



City of Burlington Stormwater Management Program
MS4 Annual Report for Calendar Year 2015

In accordance with State of Vermont permit 7022-9014 issued to the City of Burlington on October 1, 2013, we are submitting the following annual report documenting stormwater activities completed in calendar year 2015.

1) Minimum Measure 1- Public Education and Outreach

- Total Payment made to RSEP: \$5,000
- Total Online Media Impressions:
 - Spring: 442,600; 1695 clicks
 - Fall: 315,000; 1592 clicks
- # visitors to the Regional Stormwater Education Program (RSEP) website: 4659
 - RSEP web address: www.smartwaterways.org
- Maintenance/continued update of municipality's stormwater website
 - <http://www.burlingtonvt.gov/DPW/Stormwater-Management>
- Additional Public Education/Outreach completed in Burlington as part of Integrated Water Quality Planning Efforts. See: <http://bit.ly/1RyvwoI>
- Supplemental information for minimum measure 1 can be found in Appendix 1-1 (RSEP Annual Review)

2) Minimum Measure 2 – Public Involvement and Participation

- Payment made to the Chittenden County Stream Team (CCST): \$1800
 - CCST website address: <http://www.ccstreamteam.org>
 - Outreach Participation: 415 Burlington residents
 - Hands On Participation: 28 Burlington residents
 - Two Rain Garden locations (Locust Street and Coast Guard Station Parking lot) adopted by Burlington Citizens and maintained in 2015
- Green Up Day
 - Tons of Trash collected: 4.1
 - # of tires collected in Burlington: 0
 - # of cubic yards of scrap metal collected: 0
 - # of participants: 800
- Supplemental information for minimum measure 2 can be found in Appendix 2 (CCST Annual Report)
- Adopt a Drain Program: <http://www.burlingtonvt.gov/DPW/ADOPT-A-DRAIN>

- Number of new drains adopted: 100 (Total drains adopted: 218)
- Number of new drain adopters: 36 (Total adopters: 125)

3) Minimum Measure 3 – Illicit Discharge Detection and Elimination

- Number of stormwater outfalls inspected: 40
 - See map of outfall inspections in Appendix 3-1: 2015 Maintenance Report
- Number of stormwater outfalls sampled/tested: 1
 - See Appendix 3-2.1 for IDDE sampling results completed by Watershed Consulting for Appletree/Strathmore outfall
- Illicit discharges detected and eliminated: 1 (146 Appletree Pt Rd)
 - See Appendix 3-2 for information related to IDDE associated with 146 Appletree Point Road, including summary, IDDE sampling results in Appendix 3-2.1, timeline of events in Appendix 3-2.2 and follow up activities in Appendix 3-2.3
- Stormwater Infrastructure Mapping
 - Mapping updates continue as needed
 - Up to date sewer mapping is available at: <http://www.burlingtonvt.gov/DPW/Mapping-Links>
 - Draft sewershed/watershed mapping is available city wide, see: <http://arcg.is/190ncqo>
- A regulatory review related to addressing the specific categories of illicit discharges specified in 3-9014 (2012) has been completed; an update to Chapter 26 (Wastewater, Stormwater and Pollution Control ordinance) to include these additional categories is still pending other likely changes to Chapter 26, which is delayed until a later date pending our Integrated Planning Efforts which may identify additional changes to Chapter 26 (possible update in post construction stormwater management standards, credit manual requirements, etc.).

4) Minimum Measure 4 – Construction Site Runoff Control

- Number of project local EPSCs reviewed: 70
- Number of construction site inspections: 29

5) Minimum Measure 5 – Post Construction Runoff Control

- Number of project stormwater management plans reviewed: 20
- Number of small stormwater management systems (no State permit) inspected: none
- Number of public stormwater management systems inspected/maintained:
 - 11 Infiltration Chamber Systems
 - 1 swirl separator
 - 8 Rain Gardens
 - 1 permeable paver system
- Development/implementation of maintenance agreement/easement recording process underway with City Attorney office
- City Projects related to Post Construction Runoff Control in MS4
 - Permeable paver installations on South Winooski Ave and Pearl St

6) Minimum Measure 6 – Pollution Prevention and Good Housekeeping

- # of catch basins inspected: 433
- # of catch basins cleaned: 389
 - Stormwater Vactor was inoperable for portions of the year resulting in a reduced # of catch basins being cleaned
- # of manholes inspected: 64
- # of manholes cleaned: 40
- Linear feet of storm lines cleaned:
 - 4,634 linear ft
- # of catch basins repaired: 47 (See Appendix 6-1: 2015 Catch Basin Rebuild/Repairs Map)
- # lane miles swept: Total: 1880
 - All streets swept at least once in May 2015 during Clean Sweep (380 miles)
 - An additional 1500 lane miles were swept during the rest of the year.
- # of dog bags distributed: approximately 11,000
- # of tons of material collected by street sweeping and catch basin cleaning:
 - Street sweeping: 1243 yards
 - Catch Basin Cleaning: 275 Cubic Yards
- MCAP Audit completed: no (last done in 2008, will occur again this permit cycle)
- Trainings attended by City staff:
 - WEFTEC, Chicago (2 Water Resources staff)
 - NASSCO PACP certification (standardized condition rating system for pipes) training (4 Water Resources staff)
 - Numerous other webinars and training opportunities
- Municipal Repair/Good Housekeeping Projects:
 - Manhattan Outfall Channel (West) Repair: Re-stabilization of large drainage swale along western side of Rt. 127 Beltline and Manhattan
 - Design for outfall infrastructure repair and channel stabilization at Little Eagle Bay outfall system completed (constructed January – March 2016)

7) Other Stormwater Activities and Reporting

- FY 16 Stormwater Budget Proposed Expenses: \$1,330,878
- Current stormwater ISU (1000 sq. ft.) = \$1.95; Single Family home = \$5.21 (see: <http://www.burlingtonvt.gov/DPW/Billing>)
 - See Appendix 7 for Stormwater Rate history

8) Flow Restoration Plan (FRP) Development Progress (Part IV.C.1.e.1)

- The City of Burlington is required to participate in the development of three FRPs for discharges from the City to Centennial Brook, Englesby Brook and Potash Brook. The City intends to work with other MS4s to develop these FRPs and submit to the State prior to October 1, 2016.

- Centennial Brook FRP: The City began work with UVM, VTRANS and South Burlington on the FRP for Centennial Brook in 2013. Stormwater retrofits have been identified throughout the watershed and the draft plan has been presented to the State for review. The City and other MS4s must still prepare a financial and implementation plan prior to final submission to the State before October 1, 2016.
- Englesby Brook FRP: The City has received a \$63,249 LTF grant through VTRANS for the development of the Englesby Brook FRP. Work on the Englesby FRP is currently underway and our consultant, Stone Environmental (with Horsley-Witten), has been working with Emily Schelley. We anticipate completion of the Englesby Brook FRP by June 30, 2016 and submission of the Flow Restoration Plan by October 1, 2016.
- Potash Brook FRP: We are cooperating with South Burlington's larger Potash FRP effort which is underway. We anticipate completion of the FRP in the summer of 2016 and submission of the Flow Restoration Plan by October 1, 2016.

9) Development of a Low Impact Development Technical Assistance Program for Landowners (Part IV.C.1.e.4)

In addition to our own going efforts to promote Low Impact Development through our regulatory review program and through providing technical assistance through our website and directly by our staff, we have secured a \$20,000 grant with the Lake Champlain Basin Program with which we will work with our existing partners BLUE® to develop an enhanced residential stormwater certification and grant program.

10) Stream Corridor Protection of Impaired Waters (Part IV.C.1.e. 4 and 5)

In accordance with our October 1, 2015 interim report, we have prepared maps showing the impervious surface within the 100' stream corridor buffer of the impaired waters. See appendix 10-1, 10-2 and 10-3

11) Flow Monitoring Progress (Part IV.C.1.e.7)

Legislation enabling VT DEC to collect funding from the regulated MS4s for the purposes of conducting stream flow monitoring was enacted with the passage of H.650 in the 2014 legislative session. The City intends to execute the MOU for the joint Flow Monitoring in April 2016.

12) Expired Permits Progress (Part IV.C.1.e.3)

Per our October 1, 2015 interim report to the State, until the State releases the RDA permit and EFA, we do not anticipate making a decision regarding whether the City will incorporate these permits into the City's MS4 or petition the State to RDA these expired permits.

However, consistent with our October 1, 2016, we are submitting draft reports regarding the existing status of these permitted systems. In several cases, it appears that these systems may involve discharges of stormwater that is solely from private property and which discharges directly to an impaired water without entering the MS4 system. While still need to fully confirm this understanding, we will need to work with the State to understand whether or not certain permits are even eligible for MS4 incorporation if there is no commingling of flow with public MS4 stormwater prior to discharge. See Appendix 12-1 and 12-2 for reports on the remaining expired permits in Englesby and Centennial.

11) Permit deadlines for Permit Year 2015

- October 1, 2016:
 - Submit FRP for Centennial, Englesby and Potash Brooks

12) Plans/Projects for Permit Year 2016

- Ongoing development of Integrated Water Quality Management Plan:
<http://www.burlingtonvt.gov/DPW/Stormwater/IMSWP>
- Development of Formal Asset Management Plan for Stormwater infrastructure
- Repair of Outfall Channel at Little Eagle Bay
- Repair of Outfall and Channel at Gazo Avenue

13) Proposed Changes

- There are no changes proposed to the SWMP at this time.

Certifications:

"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 gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information 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."

Megan Moir, CPSWQ
Stormwater Program Manager

3/31/2016

Date Signed



Chittenden County Regional Stormwater Educational Program

Annual Review: 2015 Calendar Year Summary

2015 was a maintenance year for RSEP, utilizing 2014's "*Slow the Flow*" campaign creative around rain barrels and rain gardens and also the creative informing people about the best time to fertilize (if at all). In 2015, we saw strong results, with the second-highest website visits on record. (Only 2014 was higher.) We continued to use data from past campaign performance to tweak media buys and try some different ad formats, consistently working to reach more people.

In 2015 we also continued to improve our website, focusing on cleaning up links, developing stronger verbiage, and deleting outdated content. Building on the design refresh of 2014, the website is now technically and visually more modern, more clearly written, and easier to navigate.

Spring Advertising Campaign

During the Spring campaign we utilized some new ad formats with *Xfinity*, specifically a home page takeover and Comcast Video Plus, which allowed us to advertise on *Comcast* partner sites. Compared with Table 2: Fall 2015 Online Campaign Results, it's clear that the traditional pre-roll ads (ads that run prior to watching a video) prove to be more effective than these new ad opportunities.

The online portion of the advertising budget accounts for 36% of the overall expenditure of \$19,855. The remainder covers radio, television and print advertising. Media beyond online ads raises awareness and allows consumers additional impressions, but the vast majority of web clicks come from online ads, driven by the ease by which people can access the Smart Waterways site from an online ad.



Table 1: Spring 2015 Online Media Results

	Impressions	Clicks	Cost	Cost per Click
WCAX	90,000 impressions	198	\$990	\$5.00
Xfinity*		373	\$1,725	\$4.62
	video pre-roll, 16,300 impressions	252		
	home page takeover	33		
	Comcast Video Plus, 26,300 impressions	88		
Front Porch Forum	210,000 impressions	253	\$1,500	\$5.93
Google ad network	pay-per-click	382	\$1,398	\$3.66
Seven Days	100,000 impressions	116	\$1,093	\$9.42
TOTAL		1695	\$6,706	\$3.96

Fall Advertising Campaign

For the Fall campaign we focused back on the issue of not using fertilizer in the spring. In order to use past material, we worked with local Fox television affiliate *WFFF* to remake the old television spot (which was not digital and looked grainy) in an HD format. This spot can now be used into the foreseeable future.

