$003.75

Gena Lakin
33 Lesage Lane
Colchester, VT

NAME JB
1ST NOTICE 12/21
2ND NOTICE 12/26
RETURN 1/5

1ST NOTICE _____
2ND NOTICE _____
RETURN _____

UNC BC: 05446415281 *2363-18929-19-35
UNCLAIMED
UNABLE TO FORWARD



OS NIXIE 015 CE 1 7201/14/18

PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT OF THE RETURN ADDRESS, FOLD AT BOTTOM LINE

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Gena Lakin
33 Lesage Lane
Colchester, VT 05446



9590 9402 2803 7069 0283 73

2. Article Number (Transfer from service label)

7017 1070 0000 4304 3304

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature Agent Addressee

B. Received by (Printed Name) C. Date of Delivery

D. Is delivery address different from item 1? Yes No
If YES, enter delivery address below: Yes No

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail (over \$500)
 - Insured Mail Restricted Delivery
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

Domestic Return Receipt

309-4734-

Revised Plan 718116

RECEIVED

JUL 8 0 7AM
9102 8 0 7AM

PLANNING & ZONING

SEPTIC AREA
VERIFY WITH ENGINEER
LOCATION AND SETBACKS

SET BACK LINE

Septic

Footing Drain

Mechanical Drain

TOP SLAB
= 100'-0"

