



# Long Brook

## Watershed Description

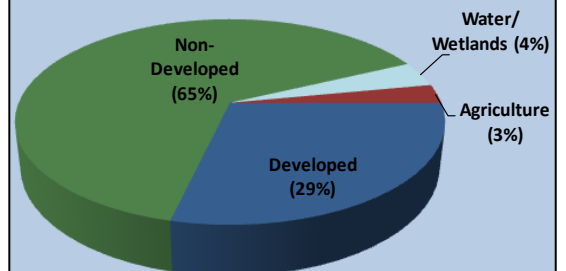
This **TMDL** applies to the Long Brook assessment unit (RI0001006R-02), a 4.9-mile long stream located in Cumberland, RI (Figure 1). The Town of Cumberland is located in the northeastern corner of Rhode Island. Long Brook is located in the center of Cumberland. The Long Brook watershed is presented in Figure 2 with land use types indicated.

The headwaters of Long Brook originate in a forested area just north of Interstate 295 between Leigh Road and Aurora Drive in Cumberland. The brook flows north and joins with a tributary that begins in Little Pond and the wetland areas within the Lippitt Estates Conservation Area. Long Brook continues north parallel to Diamond Hill Road (RI Route 114) and Little Pond Country Road, and joins with another tributary near the end of Bonnibrook Drive. The brook then continues north and joins with East Sneeck Brook before it flows into the Pawcatuck (Arnold Mills) Reservoir, a drinking water reservoir.

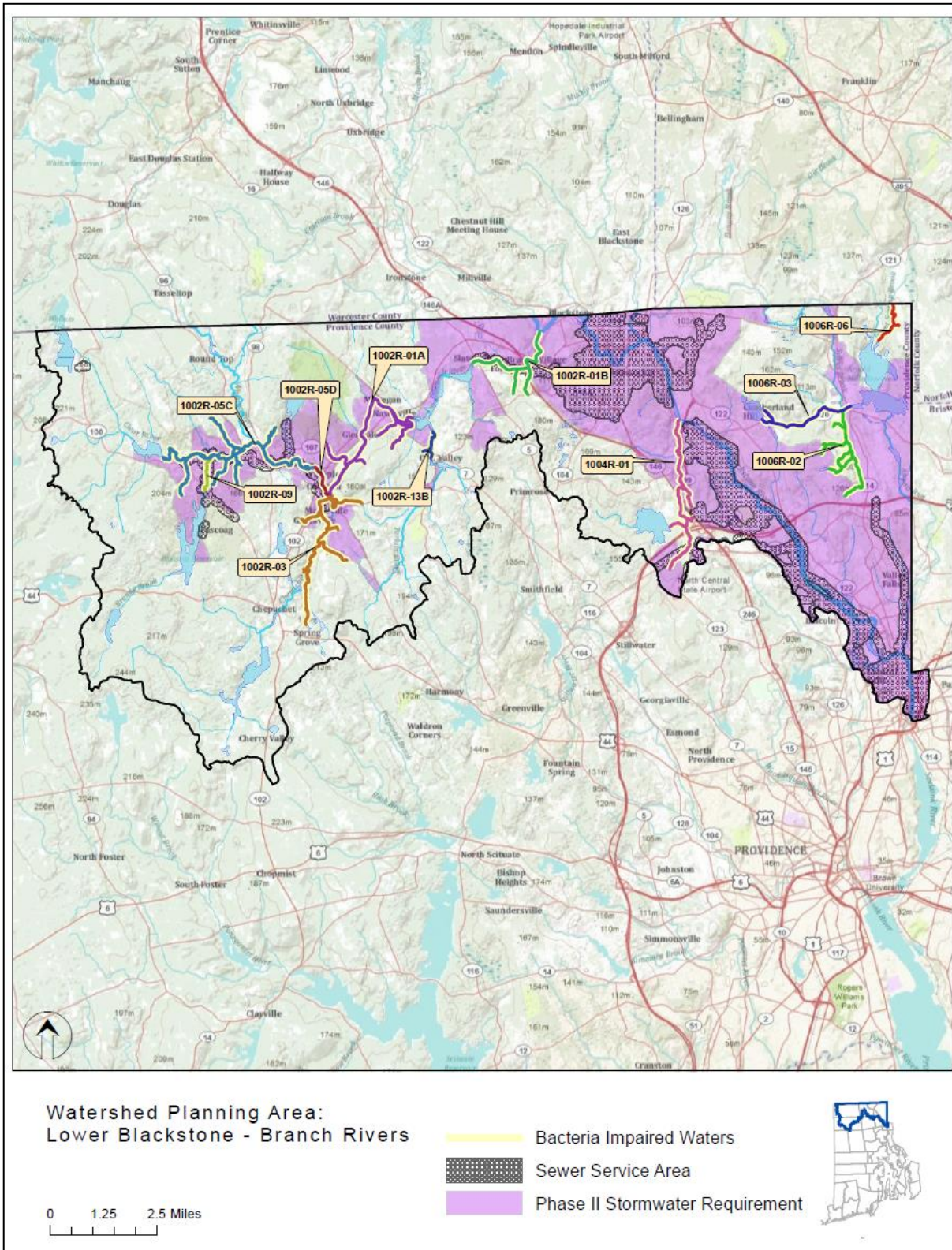
There are several conservation areas abutting the Long Brook stream corridor. Since 1995, the Cumberland Land Trust has acquired several properties along Long Brook with a focus on watershed protection (Cumberland Land Trust, 2011). The Long Brook watershed covers 2.4 square miles. As shown in the aerial image of Figure 3, non-developed lands occupy a large portion (65%) of the watershed. Developed uses (including residential and commercial uses) account for approximately 29% of the land area. Impervious surfaces cover a total of 12.9%. Wetland and surface waters occupy 4%, and agricultural use accounts for a small portion of the watershed (3%).