In addition, as mentioned above, based upon what we learned using the *Xfinity* ad formats, we decide to revert back to using pre-roll ads only, driving down the cost per click. Even with the high cost per click for *WFFF/ABC 22* ads, our overall cost per click was very low at \$3.07, as shown below in Table 2. The online portion of the advertising budget was 51% of the overall expenditure of \$9,940.

Table 2: Fall 2015 Online Campaign Results

	Impressions	Clicks	Cost	Cost per click
WCAX	120,000 impressions RSS feed	316	\$600	\$1.90
Xfinity	55,000 video pre-roll impressions	832	\$1,980	\$2.38
Front Porch Forum	50,000 impressions	77	\$750	\$9.74
Google ad network	pay-per-click	329	\$860	\$2.61
WFFF/ABC 22	90,000 impressions	38	\$700	\$18.42
TOTAL		1,592	\$4,890	\$3.07



Traffic to Program Website (www.smartwaterways.org)

Presented below in Figure 1 and Table 3 is the website visitor information for 2015, compared to preceding years.

The site had 4,659 visits during 2015, not as strong as 2014 but still the second highest on record. Website traffic increases correlate with media campaigns. The Chittenden County’ Stream Team’s *Connecting the Drops* program ran in Williston during the June timeframe, keeping web traffic high in between campaigns.

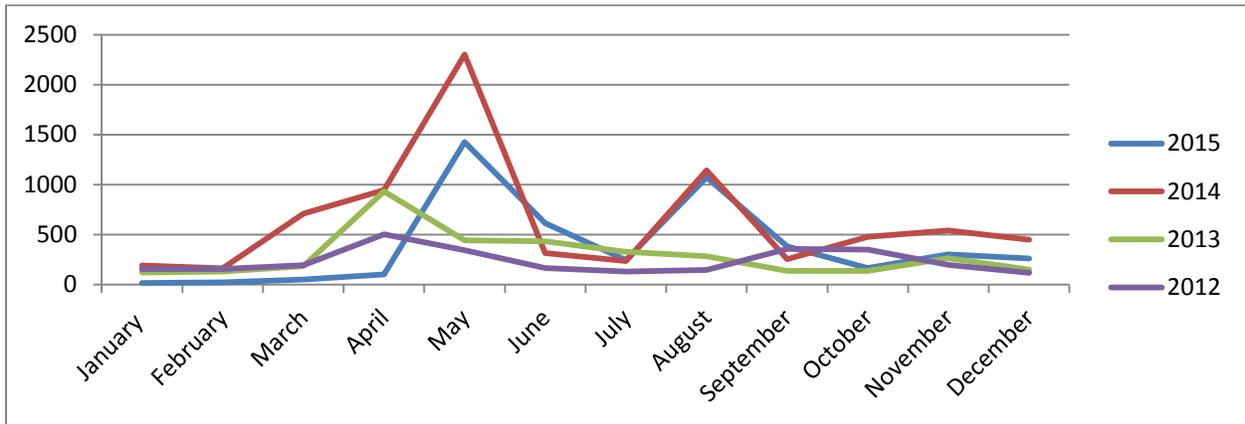


Figure 1: Total Internet Traffic to SmartWaterways.org

Table 3: Total Internet Traffic to Smartwaterways.org

YEAR	TOTAL
2015	4,659
2014	7,728
2013	3,542
2012	2,817
2011	2,859



Chittenden County Stream Team Summary of Activities January-December 2015



This report summarizes CCST activities in the 2015 calendar year. Demographic data about participant numbers from each town is presented in tabular form following the narrative.

Social Media

Facebook

- 120 total “likes”-- a 15% increase in likes from 2014 annual report numbers (104 total likes)
Facebook ‘likes’ can’t be isolated by year; only total numbers over time can be counted.
- 20% of the people who like CCST are from Burlington (23 people)
- 41% of the people who like CCST live in CCST member towns (49 people)

CCST Website

Google Analytics provides website traffic data from: January 1, 2015 to December 31, 2015

- 1,773 website visits, spending an average of 1 minute and 53 seconds on the website per visit. The number of visits is up 22% from 2014 (1,454 visits)
- 3,603 page views, similar to the 2014 quantity (3,683)
- 80.5% of visitors were new visitors to the site.
- The highest spike in page views occurred on April 2nd, with 39 visits, which coincided with the announcement that the Chittenden County Regional Planning Commission was recognized by The New England Water Environment Association with a *Stormy Award* for “Regional Collaboration for Enhanced Stormwater Program Efficiency.” Website traffic remained relatively high through April and May as the Connecting the Drops display was planned and installed. There were also spikes in July around the time of the rain barrel give-away and two rain barrel workshops. On average, the busiest months for web traffic were April, May, June and July.

Newsletter and e-correspondence

- In 2015, there were 459 subscribers to the CCST newsletter, up 55% from 295 in 2014.
- A spring newsletter was sent out in May with a 37.1% open rate. A fall newsletter was sent out in October with a 42.1 % open rate. CCST E-News open rate is high; the typical open rate for similar industries is between 20-25% according to research completed by Mail Chimp.
- The Mail Chimp email list was used throughout the year to announce rain barrel workshops and to request volunteers for water quality monitoring.



Chittenden County Stream Team

Summary of Activities January-December 2015

Organizational Partnerships

The Chittenden County Stream Team partnered with nine different organizations in 2015; CCST partnered with 12 organizations in 2014.

- A local gardener donated plants for the Stream Team's rain gardens. In 2015, Ann Pearce provided CCST with dozens of iris, lobelia and native grasses for multiple rain gardens (Chamberlin School, South Burlington and Williston Town Hall Annex, Williston).
- CCST worked with multiple schools and school groups this year for hands-on events and for outreach opportunities. The Stream Team partnered with teachers from South Burlington High School, Winooski High School and the Winooski Teen Center. Additionally, students from Champlain Valley Union High School decorated two of the rain barrels for the Connecting the Drops 3.0 display.
- CCST partnered with towns and other local organizations to host two rain barrel workshops. CCST partnered with the South Burlington Natural Resources Committee, the South Burlington Department of Public Works and the Town of Williston Public Works Department to hold the rain barrel workshops.
- During the 2015 Connecting the Drops outreach campaign and events, CCST partnered with the Let it Rain program (administered by Winooski Natural Resources Conservation District and UVM's Lake Champlain Sea Grant) to develop outreach materials and to manage the events. Lake Champlain Sea Grant staff member Becky Tharp recruited the artists for the displayed rain barrels and coordinated press and advertising. CCST partnered with the Town Williston to provide outreach for Connecting the Drops, display the barrels and engage citizens.
- CCST worked with the Milton Conservation Commission to provide outreach to the community and to build-up future ideas for hand-on participation in the town.

Media

The Chittenden County Stream Team had six media appearances this year, and increase from 4 in 2014. Copies of each article are archived in the CCST 3-ring binder housed at the office of the CCST chair (if applicable).

- Water Environment Federation (WEF) Stormwater Report May 5, 2015 (Stormy Award recognition) <http://stormwater.wef.org/2015/05/stormy-awards-elevate-new-england-stormwater-efforts/>
- Milton Independent: May 7, 2015. The Stream Team is not mentioned in the linked article, but there was a picture of CCST tabling at Milton's Green-Up Day and a caption in the print edition. <http://www.miltonindependent.com/retro-rubbish/>
- Williston Observer: May 21, 2015 <http://www.willistonobserver.com/artsy-stormwater-management-i-89-northbound-rest-stop-gets-new-rain-barrel/>
- Williston Observer: July 30, 2015 <http://www.willistonobserver.com/photos-building-a-rain-barrel/b> Photos of the Connecting the Drops rain barrel workshop
- The Citizen: May 14, 2015: <http://www.thecitizenvt.com/2015/05/14/partnership-offers-rain-barrel-workshop-june-7/>
- Shelburne News: May 6, 2015: <http://www.shelburnenews.com/2015/05/06/build-your-own-rain-barrel-june-7/>

Outreach



Winooski Natural Resources Conservation District

“Connecting people to a sustainable landscape”

Chittenden County Stream Team Summary of Activities January-December 2015

Outreach events include tabling and the distribution of educational materials or information. There were nine outreach events in 2015 in which the Stream Team interacted with 324 people. See Table 1 below for detailed outreach audience information. An additional 36 people clicked on Front Porch Forum advertisements about the Connecting the Drops 3.0 outreach campaign, bringing total outreach numbers to 360.

- Milton Green-Up Day (5/2/2015, 36 people reached)
- Connecting the Drops 3.0 ribbon cutting ceremony in Williston (5/18/15, 35 people reached)
- Presentation to Milton Conservation Commission (6/23/15, 7 people reached)
- Williston Independence Day Celebration (7/3/15, 35 people reached)
- Burlington farmers Market (8/1/15, 46 people reached)
- Water Works Fair in Burlington (8/9/15, 26 people reached)
- Summervale in Burlington (8/20/15, 28 people reached)
- Shelburne Farmers Market (9/12/15, 33 people reached)
- Shelburne Harvest Festival (9/19/15, 88 people reached)

Event-Driven Tasks

There were nine hands-on events held and the continuation of on-going tasks including, rain garden adoption and maintenance, and water quality monitoring in 2015. Detailed participation data is provided in Table 2.

- Rain Barrel Painting for Connecting the Drops 3.0 Display (April/May 2015)
 - Partnered with Champlain Valley Union High School's Art club to decorate two rain barrels for the Connecting the Drops 3.0 display in Williston
 - Six students and one teacher worked to paint two display barrels
- Rain Garden Adopters are Supplied with Plants and Mulch for work days in mid-May (May2015)
 - Rain garden adopters worked to maintain the gardens at Williston Town Hall Annex, Chamberlain Elementary School in South Burlington and at the Coast Guard Station in Burlington.
 - Donated rain garden plants were planted in the Chamberlin School garden in South Burlington, the Williston Town Hall Annex garden, and in the Coast Guard Station garden in Burlington. Other volunteers maintained the gardens but were not in need of supplies.
- Volunteer Water Quality Monitoring Training/Sampling and Volunteer Thank You (6/16/2015)
 - Interest in the water quality monitoring program was high; 28 people contacted CCST to find out more information about volunteering. Of those who contacted CCST, 22 volunteers participated in the water quality monitoring training session. Sampling occurred on five scheduled dates (6/23, 7/07, 7/21, 8/04, 8/18, 9/1)
 - Sampling was expanded this year to include e. coli sampling at Wheeler Park in South Burlington
 - Volunteers were recognized for their dedication with pizza and appreciation during the water quality monitoring training event.
 - Analyzed sampling data was uploaded to the CCST [website](#).
- Rain Barrel Decorating at the Williston Independence Day Celebration (7/3/2015)
 - 17 Williston residents participated in rain barrel decoration during the Connecting the Drops 3.0 rain barrel give away at the Independence Day Celebration; most of these people also signed up to win a rain barrel.
- South Burlington Rain Barrel Workshop (7/7/2015)



Chittenden County Stream Team Summary of Activities January-December 2015

- Partnered with South Burlington’s Natural Resources Committee and the South Burlington Department of Public Works to hold a rain barrel workshop
- 32 participants built 29 barrels. All participants received outreach materials about rain barrels and stormwater.
- Connecting the Drops 3.0 Rain Barrel Workshop (7/25/2015)
 - Partnered with the Town of Williston’s Public Works Department and Lake Champlain Sea Grant to prepare and advertise for the event.
 - 32 participants built 26 rain barrels. All participants received outreach materials about rain barrels and stormwater.
- Potash Brook Stream Clean-Up with South Burlington High School (9/20/2015)
 - Partnered with South Burlington High School Environmental Science class
 - 21 students and 1 teacher participated in the clean-up, removing four bags of trash from Potash Brook.