PROPOSED DRIVEWAY

CHAIN LOCATION

PROPOSED RE-GRADING

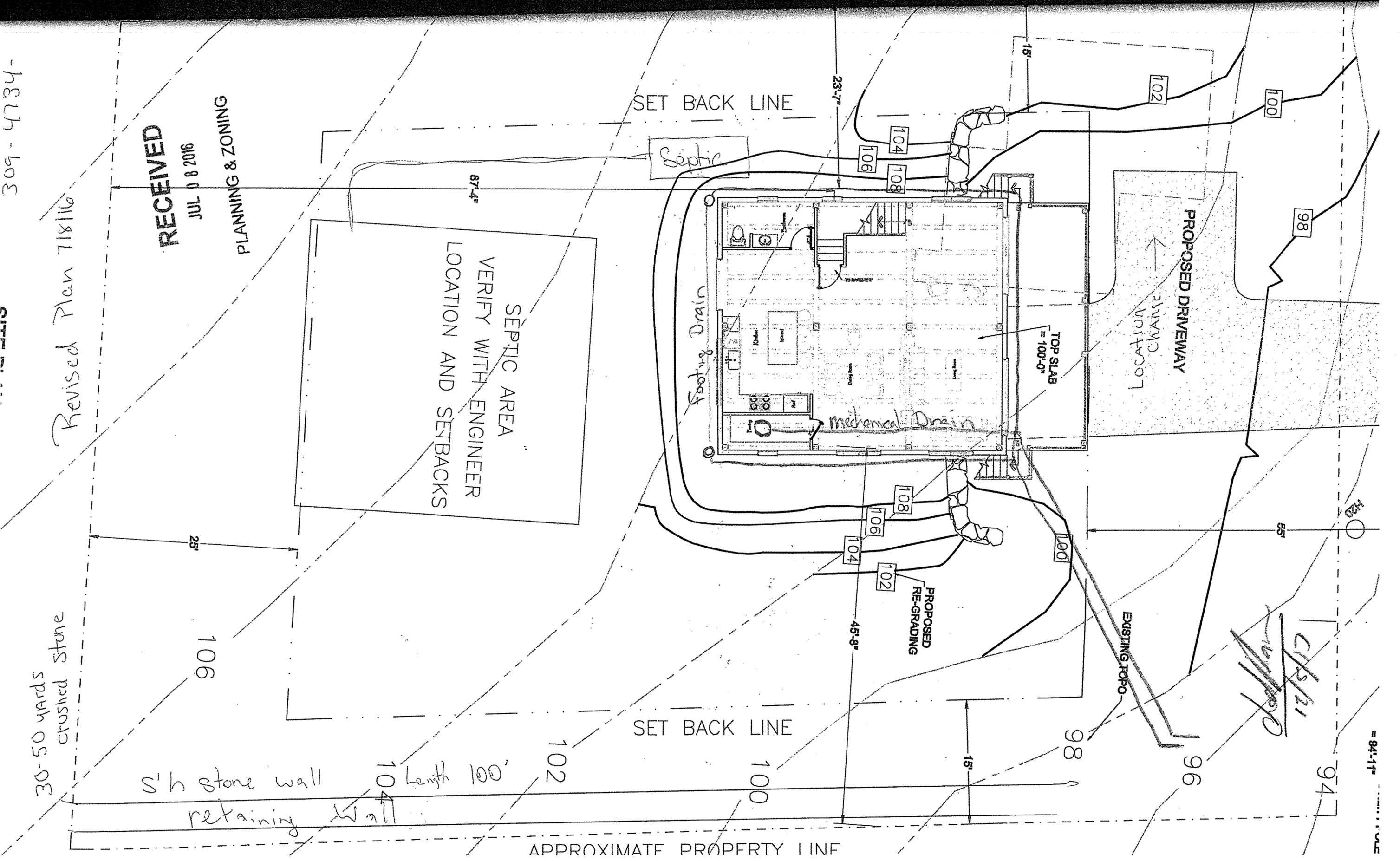
EXISTING TOPO

30-50 yards crushed stone

10' h stone wall retaining wall Length 100'

APPROXIMATE PROPERTY LINE

94'-11"





Colchester

VERMONT

Debra Lachance
34 Stone Drive
Colchester, VT 05446

781 Blakely Road • Colchester, Vermont • 05446 • 802.264.5500

www.colchestervt.gov

June 14, 2018

RE: Illicit Discharge –Lesage Lane– Colchester, VT
Parcel 69-015003-0020000

Dear Ms. Lachance:

Hope you have been enjoying the beginning of summer. As you know, last fall Town crews identified a 4" pipe coming from the overall parcel of land where your home and three others exist that enters the Town catch basin at the end of Lesage Lane. Testing revealed the presence of optical brighteners in the water discharging from this pipe, where after entering the Town catch basin this water is conveyed directly to Lake Champlain. The presence of pollutants in the water discharging from this 4" pipe means the pipe connection is considered an illicit discharge. Under the Town's federal stormwater permit, we are required to eliminate all such connections when identified.

During efforts to determine where the pipe was coming from and what it may be connected to, Town staff contacted each of the property owners in the development, performed a camera inspection of the pipe, performed building inspections, and researched our zoning and wastewater files to confirm there has never been a permitted connection from this property to the Town's stormwater system in the area of the pipe location. We notified property owners in November 2017 that barring additional information being uncovered, the pipe would be disconnected from the Town's stormwater system in the summer of 2018. We have not been contacted by any of the property owners affected expressing any opposition or concern about disconnecting this pipe. We are planning to move ahead with this disconnection, which will eliminate the illicit discharge and stop pollutants from entering into Malletts Bay.

Town crews have identified the June 22nd as the date on which this work will be performed. We plan to permanently cap the pipe during this week, document this action for permitting purposes, and then consider this issue closed. If you have any questions about this, please contact Technical Services Manager Karen Adams at 802-264-5621 or kadams@colchestervt.gov.

Again, thank you for all of your help, cooperation, and patience during our assessment of this issue. I hope you have a great summer.

Sincerely,



Bryan K. Osborne
Colchester Director of Public Works

From: [Randy Aley](#)
To: [Karen Adams](#)
Subject: FW: Lesage Ln
Date: Friday, June 22, 2018 1:30:22 PM
Attachments: [IMG_1131.JPG](#)
[ATT00001.txt](#)

Picture of the capped discharge on Lesage Ln. Had a resident come out that wasn't too happy about it, said it was tied to the four houses' perimeter drains and that he would be back out to hack saw it off later. He also said he had "cleared all this up with Bryan back in the fall".

-----Original Message-----

From: Randy Aley
Sent: Friday, June 22, 2018 1:27 PM
To: Randy Aley
Subject: Lesage Ln

Capped Pipe on Lesage Lane from Randy Aley's 6/22/2018 email



Staff followup to ensure pipe still in place 7/31/2018

RE: Illicit Discharge E. Lakeshore Dr. - Message (HTML)

File Message Nuance PDF Adobe PDF

From: Karen Adams
To: Randy Aley
Cc:
Subject: RE: Illicit Discharge E. Lakeshore Dr.

