**Lake Champlain Basin Program**

**Quarterly Report**

**April 10, 2017**

**Organization Name:** Stone Environmental, Inc.

**Project Name:** Assessment of Tile Drainage System Impacts to Lake Champlain and Phosphorus Loads in Tile Drainage in the Jewett Brook Watershed of St Albans Bay

**NEI Job Code:** 0100-310-002

**Project Code:** L-2016-060

**Final Report Due Date:** September 2018

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**Summary of Activities:**

***Task 1: Literature Review Examining Tile Drainage Systems***

Completed

***Task 2: Assessment of Tile Drainage Systems in the Jewett Brook Watershed***

The six participating farmers were interviewed regarding agronomic practices on the study fields and specific characteristics of the tile drainage systems selected for monitoring. GIS operations were performed to summarize available soil and slope data for each study field. A meeting was also held with Vermont Agency of Agriculture staff to discuss the availability of data collected by the Agency on cropping patterns and the distribution of tile drainage systems across the Jewett Brook watershed. The study field and tile drainage system characterization data were summarized in a report to the Lake Champlain Basin Program dated March 1, 2017.



Completing monitoring station construction at JBT01

Work was performed at all 12 tile drain monitoring stations to prepare the stations for flow monitoring and water sample collection. At eight of the stations, Waterflux 3000 electromagnetic flowmeters were bolted on the tile line within the monitoring manholes. These flowmeters were wired to ISCO 2105ci dataloggers/modems for continuous storage and transmission of flow data and to ISCO 6712 autosamplers for collection of flow-paced composite samples. The wiring and programming of these instruments were highly customized for this monitoring application. Solar panels, charge controllers, and deep cycle, lead-acid batteries were installed to provide power for the instruments.

Due to the large (12-inch) diameter of the JBT05 tile drain outlet, it was not feasible to install a monitoring manhole and to create a pipe loop for a Waterflux flowmeter. Therefore, an alternate structure was designed, consisting of a large plywood box containing a 90-degree V weir. An ISCO 2110 ultrasonic level sensor was installed within the box on the upstream side of the weir. Flow rate is calculated continuously from measured water level using a weir equation.

Construction has not been completed at the JBT05, JBT18, and JBT19 stations. High water levels in the receiving ditch at JBT05 precluded installation of the Waterflux 3000 flowmeters. Construction could not be completed at JBT18 and JBT19 due to saturated field conditions and difficult access.

***Task 3: Phosphorus Load Estimation of Tile Drainage Systems in the Jewett Brook Watershed***

No activity.

**Project Status:**

Installation of monitoring systems was completed at 9 of the 12 selected tile drains and flow monitoring and automated sample collection have commenced. The first round of composite samples will be collected on April 11, 2017. At three stations (JBT05, JBT18, and JBT19), field conditions have prevented completion of instrument installation. We anticipate completing construction and commencing monitoring at these sites as soon as conditions allow.

**Challenges Encountered:**

Field conditions at JBT05, JBT18, and JBT19 have precluded completion of monitoring system installation and commencement of the monitoring program.

Wireless signal strength appears to be weak at several monitoring stations, resulting in dropped data transfers and necessitating field visits to reboot certain modems. At these stations, we may need to elevate the antennas on poles.

**Work Anticipated Next Quarter:**

At JBT05, JBT18, and JBT19, construction of monitoring stations will be completed as soon as conditions allow. Flow data and sample collection will continue at all currently operating stations and will be initiated at JBT05, JBT18, and JBT19. Monitoring summaries will be provided approximately monthly.