CCST Outreach and Event Demographic Impacts

Since participation numbers for Milton and Shelburne were low in 2014 and because CCST had not focused on Burlington in some time, these towns were identified as the outreach target towns in 2015. Displayed in the table below, 2015 outreach efforts in these towns were a success and all workplan goals were met. Hands-on events are planned for these 3 towns in 2016.

Table 1: Participation in Outreach Activities by CCST Member Town

Activity	Location	Participant Town									Total
		Burlington	South Burlington	Essex	Essex Jct	Milton	Shelburne	Williston	Winooski	Other/Unkown	
Facebook 'Likes'	N/A	23	10	0	4	2	2	4	4	71	120
Website Visits	N/A	236	42	58	0	4	7	27	5	1,394	1773
e-news Mailing List	N/A	56	40	10	34	30	13	71	25	180	459
Green-Up Day	Milton	0	0	1	0	32	0	0	0	3	36
Milton Conservation Commission	Milton	0	0	0	0	7	0	0	0	0	7
CtD 3.0 Ribbon Cutting Ceremony	Williston	3	0	3	0	0	1	18	0	0	25
Independence Day Celebration	Williston	0	0	5	2	0	0	28	0	0	35
Farmers Market	Burlington	25	8	0	2	2	1	0	3	5	46
Summervale	Burlington	18	1	0	3	0	0	0	3	3	28
Water Works Fair	Burlington	19	2	1	3	0	0	0	0	1	26
Harvest Festival	Shelburne	35	0	3	0	0	5	11	9	25	88
Farmers Market	Shelburne	0	0	0	0	0	28	0	1	4	33
Front Porch Forum CtD 3.0 Ad 'clicks'	Williston	0	0	0	0	0	0	36	0	0	36
	Total	415	103	81	48	77	57	195	50	1686	2712

**Colchester represents a portion of the “other” participants, with 51 Colchester residents engaged with CCST outreach events (See Table 3 for details).

Hands-on participation events in 2015 were targeted to the towns of Williston, Winooski and South Burlington. The workplan goals for participation were met and exceeded in all three towns. There were a total of 188 event participants in 2015, surpassing the workplan goal of 100 participants. Outreach towns for the following year are selected from end-of-year event participation numbers and frequency of targeting a town. Based on the participation numbers from 2015 and the inclusion of Colchester into CCST, the towns that will be targeted for outreach in 2016 are: Colchester, Essex and Essex Junction.



Chittenden County Stream Team Summary of Activities January-December 2015

Table 2: Participation in Hands-On /Event-Driven Projects

Activity	Location	Participant Town									Total
		Burlington	South Burlington	Essex	Essex Jct	Milton	Shelburne	Williston	Winooski	Other/ Unkown	
Adopt-a Rain Garden Maintenance Days	Multiple	7	12	0	9	0	0	4	0	0	32
WQ Monitoring Training and Volunteer appreciation	Williston	7	5	1	2	0	1	4	2	0	22
WQ Monitoring Volunteers	Multiple	5	4	0	0	0	1	3	1	0	14
Stream Clean-Up	Winooski	0	0	0	0	0	0	0	10	0	10
Painting Barrels for CTD Display	Hinesburg (CVU)	0	0	0	0	0	1	3	0	3	7
Rain Barrel Workshop	South Burlington	9	14	0	0	0	3	0	0	6	32
Rain Barrel Decorating	Williston	0	0	0	0	0	0	17	0	0	17
Rain Barrel Workshop	Williston	0	3	1	1	3	0	22	0	2	32
Stream Clean-Up	South Burlington	0	22	0	0	0	0	0	0	0	22
		28	60	2	12	3	6	53	13	11	188

Other Vermont towns that are not part of the Chittenden County Stream Team participate in CCST activities. The chart below identifies towns with significant participation (Table 3).

Table 3. Participation in CCST Activities from Non-Member Towns

CCST Outreach and Event Participation Beyond Participating MS4 Towns									
	Huntington	Jericho	Richmond	Hinesburg	Charlotte	Colchester	Montpelier	St. Albans	Total
Facebook likes	1	4	0	3	0	7	4	4	23
e-news	1	2	4	3	1	12	0	2	25
website visits	0	2	1	6	1	26	48	8	92
Green-Up Day tabling in Milton	0	0	0	0	0	3	0	0	3
Burlington Farmers Market	0	0	0	0	0	2	0	0	2
Burlington's Summervale	0	0	0	0	1	0	0	0	1
Water Works Fair (BTV)	0	0	0	0	0	1	0	0	1
Shelburne Harvest Fest	0	0	0	0	0	0	2	2	4
Shelburne Farmers Market	0	0	0	2	0	0	0	0	2
	2	8	5	14	3	51	54	16	153

Connecting the Drops 3.0

In 2013, the Winooski Natural Resources Conservation District received a grant from the Ecosystem Restoration Program, VT DEC, for Let it Rain, a technical and financial assistance program aimed at supporting landowners in the installation of low impact development practices, and subsequently received funding from the Lake Champlain Basin Program to support this initiative with funding for outreach and education to landowners about stormwater. Connecting the Drops emerged from Let it Rain as an art and education installation about stormwater, featuring rain barrels, in downtown Burlington in the summer of 2013. WNRCD received a \$40,000 grant from ECOS to develop Connecting the Drops. RSEP provided an additional \$12,500 to leverage the exhibit's exposure for logo placement on print and web ads, signage, website, fliers, and verbal recognition at public events associated with the exhibit.



Chittenden County Stream Team Summary of Activities January-December 2015

Based on the successful outcomes of the 2013 campaign, RSEP members requested a proposal for a second year of the Connecting the Drops Project, known as Connecting the Drops 2.0 (CtD 2.0). With a significantly smaller scope, Lake Champlain Sea Grant (LCSG) worked with The Chittenden County Stream Team (CCST) to develop a “traveling” version of the Connecting the Drops exhibit to be held in Essex Junction during the summer of 2014. CtD 2.0 had a significant impact on successfully meeting and exceeding CCST’s outreach goals in 2014. The amount spent by CCST (\$1,728.77) on CtD2.0 was six percent of CCST’s FY15 budget. This relatively small budget percentage had a large impact on overall community participation numbers, which exceeded workplan goals in 2014. Due to the success of CtD2.0, CCST decided to pursue a third year of the campaign, Connecting the Drops 3.0 (CtD 3.0). The Town of Williston was selected because it was a 2015 CCST target town and there was support from town representatives.

Full reports on the details of the CtD 3.0 and all of the Connecting the Drops campaigns are available and on file with the CCST chairs.

A total of seven rain barrels were displayed at Williston Community Park for the CtD 3.0 exhibit displayed from May 23-June 29, 2015. Five barrels were decorated by local artists and two barrels were decorated by student artists from the Champlain Valley Union High School Art Club. In addition to the display in Williston Community Park, there were two outreach events associated with CtD 3.0 and a build-your-own rain barrel workshop. Throughout the five weeks that the rain barrels were on display in Williston Community Park before the give-away, 85 people applied through the Let it Rain website/QR code on the display signage to win a rain barrel (Table 4); an additional 30 people signed up during the Independence Day celebration (Table 5) for a total of 115 sign-ups.

Table 4. Rain Barrel Sign-Ups by Town (QR Code)

Town	# of People
Burlington	4
Essex	2
Essex Junction	9
South Burlington	2
Williston	55
Colchester	2
Other	11
TOTAL	85

Table 5. Rain Barrel Sign-Ups by Town (During Event)

Town	# of people
Williston	26
Essex	2
Essex Junction	1
Burlington	1
Total	30

The total cost to plan, manage and implement CtD 3.0 was \$3,800.84. In addition to personnel hours for project management and travel funds, the primary costs are compensation for the five professional artists (\$1,000) and paid advertising (\$722.10). CCST staff used 48.5 personnel hours and \$94.55 of mileage to plan and execute CtD3.0.

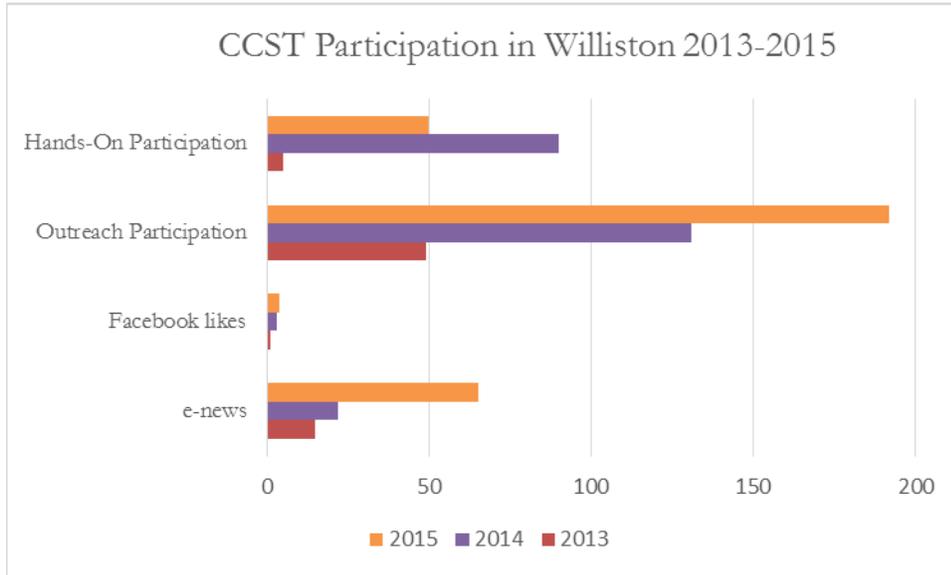
Connecting the Drops 3.0 had a significant impact on CCST’s successful year in 2015. The amount spent by CCST (\$3,800.84) is 14 percent of CCST’s FY15 budget. This relatively small budget percentage had a large impact on the overall participation numbers in 2015. All workplan targets for outreach and event participation in Williston were exceeded through the CtD 3.0 events. Additionally, the draw of signing up to win a rain barrel at the Williston Independence Day Celebration resulted in the largest impact in terms of outreach that CCST has made in Williston to date. Not only did Williston residents sign up to win a barrel, but many of them took outreach materials, talked with CCST staff and/or decorated CCST’s chalkboard rain



Chittenden County Stream Team Summary of Activities January-December 2015

barrel. A comparison of participation numbers in Williston between 2013, 2014 and 2015 for equivalent events and interactions is provided below (Figure 1). The elevated outreach numbers may be attributed to the increased CCST presence and advertising efforts that occurred through CtD3.0.

Figure 1. Williston Participation Numbers 2013-2015



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 clean and attractive by performing basic maintenance activities like picking up litter, pulling weeds, and installing new mulch. The “adopted” gardens are of varying age and origin. A few were installed by the Winooski Natural Resources Conservation District/Chittenden County Stream Team, some have been in existence for a long time and needed extra care, while others are new. Information about CCST adopt-a-rain garden program is available on the Stream Team [website](#). In 2015, CCST chairs approved funding to create signage for the rain gardens. The signs were printed and installed in several gardens.

Following is a description of the status of each of the CCST public rain gardens; Table 6 condenses the information:

Brownell Library Rain Garden

Location: 6 Lincoln St. Essex Junction

Status: This garden has existed for many years and has several mature shrubs. Unfortunately, several of the mature shrubs are the invasive burning bush (*Euonymus alatus*.) Although the garden does not currently have an adopter, it has had an active adopter over the last several years. Additional plants and mulch were added to the garden in 2013 and 2014. It has been weeded and well-maintained in 2013, 2014 and 2015. Brownell Library staff are interested in getting rid of the burning bush. CCST would like to work with the Village of Essex Junction to remove the invasive plants and seek replacement shrubs.