Sent: Tue 7/31/2018 1:09 PM

Intern and I looked last week and it was still there.

From: Randy Aley
Sent: Tuesday, July 31, 2018 12:58 PM
To: Karen Adams; Denise Johnson-Terk
Subject: RE: Illicit Discharge E. Lakeshore Dr.

Any chance anyone has checked the pipe cap? Last I looked was a couple of weeks ago and it was still there.



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MEMORANDUM

TO: Karen Adams, Technical Services Manager
FROM: Sarah Hadd, Director of Planning & Zoning
DATE: March 21, 2019
RE: Stormwater Reporting Calendar Year 2018

Please find attached a spreadsheet enumerating projects advanced to construction for the period January 1, 2018 through December 31, 2018 with more than an acre of land disturbance. In calendar year 2017, the Department issued in total 553 permits and conducted 671 inspections (excluding certificates of occupancy and violation investigations).

Should you need any additional information, including copies of the individual permits, please feel free to contact me directly.

Colchester Projects, Under Construction as of December 2018, over 1 Acre

Colchester Planning Zoning Department
Monthly Report

Status of Approved Residential Projects for December 2018 (FY2019)

Project	Units Const./Remaining Units	Location	Contact	Acreage Disturbed	Project Acreage	Lot Coverage	Status
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Projects Under Construction							
Bean, Derek	1/4 lots	Jasper Mine Rd., tax map 16, parcel 32-4	Derek Bean	1 to 5 ac.	3.56	Up to 20%	Under Construction
Lomatire	49 unit PUD (23 sf & 13 duplexes)	Tax Map 6, Parcel 5, 634 Malletts Bay Rd	Rivers Edge Building	over 5 ac.	48	Up to 20% each	Under Construction
Mele	2/4 new units (1 preexisting)	422 Malletts Bay Avenue, Tax Map 6, Parcel 9 and 9-1	O'Leary - Burke Civil Assoc.	5 ac.	82	Up to 20%	Under Construction
Brigante Living Trust	27/45 units	239 Malletts Bay Avenue, Tax Map 6, Parcel 8	O'Leary - Burke Civil Assoc.	More than 5 ac.	25.23	Up to 20% for each lot	Under Construction
Gintoff, Hank	6/8 units	East Lakeshore Drive, tax map 66, parcel 16-1	Gintoff, Hank	1 to 5 ac.	3.03	1.06	Under Construction
Goad	6/7	0 Roosevelt Highway, Tax Map 11, Parcel 19	John Forcier	More than 5 ac.	202	Up to 20% each lot	Under Construction
Spruce Hill Farm LLC	2/5 lots	1751 East Road, Tax Map 12, Parcel 26	Fitzgerald Construction	More than 5 ac.	88.15	Up to 30% each lot	Under Construction

Blum	4 units	2825 Malletts Bay Avenue, tax map 28, parcel 79	Krebs & Lansing Engineers	less than 1 ac.	1.65	Up to 20%	Under Construction
Brooker, J.	3/6 units	Jen Barry Lane, Tax Map 47, Parcel 001012	O'Leary - Burke Civil Assoc.	1 to 5 ac.	4.36	Up to 20% for each lot	Under Construction
Cary Construction	3/3 lots	17 Church Road, Tax Map 41, Parcel 41	Cary Construction	1 to 5 ac.	1.5	Up to 20% for each lot	Completed
Delco	nine congregate duplexes totaling 18 units	521 River Road, Tax Map 35, Parcel 1	Lamoureux & Dickinson	1 to 5 ac.	6.9 acre	14%	Site work begun
Powell	1/3 new lots	133 and 354 Platt Road, Tax Map 78, Parcel 19 and Tax Map 77, Parcel 2	John Powell	>5	22	Up to 20% for each lot	Under Construction
Hayward, Nathaniel	13/14 lots	Niquette Bay Road, Tax Map 17, Parcels 15-1	Nathaniel Hayward	More than 5 ac.	22	Up to 20%	Under Construction
Barry, Bruce	1/7 lots	Jen Barry Lane, Tax Map 47, Parcel 1	David Burke	More than 5 ac.	28.1	Up to 30% for seven of the lots	Under Construction
Marble Island	56/76 units completed	Tax Map 57 Parcel 9	J.L. Davis Realty	over 5 ac.	61.47	Up to 60%	Dev. Under construction