## Assessment Unit Facts (RI0001006R-02)

- **Town:** Cumberland
- **Impaired Segment Length:** 4.9 miles
- **Classification:** Class AA
- **Direct Watershed:** 2.4 mi<sup>2</sup> (1,502 acres)
- **Impervious Cover:** 12.9%
- **Watershed Planning Area:** Branch - Blackstone (#8)

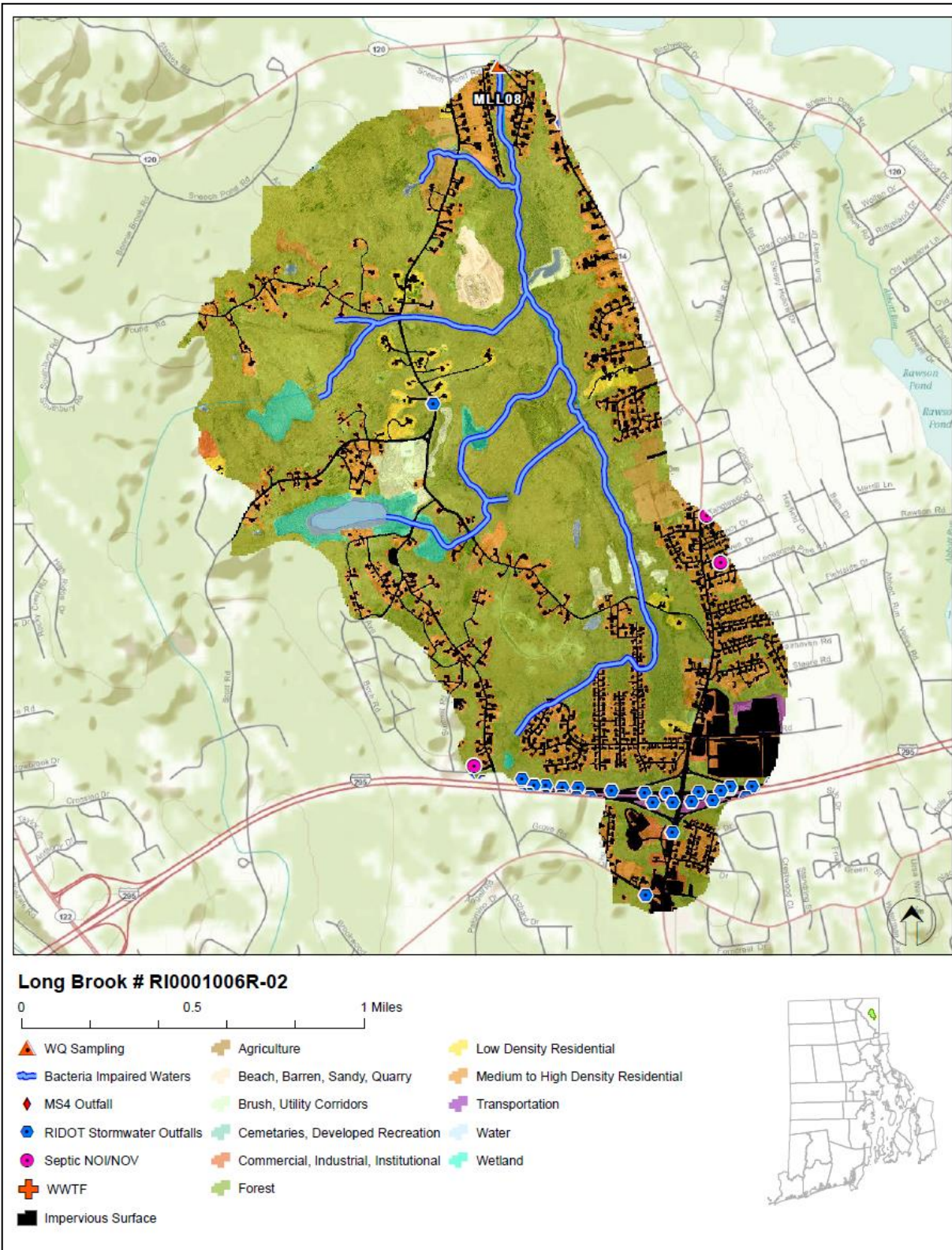


**Watershed Land Uses**



**Figure 1: Map of the Branch-Blackstone Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewer service areas, and stormwater regulated zones.**

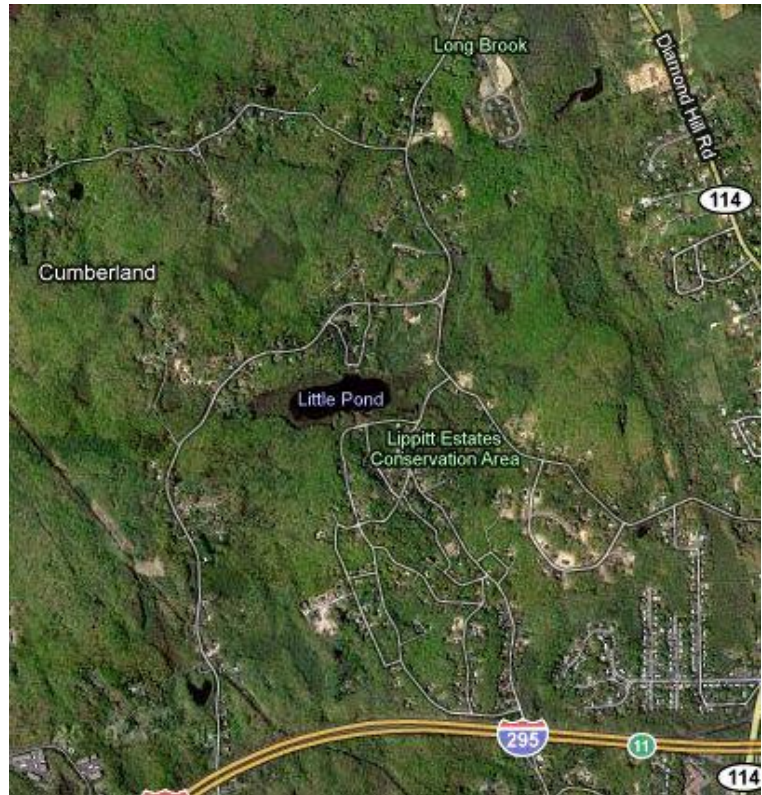




**Figure 2: Map of Long Brook watershed with impaired segment, sampling location, and land cover indicated.**

### Why is a TMDL Needed?

Long Brook is a Class AA freshwater stream and is a tributary within Pawtucket Water Supply Board's public drinking water supply system. However, as it is not a terminal reservoir, its applicable designated uses are primary and secondary contact recreation (RIDEM, 2009). Due to its designation as an ecological habitat and critical habitat for rare and endangered species, Long Brook has been designated by RIDEM as a Special Resource Protection Water (SRPW), providing it with special protections under RIDEM's Antidegradation Provisions. SRPWs are high quality surface waters that have been identified as having significant ecological or recreational uses or are public water supplies.



**Figure 3:** *Partial aerial view of the Long Brook watershed. (Source: Google Maps)*

From 2008-2009, water samples were collected from a single sampling location (MLL08) and analyzed for the indicator bacteria, enterococci. The water quality criteria for enterococci, along with bacteria sampling results from 2008-2009 and associated statistics are presented in Table 1. The geometric mean was calculated for Station MLL08 and exceeded the water quality criteria for enterococci.