Chittenden County Stream Team

Summary of Activities January-December 2015

Callahan Park Rain Garden

Location: Locust St., Burlington

Status: This garden has been functioning well for some time, despite its surrounding conditions. In 2013 the garden began to experience significant slumping. Work was done to repair the slumping, which caused the loss of many plants. However, the garden appears to be building back up and doing better. This garden has an active volunteer, Brad Ketterling, who is committed to weeding and monitoring the garden. This garden received donated plants in 2015. Brad is interested in adding more pollinator species in the future.

Chamberlain School

Location: 262 White Street, South Burlington

Status: This garden was installed in partnership with WNRCDC and the Let it Rain Program in 2013. This is one of several rain gardens on the grounds of Chamberlain Elementary. Chris Provost has adopted this garden and actively maintains it. He often uses his students to help maintain the gardens and uses the gardens as an educational aide. Additional plants and mulch were provided to these gardens in 2014 and 2015.

Coast Guard Station

Location: Depot Street, Burlington

Status: This garden was very overgrown for some time. It is a small garden in a large parking lot at the edge of Lake Champlain. In 2014, CCST worked with the ECHO summer kids program to engage elementary school children in rain gardens. In several work sessions over the summer, the students pulled weeds, removed trash, planted dozens of new plants and applied mulch. The garden is doing very well and now has an active adopter, Wiley Reading.

Correctional Facility

Location: 7 Farrell St., South Burlington

Status: This garden is visible from the road and appears to be functioning. Originally, employees of the prison adopted this garden and would occasionally maintain the garden with inmates. There has been a lot of staff turn-over in the past few years without a clear adopter. In 2013, CCST delivered upwards of 50 plants to the center to be planted by the inmates. We were told that there was a weed-pulling day in 2014.

Farrell Park

Location: Swift Street, South Burlington

Status: This garden is unique in terms of its design. It is called an “advanced wetland stormwater filter.” It was installed in 2012. Stormwater enters the garden through 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 not ever in need of additional plants or maintenance. It would not be appropriate to add mulch to this garden. CCST would like to find another adopter to bring any issues to our attention.

Landry Park

Location: North St., Winooski

Status: This garden was constructed in 2006. It was originally constructed as two separate gardens along the narrow strip of grass between a fence at Landry Park and the road. Over the years, the garden has fallen into



Chittenden County Stream Team Summary of Activities January-December 2015

disrepair. 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 most of the vegetation and caused gullies to form. Over the years, CCST has attempted to add more vegetation and mulch in hopes of slowing the flow, but these attempts have not been successful. The City of Winooski is willing to work with CCST to repair the garden. Currently UVM students in an Ecosystem Design course are developing recommendations to repair the garden. There is no current adopter; the adoption program was put on hold for this garden as we try to address its problems.

Williston Town Hall Annex

Location: 7900 Williston Rd, Williston

Status: This small garden, near the entrance walkway to the Annex building and the parking lot, has had an active adopter since 2014, Rita Desseau. Each year she weeds the garden and has installed plants and mulch as needed. In 2013, after an absence of care for a year, UVM students helped clear the garden of trash and weeds.

Williston Library

Location: 21 Library Lane, Williston

Status: This garden has had an active adopter for many years. Andrew Wolf cares for the garden and keeps CCST posted on its status. The garden is functioning properly, is weeded and not in need of any extra care.

New Garden:

South Burlington Fire Department

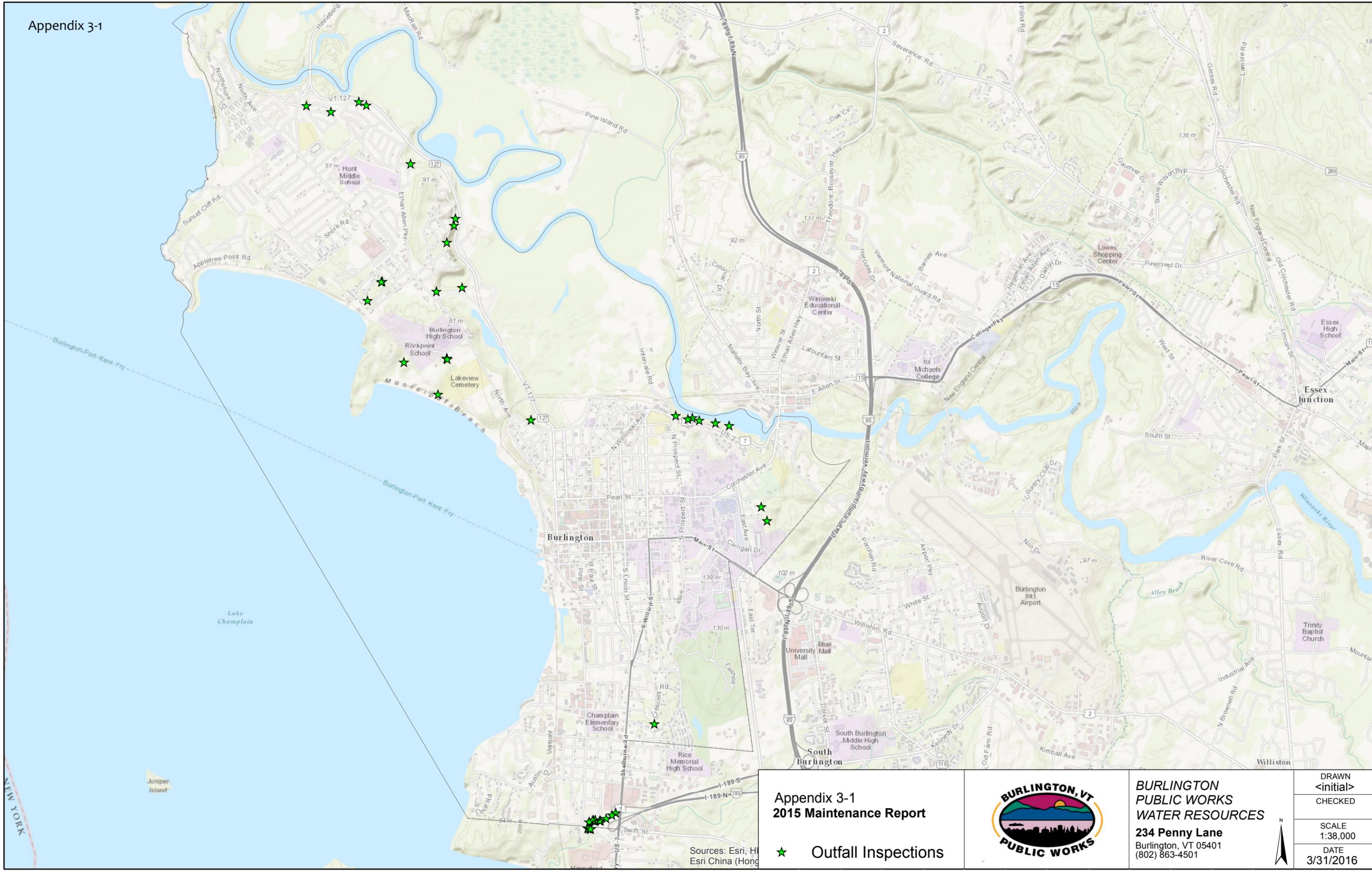
575 Dorset St.

Status: South Burlington recently installed a bioretention area/rain garden to improve stormwater management at the Fire Department. <http://www.sburlstormwater.com/stormwater-projects/city-offices-stormwater-improvement-project/>. We have been actively looking for a volunteer to maintain this garden over time.

Table 6. CCST 2015 Rain Garden Status Update

Town	Garden Name	Adopter	Last Miantenance	Needs
Burlington	Coast Guard Station	Yes	plants/mulch 2014, 2015 weeding	None
Burlington	Callahan Park	Yes	plants/weeding 2015	None
South Burlington	Farrell Park	No	monitored through 2014	Nothing for garden, but do need a new adopter
South Burlington	Correctional Center	Yes	2014 plants/weeding	Touch base with new staff
South Burlington	Chamberlain School	Yes	2015 plants/mulch	none
South Burlington	Fire Station	No	new garden	needs adopter
Essex Junction	Brownell Library	No	2014/2015 new plants, weeding	Needs new adopter, needs removal of invasives
Williston	Town Hall Annex	Yes	2015 weeding/2014 mulch and plants	None
Williston	Willsiton Library	Yes	2015 plants/weeding	None
Winooski	Landry Park	No	2014 plants, weeding (2015 maintenance on hold)	Serious attention/redesign





Sources: Esri, H
Esri China (Hong

Appendix 3-1
2015 Maintenance Report

★ Outfall Inspections



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Appendix 3-2

Strathmore Development – 2015 IDDE Summary

Burlington Water Resources Dept.

In addition to previous IDDE efforts at the Strathmore outfall (optical brightener pad based, always negative), the Strathmore Home Owners Association (HOA) has been conducting *E. coli* sampling of their beach. Most recently in 2013, the HOA contacted the Burlington Stormwater Program (BSP) with reports of high *E. coli*. In response to this effort, the Stormwater Program again deployed optical brightener pads in the most downstream manhole before the outlet, sampled various catch basins for *E. coli* along Appletree Point Road, and also conducted lining cleaning. Although an odor was detected in the most downstream manhole, the optical brightener pad once again was negative. Moreover, there was evidence of beaver (sticks) in the manhole and the *E. coli* counts at that time were presumed to be the result of wildlife. The BSP recommended to the HOA that grate be installed to limit the ability of wildlife to access the system.

In the summer of 2015, the HOA contacted the BSP with reports of extremely high *E. coli* and indicated that they were considering contracting with Watershed Consulting Associates (WCA) to pinpoint the source. Upon learning of the persistent *E. coli* the City instead contracted directly with WCA to do an enhanced IDDE investigation in the area upstream of the manhole, using tools other than OB pads (ammonia and surfactant testing).

Through the enhanced WCA testing (See Appendix 3-2.1) and confirmatory CCTV with dye in the suspected household, an illicit connection was confirmed at 146 Appletree Point Road. See the timeline in Appendix 3-2.2 of events from discovery (9/2/2015) through remedy (on 9/25/2015). Once the connection was discovered, the downstream stormwater manhole was vactored regularly to minimize the discharge of sewage to the Lake. Additional testing was done after the illicit connection remedy and was negative for surfactants (and in most cases for ammonia – which can be present for other reasons) for portions of the system in close proximity to the illicit connection. We believe the lower portion of the system is influence by backwater which is why samples immediately upstream of the illicit connection were positive in some cases.

Additional follow up investigation (CCTV) and testing were done to address any other suspicious results from WCAs comprehensive testing and from additional *E. coli* sampling completed by the HOA. (See 3-2.3) No human sanitary influenced illicit connections were found, however, presence of rodents and rodent fecal matter were discovered during the inspections. The Stormwater Program is continuing to work with the HOA to develop pet waste yard signs to be deployed in 2016, as well as installing rodent grates on the ends of private outfall pipes within the neighborhood.