2018 MS4 Annual Report Flow Restoration Plan Implementation Summary

The Town of Colchester has two approved flow restoration plans, for Sunderland Brook and Morehouse Brook, respectively. Below is a summary of implementation activities for each FRP.

Sunderland Brook – There are no activities in progress currently. The State has acknowledged that the current BMPs in the Sunderland Brook watershed demonstrate compliance with the TMDL target and no additional implementation is needed for flow restoration purposes at this time.

Morehouse Brook – This FRP is proceeding in accordance with the planned implementation schedule, seen below, with the exception of the Pine Grove Terrace Project. This was previously two separate projects (referred to as WIN3 and WIN4 in the original FRP) that have been combined into one overall project and is currently under design by Stone Environmental. Construction is expected in July/August of 2019 which is ahead of schedule. In concert with the City of Winooski, our FRP implementation partner for the Morehouse Brook watershed, we intend to seek out grant opportunities to fund later phases of FRP projects and feel the overall implementation is on schedule.

Schedule	Proposed BMP	Task	
		Design	Construction
FY '19	Pine Grove Terrace Pond	X	
FY '20			X
FY '21	Landry Park, west and east	X	
FY '22			X
FY '23	Brisson Ct; southern Cedar Street	X	
FY '24			X
FY '25			
FY '26			
FY '27			

List of Permits & Inspections for General Permits incorporated into the MS4 – 2018 Annual Report

Stormwater Permit	Permit #	Date Inspected	Maintenance Performed?
Bloomfield Drive	3910-9010	5/22/2018	N/A
Campus Connector Road (2 discharge points)	5660-9010	6/7/2018	N/A
Creek Farm	4303-9010.R	6/5/2018	N/A
Eagle Park	4333-INDO	5/22/2018	N/A
Eagle Park	1-0052	5/22/2018	N/A
Edgewood (5 discharge points)	3417-9010.R	6/11/2018	N/A
Fern Court	4865-9010	6/11/2018	N/A
Fort Ethan Allen	5598-INDO.R	6/11/2018	N/A
Hidden Oaks 1	2-1165	5/22/2018	N/A
Hidden Oaks 2	1-0959	5/22/2018	N/A
Holy Cross Road Shared Use Path	6246-9015	6/11/2018	N/A
Ira Allen Court (2 discharge points)	3560-9010.AR	6/11/2018	N/A
Leclair	3411-9010.R	6/11/2018	N/A
Municipal Offices	5278-9015	6/15/2018	N/A
Stone Bridge	4126-9010.R	6/11/2018	N/A
Timberlake Drive	3505-9010.AR	6/11/2018	N/A
Town Garage	3131-9010.AR	6/15/2018	N/A
Wall Street	1-0674	5/2/2018	N/A
Williams Crossing	3412-9010.R	6/11/2018	N/A
Miscellaneous Discharges	3510-9010.AR		
Mallard Drive (S/N 001)		5/1/2018	N/A
Red Oak Drive (S/N 002)		5/1/2018	N/A
Buckingham Drive (S/N 003)		5/1/2018	N/A
Bellwood Ditch (S/N 004)		5/1/2018	N/A
W. Lakeshore Drive (S/N 005)		5/1/2018	N/A
W. Lakeshore Drive (S/N 006)		5/1/2018	N/A
W. Lakeshore Drive (S/N 011)		5/15/2018	N/A
E. Lakeshore Drive (S/N 007)		5/15/2018	N/A
E. Lakeshore Drive (S/N 008)		5/15/2018	N/A
E. Lakeshore Drive (S/N 009)		5/15/2018	N/A
E. Lakeshore Drive (S/N 010)		5/15/2018	N/A