To aid in identifying possible bacteria sources, the wet and dry-weather geometric means were calculated for Station MLL08. Both the wet and dry-weather geometric mean values exceeded the water quality criteria for enterococci, with wet-weather values higher than dry-weather values.

Due to the elevated bacteria measurements presented in Table 1, Long Brook does not meet Rhode Island's bacteria water quality standards, was identified as impaired, and was placed on the 303(d) list (RIDEM, 2008). The Clean Water Act requires that all 303(d) listed waters undergo a TMDL assessment that describes impairments and identifies measures needed to restore water quality. The goal is for all water bodies to comply with state water quality standards.



### Potential Bacteria Sources

There are several potential sources of bacteria in the Long Brook watershed including malfunctioning onsite wastewater treatment systems, illicit discharges, wildlife and domestic animal waste, and stormwater runoff from developed areas.

#### Developed Area Stormwater Runoff

The East Sneeck Brook watershed has an impervious cover of 12.9%. Impervious cover is defined as land surface areas, such as roofs and roads that force water to run off land surfaces, rather than infiltrating into the soil. Impervious cover provides a useful metric for the potential for adverse stormwater impacts. As discussed in Section 6.3 of the Core TMDL Document, as a general rule, impaired streams with watersheds having higher than 10% impervious cover are assumed to be impacted by stormwater runoff.

Between 2004 and 2009, Cumberland mapped about 80 percent of its stormwater outfalls and catch basins as part of its Phase II requirements (MS4). Long Brook was shown to receive discharges from several stormwater outfalls.

#### Onsite Wastewater Treatment Systems

The residents in the Long Brook watershed rely almost entirely on onsite wastewater treatment systems (OWTS), such as septic systems and cesspools. While nearly half of Cumberland is serviced by a municipal wastewater system (Town of Cumberland, 2004), the majority of the Long Brook watershed is undeveloped and does not have access to the municipal system (Figure 1). Failing OWTS can be significant sources of bacteria by allowing improperly treated waste to reach surface waters (RI HEALTH, 2003). OWTS that are improperly sized, are malfunctioning, or are in soils poorly suited for septic waste disposal can be sources of bacteria to surface waters (USEPA, 2002). The soils in much of the Long Brook watershed are not well suited for OWTS due to wetness, flooding potential, slow percolation, and slopes. These soils include Adrian Muck, Canton, and Paxton types. Over 30 percent of the town's total land area has soils poorly suited for septic waste disposal (Town of Cumberland, 2003). As shown in Figure 2, three OWTS Notices of Violation/Notices of Intent to Violate have been issued by the RIDEM Office of Compliance and Inspection in the southern and western portions of the watershed.

#### Illicit Discharges

The Town of Cumberland has completed several studies on the feasibility of extending the municipal sewer system to new areas. As a part of these studies, the need for developing and implementing town

programs aimed at detecting illicit discharges to the town's storm drains has been highlighted (Town of Cumberland, 2004; Town of Cumberland, 2003). As shown in Figure 2, there are several stormwater outfalls in the Long Brook watershed. Illicit discharges can occur when municipal sewer system pipes are connected directly to storm drain pipes or are leaking into storm drain pipes.

#### Waterfowl, Wildlife, and Domestic Animal Waste

Domestic animals within the Long Brook watershed represent a potential source of bacteria. Residential developments are located directly adjacent to the stream in several areas. If residents are not properly disposing of pet waste, the bacteria associated with that waste could enter and contaminate the stream.

Large sections of the Long Brook watershed are protected and provide sanctuary to a variety of wildlife including squirrel, deer, and waterfowl. Many of these conservation areas surround the stream (Cumberland Land Trust, 2011) concentrating wildlife around Long Brook. Wildlife, including waterfowl, may be a significant bacteria source to surface waters. With the construction of roads and drainage systems, these wastes may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface water. As such these physical land alterations can exacerbate the impact of these natural sources on water quality.

#### Existing Local Management and Recommended Next Steps

Additional bacteria data collection would be beneficial to support identification of sources of potentially harmful bacteria in the Long Brook watershed. These activities could include sampling at several different locations and under different weather conditions (e.g., wet and dry). Field reconnaissance surveys focusing on stream buffers, stormwater runoff, and other source identification would also be beneficial. Based on existing ordinances and previous investigations, the following steps are recommended to support water quality goals.