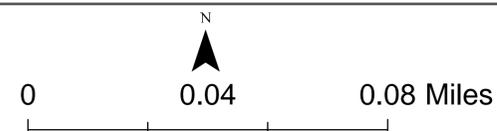
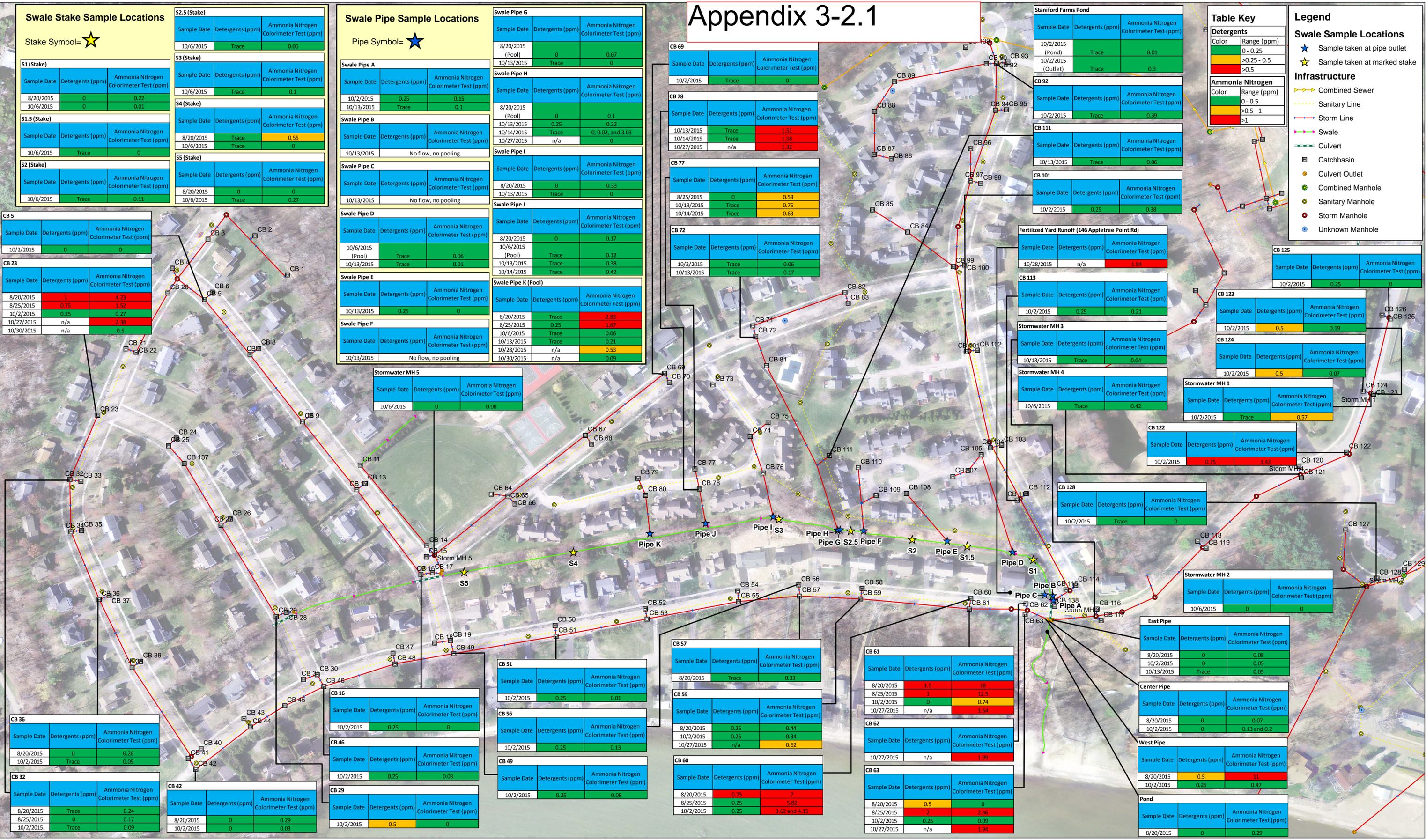
Lessons Learned:

This illicit connection was the result of the common practice for subdivision development whereby the developer constructs the sewer and stormwater infrastructure and leaves sewer and stormwater stubs for each home lot. The homebuilder is then responsible for connecting the sewer laterals and any storm or foundation drains to these stubs. In this case, the builder connected the sewer lateral from the home to the storm system. Because there was no excavation for this connection in the right of way, the City did not have a formal process for reviewing this connection at the time that it was made. The building

permit/plumbing process is focused on the fixtures internal to the home and extending only 6' outside the home. While the City does not have a great many remaining subdivision development opportunities where this phased approach (and possibility for illicit connection) might cause a similar situation, we are aware of the possible gap in oversight for these situations. While the State Wastewater office appears to now have an "installer certification" process which would address these type of situations, the reality is that there appears to be no standard for how stubs are marked and how correct lot level connections to these stubs are inspected.

Additionally, we have learned that Optical Brightener testing, while a good inexpensive screening tool, will not capture all illicit connections. This may be due to the fact that many detergents no longer contain optical brighteners. As such, the City will be investigating the feasibility/cost of adopting additional screening tools such ammonia and MBAS surfactant testing. We would prioritize outfalls that are in close proximity to public or private beaches (i.e. Lake outfalls) for our initial enhanced IDDE screening.

Appendix 3-2.1



Strathmore Development
Data Overview
Detergents and Ammonia Nitrogen Testing

Appendix 3-2.2

Strathmore Storm System
 Illicit Sanitary Connection to Storm Sewer
 Timeline of Events 2004 - 2015

Date	Description	Downstream Storm Manhole Vactored
2000	Home at 146 Appletree gets built. Contractor mistakenly ties house sewer lateral to storm stub on the property.	
2004	Strathmore outfall gets tested along with all other outfalls for E. Coli and Optical Brightener (OB) as part of first MS4 permit. Results did not warrant further investigation.	
2011	Strathmore outfall gets tested along with all other outfalls for Optical Brightener (OB) as part of first MS4 permit. Results did not warrant further investigation.	
2013	DPW gets an emial from Strathmore HOA that their E. Coli tests reveal high counts. OB pad is negative and beavers in the storm pipes were believed to be the culprits.	
July 2015	HOA alerts DPW to high bacteria counts again. DPW hires Watershed Consulting to try and find the source. By then DPW has learned that not all clothes detergents contain optical brighteners.	
August 2015	Watershed Consulting hired to assist DPW with trying to find the source of contamination.	
8/28/2015	Megan Moir notified of substantially high ecolli counts and was provided a hot spot map from Watershed Consulting.	
	The same day, DPW CCTV crew mobilized to initially film upstream of the "hot" CB 61 for illicit connections. Nothing suspicious was found.	yes
8/27/2015		
8/28/2015		
8/29/2015		
8/30/2015		

9/1/2015	DPW CCTV crew continued to film the sanitary sewer both upstream and downstream of the hot spot location. We also filmed the stormwater main, downstream of the hot spot catch basin, to which we observed a significant sag in the pipe. At this juncture, Matt Dow and Greg Johnson removed small chunks of sanitary grease from the stormwater manhole in front of 146 Appletree Pt Rd. This observation strongly suggested a full piped connection to the stormwater main.	yes
9/2/2015	CCTV crew, with the help of a Wastewater Vacuum truck, vacuumed the storm manhole in front of 146 Appletree while the camera drove from the hot spot catch basin, towards the previously observed pipe sag. Thanks to the vacuum truck, we were able to clearly observe a sanitary connection to the stormwater main.	
	Greg Johnson dye tested the 146 Appletree Pt bathroom toilet, while Tim Grover confirmed it's entry to the stormwater main.	
	All parties notified of the connection (DPW Water Resources management, homeowners at 146 Appletree)	
9/3/2015	Laurie Adams left a message for Steve Cunningham, notifying him of issue and requesting to call back.	Yes
9/4/2015		Yes
9/5/2015	weekend	
9/6/2015	weekend	Yes
9/7/2015	DPW Water Resources, in an act to avoid digging up the road, decided to seek out a contractor with ground penetrating radar (GPR) equipment, to locate the inactive sanitary sewer stub on 146 Appletree lot.	
9/8/2015	Laurie Adams left a second message for Steve Cunningham, and notified homeowner of progress.	Yes
9/9/2015		Yes
9/10/2015		

9/11/2015	GPR used to locate sanitary sewer stub on 146 Appletree. Results showed it may be possible to make the new connection in the front lawn, and may not require digging in the roadway.	Yes
9/12/2015		
9/13/2015		
9/14/2015	S. Roy leaves phone message with contractor	
9/15/2015	S. Roy leaves phone message with contractor	yes
9/16/2015	S. Roy leaves phone message with contractor	yes
9/17/2015	S. Roy leaves two phone messages with contractor	yes
9/23/2015	Contractor starts work. Couldn't find sewer stub, so Hartigan is called in to use their lateral camera to help locate	yes
9/24/2015	While digging a trench along the sidewalk to find the elusive stub the contractor clips the house's water service. Distribution is called in to fix. A blow pipe is used to find the sewer stub located under the driveway. Confirmed with dye test.	
9/25/2015	Contractor makes house connection to sewer stub and caps off the unused storm connection.	

Appendix 3-2.3

Strathmore IDDE update

11/18/2015

Greg Johnson, Stormwater Technician

Recommendations from Watershed Consulting:

Location: Line J from outfall

Action: Camera inspection

Reasoning: On two occasions the team had elevated hits of ammonia in the first CB up from the pipe outfall into the swale (1.51 and 1.58).

This pipe is private, yet was filmed by DPW on 11/12/2015. There were no directly connected pipes entering the main line or other suspicious signs of an illicit connection. However, there were animal feces observed directly adjacent to the outfall.

Recommendation by DPW:

1. Consult with contractor to clean CB's and pipes connected to this system
2. Install Agri Drain Rat Guard (EJP carries this product) 15". This is a hinged screening mechanism to keep rodents from entering stormwater collection systems at the outfall.
3. Install optical brightener pad below the underdrains in the catch basin on the north side of the road. Strathmore HOA coordinates dye testing in the condo's.
 - a. 12/16/15 – All Optical Brightener pad results were negative for dye.

Location: Line H from outfall

Action: Camera inspection

Reasoning: The team did not get any elevated hits for ammonia or detergents along this line, although the HOA did get elevated ecoli on several occasions. Because of the elevated ecoli readings it is suggested that the line is televised.

This pipe was filmed 11/18/2015 and a significant amount of rodent feces were observed inside the pipe, as well as the culprit; a raccoon. No other suspicious connections or evidence of human sanitary waste.

Recommendation by DPW:

1. Consult with Contractor to clean pipe
2. Install Agri Drain Rat Guard (15")
3. Re-sample in the spring of 2016

Location: CB#122 on east pipe

Action: vacator CB, inform HOA to notify residents about not dumping into CBs

Reasoning: A large amount of dog feces was observed in this CB, as well as high ammonia and detergents. It appeared that someone had been dumping into this CB.

CB was cleaned by DPW on 10/23/15. Burlington DPW is currently working on developing an outreach campaign (lawn signs) reminding owners to clean up after their pet. Given the timeframe of winter/snow approaching, the Stormwater Program recommends deploying the signs in the spring of 2016.

Location CB#23

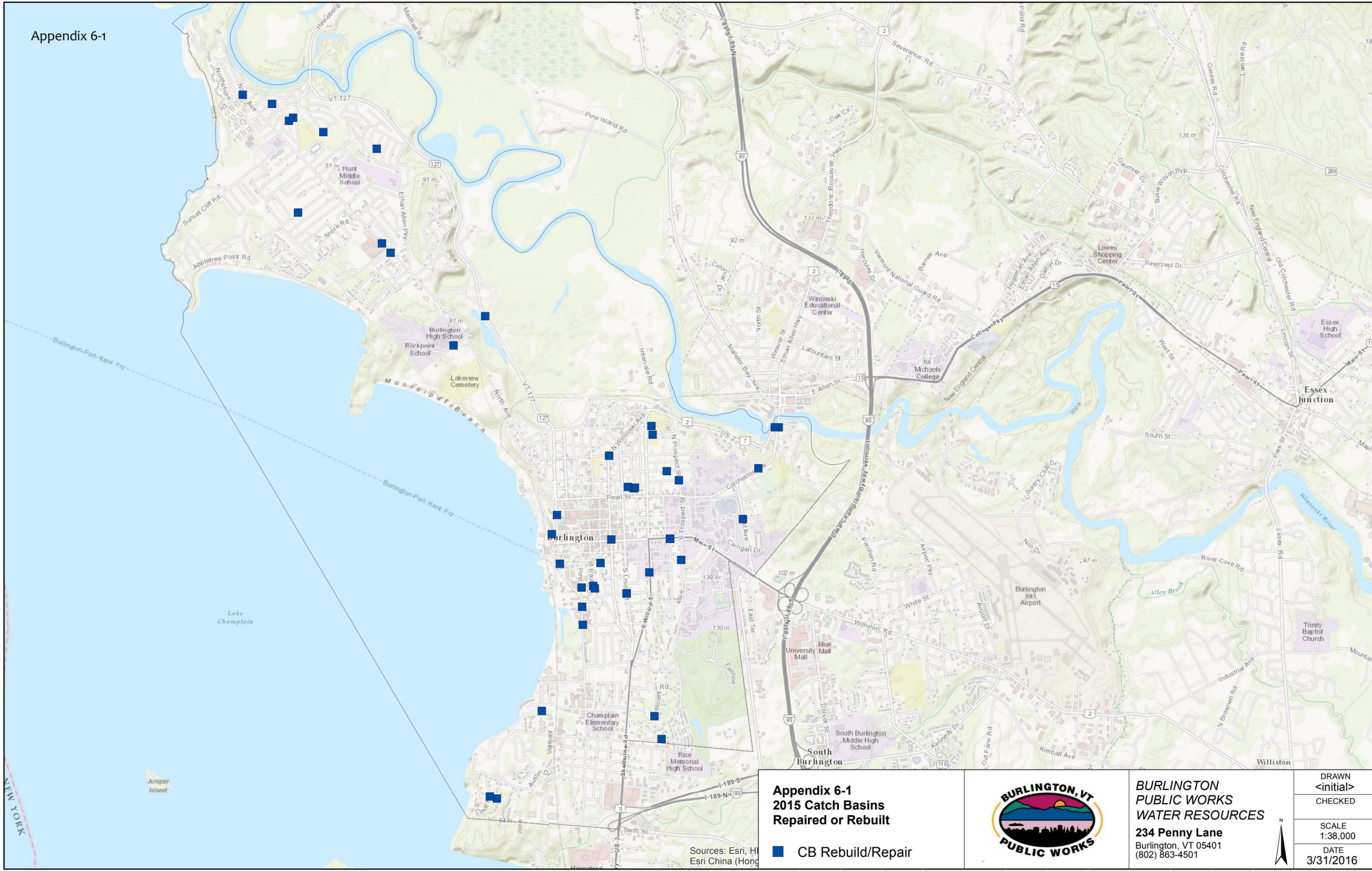
Action: WCA to install collection bag on underdrain pipe to capture sample to confirm no transient IDDE from pipe

Reasoning: The CB had very high ammonia and detergents on 8/20 and 8/25 but much lower values on 10/2. It is still considered suspicious.

CB was inspected on 11/12, and underdrain pipe was dry and no collection bag observed. CB was inspected again on 11/18 and pipe was still dry, with no collection bag observed.

Recommendation by DPW:

1. Clean this catch basin in the spring of 2016 and re-sample.
2. ** Optical Brightener pad was deployed in October and yielded a negative test result



Sources: Esri, H
Esri China (Hong

**Appendix 6-1
2015 Catch Basins
Repaired or Rebuilt**

■ CB Rebuild/Repair

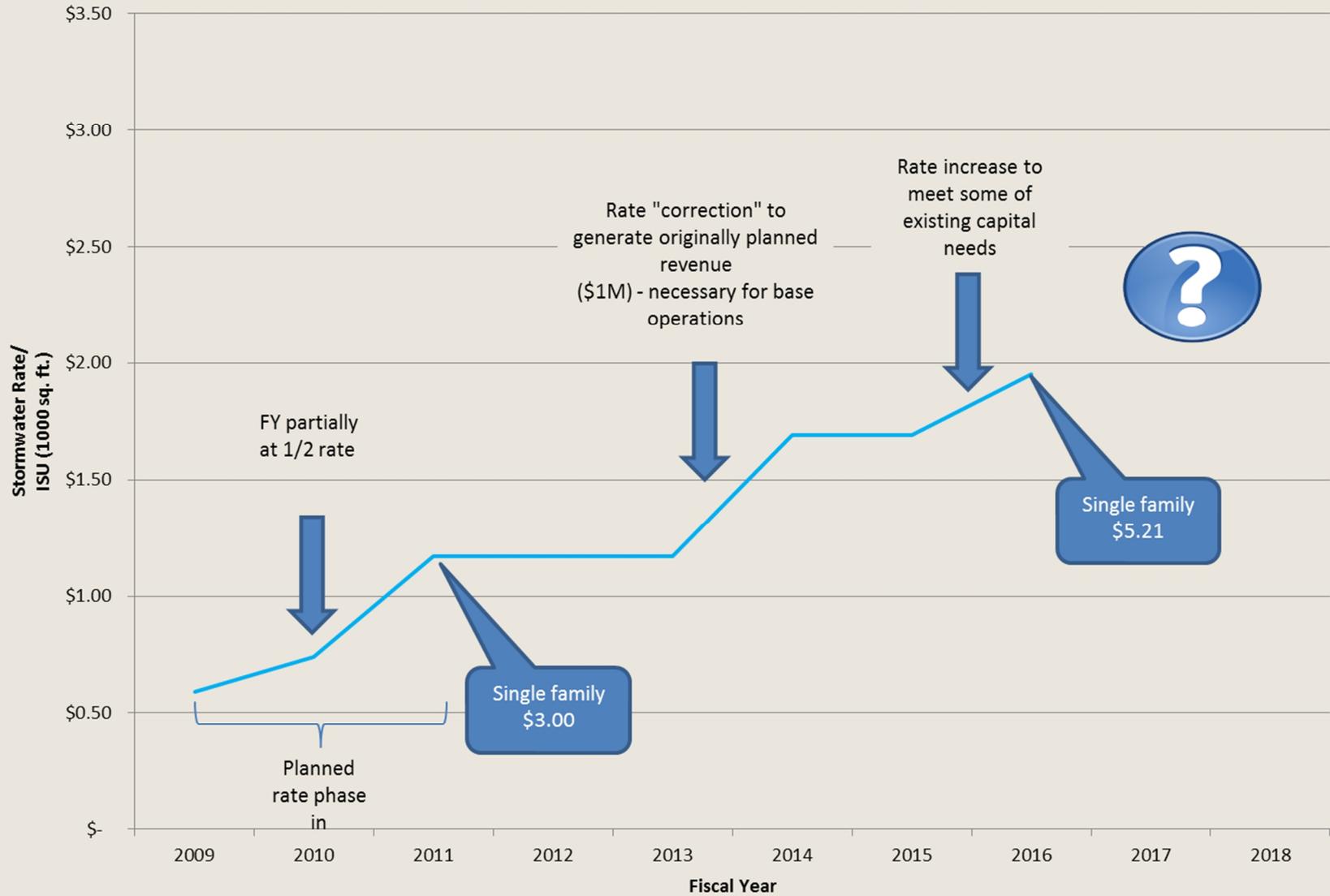


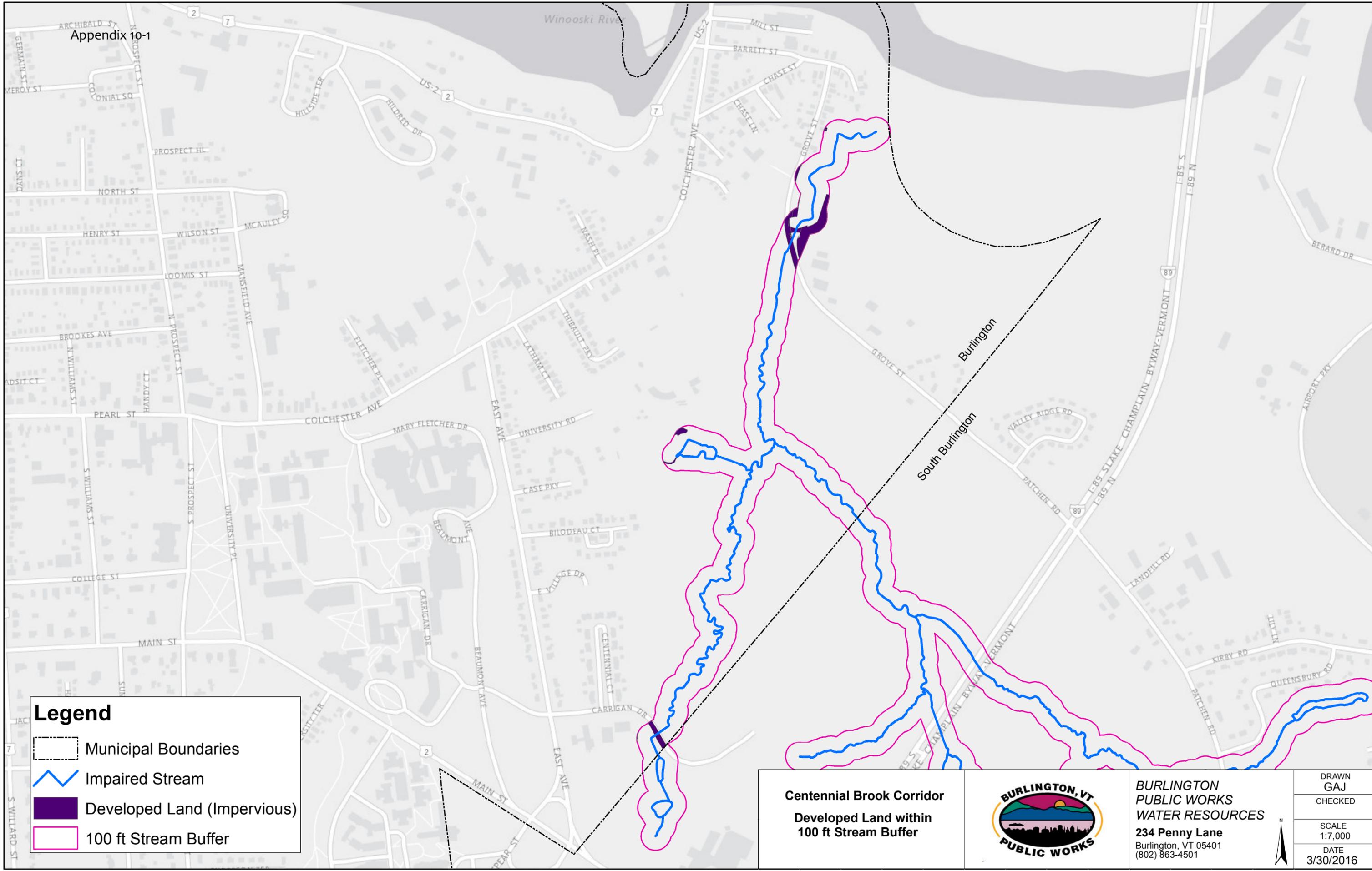
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Burlington Stormwater Rate (per ISU) History