#### Stormwater Management

The Town of Cumberland (RIPDES permit RIR040035) and the Rhode Island Department of Transportation (RIDOT) (RIPDES permit RIR040036) are municipal separate storm sewer (MS4) operators in the Long Brook watershed and have prepared the required Phase II Stormwater Management Plans (SWMP). Though most of the Long Brook watershed is within the Phase II regulated area, portions of the western section are outside of the regulated area.

Cumberland's SWMP outlines goals for the reduction of stormwater runoff to Long Brook through the implementation of Best Management Practices (BMPs). Many of these BMPs are now in place, including, mapping all stormwater outfalls, instituting annual inspections and cleaning of the town's

catch basins, implementing an annual street sweeping program, adopting construction erosion and sediment control and post-construction stormwater control ordinances, and conducting public education activities (RIDEM, 2010a).

Currently, Cumberland does not have an illicit discharge detection and elimination ordinance. These types of ordinances prohibit illicit discharges to the MS4 and provide an enforcement mechanism. The town should pursue the development and implementation of an illicit discharge detection and elimination ordinance. In Cumberland's Comprehensive Plan, Action NR.1.3.3. proposes the establishment of a Wastewater Management District (WWMD) within the Cumberland and Pawtucket Reservoir Watershed, which includes Long Brook (Town of Cumberland, 2004). Having an active WWMD would help to establish and enforce any future illicit discharge detection and elimination ordinance. In the past, the Cumberland Department of Public Works has identified illicit discharges through routine catch basin cleaning. In these cases, Cumberland has notified RIDEM for enforcement (Town of Cumberland, 2003). These discharges can be a significant source of bacterial contamination and Cumberland should have thorough measures in place for detection. Illicit discharges can also be identified through continued dry-weather outfall sampling and microbial source tracking.

RIDOT has completed a SWMPP for state-owned roads in the watershed. RIDOT's SWMPP and its 2011 Compliance Update outline its goals for compliance with the General Permit statewide. It should be noted that RIDOT has chosen to enact the General Permit statewide, not just for the urbanized and densely populated areas that are required by the permit. RIDOT has finished mapping its outfalls throughout the state and is working to better document and expand its catch basin inspection and maintenance programs along with its BMP maintenance program. Stormwater Management Pollution Prevention Plans (SWPPPs) are being utilized for RIDOT construction projects. RIDOT also funds the University of Rhode Island Cooperative Extension's Stormwater Phase II Public Outreach and Education Project, which provides participating MS4s with education and outreach programs that can be used to address TMDL public education recommendations.

While these first steps are important to reduce the effects of stormwater runoff to Long Brook, additional efforts are needed to restore the river's water quality. As mentioned previously, the Long Brook watershed has an impervious cover of 12.9%, a level where stormwater impacts are expected. At this threshold, RIDEM requires the MS4 operators to continue to comply with and adapt their minimum measures to reflect the bacteria impairments in the regulated areas. Cumberland and RIDOT should also ensure that their post-construction ordinances are consistent with Section 6.2 of the Core TMDL Document. Information regarding plans to revise the post construction ordinance should be documented in a TMDL Implementation Plan (TMDL IP). Unless otherwise noted in this waterbody summary, any other TMDL IP requirements described in Section 6.2 of the Core TMDL Document are not applicable to the MS4 operators for watershed areas having impervious cover between 10 and 15 %. Information

regarding how the MS4 operators' minimum measures are addressing the pollutant of concern (i.e. bacteria) should be documented in the MS4 operators' annual report, consistent with Part IV.G.2.d of the RIPDES General Permit (RIDEM, 2010b). Further detail is also included in Sections 6.3 of the Core TMDL Document.

The Town of Cumberland should continue to implement the goals of its Phase II SWMPP including dry weather sampling, extensive street and catch basin cleaning programs, and public education activities. RIDOT should also continue to implement the goals of its Phase II SWMPP.

### Onsite Wastewater Management

The majority of the residents within the Long Brook watershed rely on OWTS. Currently, the Town of Cumberland does not have an Onsite Wastewater Management Plan or an OWTS ordinance. As part of an onsite wastewater management planning process, Cumberland should adopt ordinances to establish enforceable mechanisms to ensure that existing OWTS are properly operated and maintained. RIDEM recommends that all communities create an inventory of onsite systems through mandatory inspections. Inspections encourage proper maintenance and identify failed and sub-standard systems. Policies that govern the eventual replacement of sub-standard OWTS within a reasonable time frame should be adopted. The Rhode Island Wastewater Information System (RIWIS) can help develop an initial inventory of OWTS and can track voluntary inspection and pumping programs (RIDEM, 2010b).