Legend

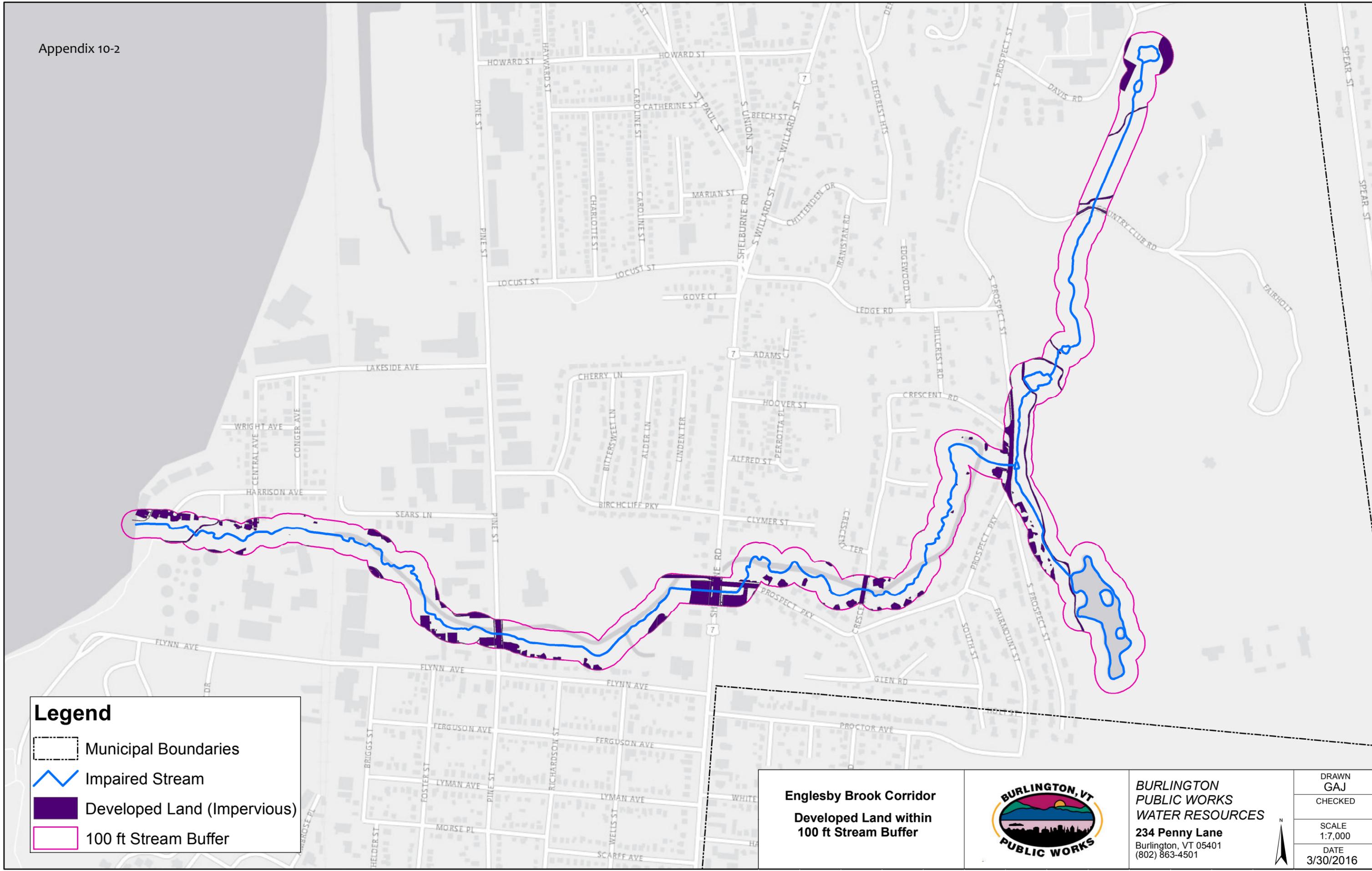
-  Municipal Boundaries
-  Impaired Stream
-  Developed Land (Impervious)
-  100 ft Stream Buffer

Centennial Brook Corridor
Developed Land within
100 ft Stream Buffer



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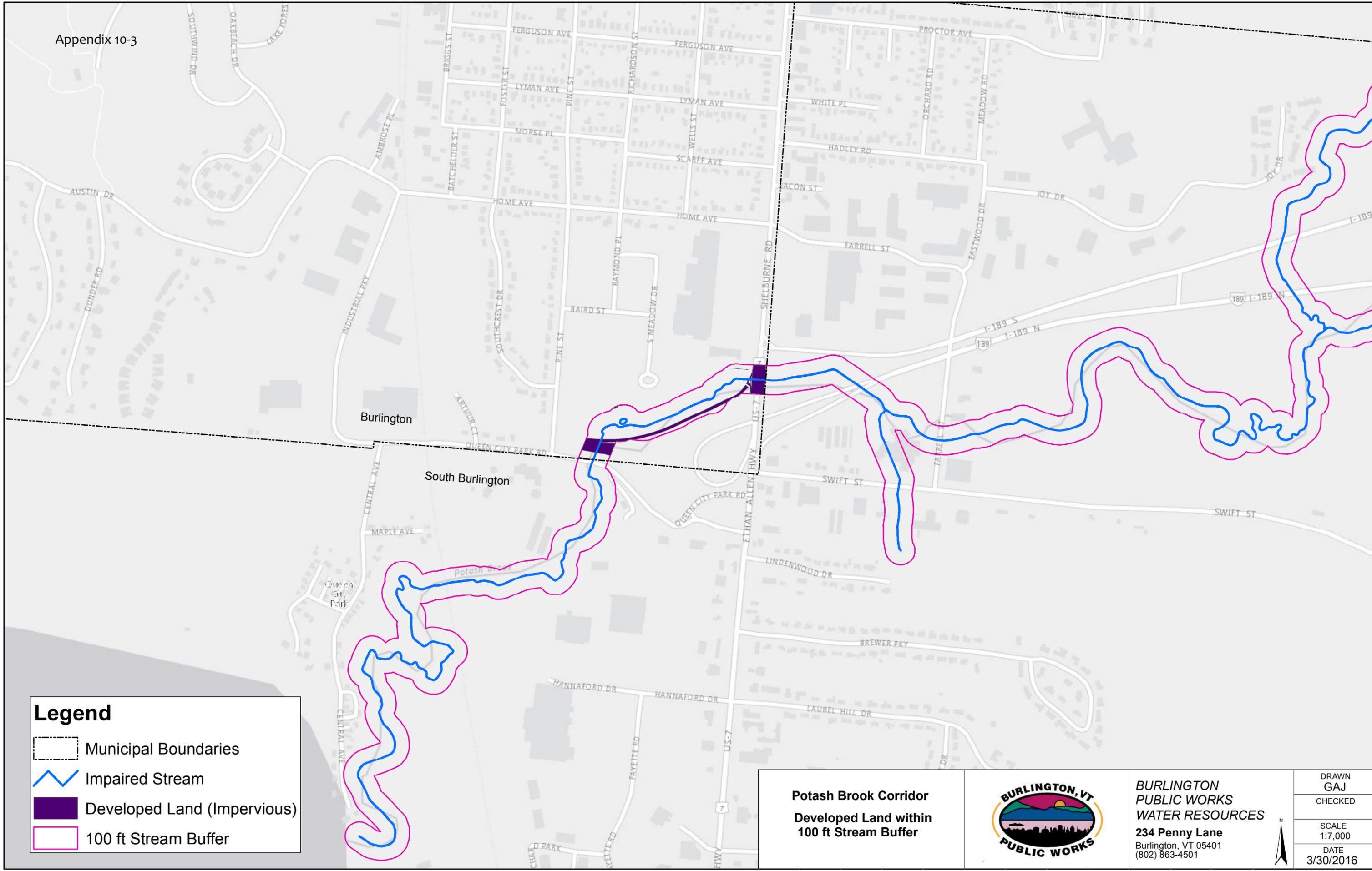
- Municipal Boundaries
- Impaired Stream
- Developed Land (Impervious)
- 100 ft Stream Buffer

Englesby Brook Corridor
Developed Land within
100 ft Stream Buffer



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Legend

-  Municipal Boundaries
-  Impaired Stream
-  Developed Land (Impervious)
-  100 ft Stream Buffer

Potash Brook Corridor
Developed Land within
100 ft Stream Buffer



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March 29, 2016

To: Megan Moir, CPESC, CPSWQ

From: Julie Moore, PE

Stone Project No. 16-030

Subject: Englesby Watershed Expired Stormwater Permit Review

MEMO

DRAFT

Stone completed a field assessment of each of the five systems in the Englesby Brook watershed with expired stormwater permits. These systems are identified in Table 1, below.

Table 1: Expired Stormwater Permits in the Englesby Brook Watershed

Permit Number	Project Name	Permit Issued
1-0337	Howard Mental Health Services	3/4/1982
1-1087	Flynn Ave Coop Housing	9/15/1992
2-0789	Overlake Condominiums	11/24/1988
2-0999	Champlain Apartments	4/20/1982
2-1052	Crescent Terrace	12/20/1985

In general, the permits are written rather broadly with few enforceable items and typically focus on curb-and-gutter system elements, including catch basins. Further, the site plans available in the permit files tend to lack the specificity and level of detail provided for systems constructed post-2002. A brief summary of our observations is provided below, including recommendations for completing any actions that would be required to bring the facilities into compliance.

1-0337, Howard Mental Health Services, 300 Flynn Ave. Need to confirm whether private and MS4 comingling prior to discharge to Englesby

Permit covers the discharge of roof drainage via “stone lined ditch in natural drainage swale” to Englesby Brook; parking lot runoff does not appear to be regulated under the permit. During the site visit we found that the stone lined ditch is not well defined. The majority of flow leaving the site and discharging to Englesby Brook appears to occur via subsurface drain pipes not included in the permit; four outfalls were identified during the site visit that are not included in the City’s stormwater GIS layer, including one of which appears to divert water directly from Pine Street. In order to bring this facility into compliance with its existing permit, the stone lined ditch would need to be improved. In addition, the source of the water draining to each of the subsurface drains should be confirmed. As part of the Englesby Brook Flow

Restoration Plan (FRP), a potential retrofit was identified for managing runoff from parking lots draining to the existing green space behind 300 Flynn Ave.

Photo 1: Presumed Location of Natural Drainage Swale and Unknown Subsurface Drainage Outlet



1-1087, Flynn Ave Coop Housing, 288 Flynn Ave

Need to confirm whether private and MS4 comingle prior to discharge to Englesby

Permit covers the discharge of stormwater runoff from roofs and paved parking lots following treatment “via grass-lined swales, through rip-rapped areas at the top of bank of Englesby Ravine, and via overland flow across vegetated terrain...” During the site visit we found that there are grass-lined to the north of the apartment complex which appear to convey stormwater runoff to rip-rapped areas that lead down to the ravine. We also noted during our site visit that the parking lot catch basin indicated in the City’s stormwater GIS layer does not exist. This site was generally found to be in compliance with its permit. As part of the Englesby Brook FRP, a significant potential retrofit was identified for in the green space immediately to the west of 288 Flynn Ave. and to the east of the proposed Champlain Parkway alignment.

Photo 2: Rip-rapped Slope Behind 288 Flynn Ave



2-0789, Overlake Properties, 545 Prospect St

Permit covers the discharge of stormwater runoff from paved road and parking lots after treatment by “passage through trap catch basins” to a stone bed and “approximately 1000 feet overland flow through wooded area and grassed drainage swale to the stream.” During the site visit we observed that sediment levels in the catch basin were below the invert of the outlet pipe, but that the outlet lacked a trap or hood. In addition, we observed a PVC pipe passing through the basin (not draining into). The stone bed noted in the permit could not be located. A 15” concrete pipe and 6” PVC pipe were both located approximately 100 feet southeast of Prospect St, which discharged into a small wetland area (see Photo 3). We followed the outflow from the wetland area for a considerable distance but could not see where it connected to the stream; a portion of the flow appeared to cross Prospect Pkwy. In order to bring this facility into compliance with its existing permit, a trap or hood would need to be fitted onto the catch basin outlet and a stone bed or other

Discharge is not commingled with MS4 flow, flow discharges to a culvert that traverses City ROW and then discharges to Burlington Country Club.

energy dissipation measures added at the outlet. In addition, it would also be prudent to determine the source of the water passing through the catch basin in the PVC pipe in order to guard against a potential illicit discharge were it to carry something other than stormwater. As part of the Englesby Brook FRP, a potential retrofit was identified for managing runoff in the green space at the southern end of the parcel.

Photo 3: Looking Downstream from the 15" Concrete Pipe Outfall



Currently appears to outlet to abandoned pipe in stream bed which is not believed to receive any MS4 flow, thus there may not be commingling.

2-0999, Champlain Apartments, 817 Pine St

Permit covers the discharge of stormwater runoff from paved parking areas after “passage through trap catch basins and a 1500 gallon septic tank in series” before being piped directly to the city stormwater system. During our site visit we observed that sediment in all three parking lot catch basins has accumulated above the invert of the outlet pipe. No access manholes (or similar) for the septic tank were observed; the septic tank may be located under the dumpster cage in the south west corner of the parking lot (see Photo 4). The catch basin indicated in the City’s stormwater GIS layer in the green space/courtyard area near the building could not be located. In order to bring this facility into compliance with its existing permit, the catch basins would need to be serviced and a trap or hood would fitted onto each of the outlets. In addition, the septic tank should be formally located and likely serviced. As part of the Englesby Brook FRP, a potential retrofit was identified along/underneath the western edge of the parking lot.

Photo 4: Looking East toward Dumpster Cage and Probable Septic Tank Location



Accepted City Street - flow commingles before discharge

2-1052, Crescent Terrace

Permit covers the discharge of stormwater runoff from the paved roads and driveways, roofs and natural terrain, via overland flow across “grassed and/or vegetated terrain to a catch basin and rip-rapped outfall, prior to discharge to an unnamed tributary...” During our site visit we observed that sediment levels in the three catch basins indicated in the City’s stormwater GIS layer were below the invert of the outlet pipes. The vegetated terrain and rip-rapped outfall were observed as described in the permit. This site was generally found to be in compliance with its permit. No specific retrofit for this site is currently contemplated as part of the Englesby Brook FRP, however this is a part of a neighborhood generally being evaluated for targeted disconnection.

Photo 5: Large Stone Rip-Rap at Outfall



March 16, 2016



Megan J. Moir
Stormwater Program Manager
Department of Public Works
City of Burlington
P.O. Box 878
Burlington, VT 05402

DRAFT

RE: *South Meadows Expired Permit Site Inspection (Permit #1-0661)*

ATTACHMENTS: A-1: Site Drainage Map
A-2: Site Inspection Photos
A-3: Existing Stormwater BMP Site Inspection Form

Dear Megan:

Watershed Consulting Associates, LLC (WCA) has completed an analysis and two site inspections at the South Meadows development, the only site with an expired permit within the City of Burlington and the Potash Brook watershed (permit # 1-0661). The site drains primarily via catchbasins and pipes to a wet pond. The pond is located south of the end of South Meadow Drive in Burlington (see attached Site Drainage Map, A-1). The drainage area for the detention pond (10.1 acres) includes 4.7 acres of mapped impervious area (46.5% impervious). The stormwater permit for this BMP, expired on June 30, 1993, included 5.4 acres of impervious cover.

Field Inspection Summary:

WCA initially inspected the South Meadows detention pond on September 9th, 2015 at 10:00am and a second inspection was completed on March 11, 2016 at 2:30pm. During these inspections, WCA noted the following issues:

- The banks of the pond are eroding (A-2, Figure 1).
- WCA noted that there were several cracks / holes in the outlet pipe, and the pipe was tilted. Additionally, trash and vegetation debris were noted in and around the pipe (A-2, Figure 2 and 3).
- Sediment was built up in the bottom of the pond (A-2, Figure 4).
- Half of the gate to the pond was disconnected from the fence hinge and was held up with twist ties.

WCA personnel also investigated the drainage area for the pond on March 11, 2016 and noted three issues:

1. Catchbasins need to be vactored. WCA noted accumulated sediment and detritus in catchbasins.
2. Sediment buildup was noted on top of one catchbasin (catchbasin farthest east in the drainage area; A-2, Figure 5).
3. Unvegetated soil was noted in front of one of the residences to the east of the intersection of Baird Street and South Meadow Drive. It appears that some type of construction was recently completed. This surface should be revegetated as soon as possible to minimize sediment runoff into catchbasins, pond, and Potash Brook (A-2, Figure 6).

Recommendations:

The existing problems with the pond are significant and exceed normal pond maintenance. Additionally, a retrofit has been proposed for this pond as part of the Potash Brook Flow Restoration Plan (FRP) as it does not meet post 2002 stormwater standards. The proposed retrofit in the FRP includes expanding the pond or potentially creating a gravel wetland to increase storage capacity, improve water quality, and provide channel protection control. Approximately 16,117 cubic feet of storage would need to be added to the pond to meet the upgrade as proposed in the FRP. As such, WCA recommends that this pond be considered a high priority for retrofit as part of the FRP and scheduled for upgrade in the near future. However, in the meantime, WCA recommends that the following be completed:

1. Vactor catchbasins
2. Fix gate to the pond
3. Remove sediment in the parking lot
4. Stabilize the newly graded area in front of one residential unit

Please let me know if you have any questions.

At this point it appears that there is no commingling of MS4 flow with private flow from this permitted system. It does not appear City has direct authority to address systems where there is no commingled flow.

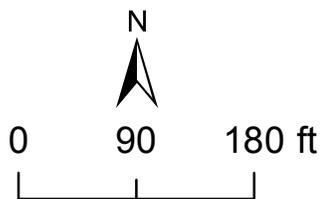
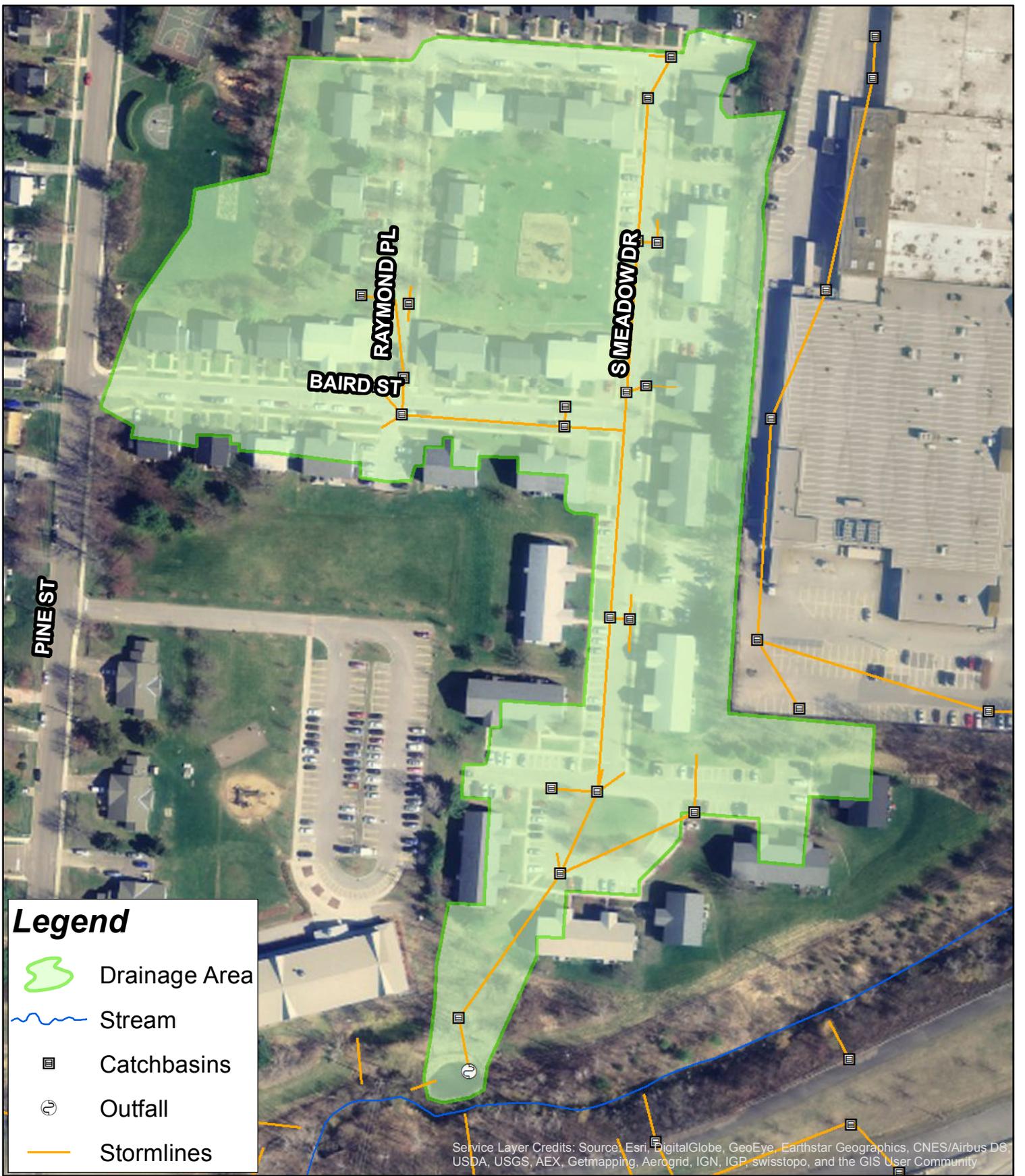
Sincerely,



Andres Torizzo, WCA Principal



Kerrie Garvey, GIS Specialist



South Meadows BMP Drainage Area

Attachment A-1



Map Produced: 03-14-2016

Site Inspection Photos (Attachment A-2)

Site Name: South Meadows Pond

Photos Taken: March 11, 2016



Figure 1. Eroding pond banks.



Figure 2. Holes, debris buildup, and trash at pond outlet structure.



Figure 3. Alternative view of tilted pipe with holes, debris buildup, and trash.



Figure 4. Sediment buildup along the sides and bottom of pond.



Figure 5. Sediment buildup on top of one catchbasin in parking area.



Figure 6. Construction area in need of re-vegetation.

Assessment Information		Site Information
Site Name: South Meadows Pond		Site/Practice Description: Fenced detention pond 
Current Permit #: 1-0661		
BMP Type: Detention Pond		
BMP Ownership: Private		
Post 2002 Upgrades (Y/N): N		
Date/Time Assessed: 09-09-2015, 10:00am; 03-11-2016, 2:30pm		
Address/Cross Streets: S Meadow Dr and Baird St		
Reviewed Site Plans Prior to Field Visit: Yes		
Active Pollution Visible: Trash, litter		
Operation/Maintenance Issues: Sediment buildup in pond, pond sides are eroded, outlet structure damaged (cracked / holes, tilted) and debris and trash are built up around standpipe. Catchbasins need to be vactored (significant buildup of sediment and debris noted in catchbasins). Significant sediment buildup on top of one catchbasin.		
Existing BMP Sizing Information		
Access Issues: Area is fenced, but half of the gate is was no longer attached to the fence (held on by twist ties) on March 11, 2016 visit.		
BMP Outlet Structure Overview: Standpipe with culvert outlet to Potash Brook.		
Orifice 1: Culvert	Orifice 2: Standpipe	Orifice 3: Could not determine how water was entering the pipe.
Multiplier: 1	Multiplier: 1	Multiplier:
Diameter (in): 18	Diameter (in): 24	Diameter (in):
Orientation (V/H): Vertical	Orientation (V/H): Horizontal	Orientation (V/H):
Material: CMP	Material: CMP	Material:
Invert from Rim: 31"	Invert from Rim: 0	Invert from Rim:
Emergency Spillway (Y/N): No		
Notes: Suggest foregoing pond maintenance and concentrate on upgrading the pond as repairs and maintenance would be a significant undertaking.		
Retrofit Feasibility		
Is Retrofit Possible/Needed: Yes		
Justification: Pond does not meet post 2002 standards; does not provide water quality benefit.		
Proposed Practice Type: Potential to expand pond, add forebay, upgrade to post 2002 standards.		
Feasibility Issues/Comments: We noted a water line that could limit expansion potential. Proximity to Potash Brook is also of concern.		

Pond overview photo