The Town of Cumberland is currently not eligible for the Community Septic System Loan Program (CSSLP). The CSSLP program provides low-interest loans to residents to help with maintenance and replacement of OWTS. It is recommended that Cumberland develop a program to assist citizens with the replacement of older and failing systems.

### Waterfowl, Wildlife, and Domestic Animal Waste

Cumberland's education and outreach programs should highlight the importance of picking up after dogs and other pets and not feeding waterfowl, particularly around conservation lands within the watershed. Animal wastes should be disposed of away from any waterway or stormwater systems. Cumberland should work with volunteers from the town to map locations where animal waste is a significant and chronic problem. This work should be incorporated into the municipalities' Phase II plans and should result in an evaluation of strategies to reduce the impact of animal waste on water quality. This may include installing signage, providing pet waste receptacles or digester systems in high-use areas, enacting ordinances requiring clean-up, and targeting educational and outreach programs in problem areas.



Towns and residents can also take several measures to minimize waterfowl-related impacts. They can allow tall, coarse vegetation to grow in areas along the shores of Little Pond, the headwater pond for one of Long Brook's tributaries that is frequented by waterfowl. Waterfowl, especially grazers like geese, prefer easy access to the water. Maintaining an uncut vegetated buffer along the shore will make the habitat less desirable to geese and encourage migration. With few exceptions, Part XIV, Section 14.13, of Rhode Island's Hunting Regulations prohibits feeding wild waterfowl at any time in the state of Rhode Island. Educational programs should emphasize that feeding waterfowl, such as ducks, geese, and swans, may contribute to water quality impairments in Long Brook and can harm human health and the environment.

### Land Use Protection

Currently, the Long Brook watershed is approximately 68% undeveloped, however only a small portion of this area is protected as open space. As source waters to Pawtucket Water Supply Board's water supply system preserving the watershed's natural areas is particularly important. The Long Brook watershed currently has several conservation areas consisting of important woodland and wetland areas (Cumberland Land Trust, 2011). Within the Town of Cumberland's Comprehensive Plan, specific policies (Policy NR1.2) were proposed to preserve the unique natural areas through land acquisition, conservation easements, transfer of development rights, and other creative methods to limit development (Town of Cumberland, 2004).

Preserving these natural areas is important because woodland and wetland areas within the Long Brook watershed absorb and filter pollutants from stormwater, and help protect both water quality in the stream and stream channel stability. It is important to continue preserving these undeveloped areas, and to institute controls on development in the watershed.

The steps outlined above will support the goal of mitigating bacteria sources and meeting water quality standards in Long Brook.

**Table 1: Long Brook Bacteria Data**

**Waterbody ID:** RI0001006R-02

**Watershed Planning Area:** 8 – Branch - Blackstone

**Characteristics:** Freshwater, Class AA, Tributary within a Public Drinking Supply, Primary and Secondary Contact Recreation, SRPW

**Impairment:** Enterococci (colonies/100mL)

**Water Quality Criteria for Enterococci:** Geometric Mean: 54 colonies/100 mL

**Percent Reduction to meet TMDL:** 82% (Includes 5% Margin of Safety)

**Data:** 2008-2009 from RIDEM

**Single Sample Enterococci (colonies/100 mL) Results for Long Brook (2008-2009) with Geometric Mean Statistics**

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
MLL08	Long Brook at Sneeched Pond Road	8/18/2009	291	Dry	<b>234 (82%)*</b>
MLL08	Long Brook at Sneeched Pond Road	8/5/2009	249	Wet	
MLL08	Long Brook at Sneeched Pond Road	7/7/2009	488	Wet	
MLL08	Long Brook at Sneeched Pond Road	5/13/2009	79	Dry	
MLL08	Long Brook at Sneeched Pond Road	9/22/2008	249	Dry	
Shaded cells indicate an exceedance of water quality criteria					
*Includes 5% Margin of Safety					

**Wet and Dry Weather Geometric Mean Enterococci Values for Station MLL08**

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
MLL08	Long Brook at Sneeched Pond Road	2008-2009	2	3	234	349	179
Shaded cells indicate an exceedance of water quality criteria							
Weather condition determined from the Weather Underground rain gage in Lincoln, RI							

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