Credit Valley Conservation
inspired by nature

Schedule A - Monitoring Proposal and Workplan: Riverdale Farms Pond, Inglewood

Purpose:

The purpose of this monitoring program will be to initiate a sampling protocol for a stormwater pond facility in order to assess its conformity to existing and new Environmental Compliance requirements and targets.

In order to do this, a short term monitoring program (approximately two seasons) will be conducted to assess the water quality and water levels entering and discharging from the Inglewood Riverdale Farms Stormwater Pond. This will include continuous water level, temperature, conductivity, and turbidity monitoring.

This monitoring work is intended to further inform the development of ongoing monitoring procedures for existing and the assumption of new stormwater facilities.

Timeline:

Monitoring of this facility will take place over approximately two sampling seasons:

1. Spring-Fall 2018
2. Spring-Fall 2019

Monitoring activities will be finalised in late summer 2019.

Data analysis and reporting will be conducted in fall 2019 for an anticipated project completion of December 2019.

Proposed Monitoring:

Monitoring will take place at two locations and will include continuous water level, temperature, conductivity, and turbidity monitoring:

1. **Continuous water levels** will be collected through the use of HOBO U20 level loggers and a barometric pressure compensation logger, installed in piezometer standpipes in the direct vicinity of the water quality data collection.
2. **Water quality** readings measuring continuous turbidity, conductivity and water temperature will be collected through use of YSI sondes at 15 minute data collection intervals, deployed in the flow-through channels directly at the point of outfall and daylighting (pond inlet), and at the outlet channel location just downstream of the outlet headwall from the pond (see Figures 1 and 2 below).
3. **Continuous Turbidity** readings will then be translated into estimated TSS concentrations through use of an established TSS and Turbidity relationship collected from similar stormwater effluent from a mid-density residential area in Caledon.

For the purposes of conducting this evaluation, direct flow monitoring and water quality loads will not be conducted, due to the high costs, complexity and time required for the collection of this information.

CVC will conduct monthly site visits to conduct equipment maintenance, assessments, and download data. CVC is responsible for the maintenance an operation of equipment during the study period.

Figure 1: Multi-parameter sondes and installation equipment

Figure 2: Level logger stand pipe installation in stream

Meteorological Information

In order to analyze and assess the collected water quality and level data from both the inlet and outlet locations, CVC will require real-time (continuous) access to a nearby meteorological station (preferably within 5 km of the monitoring location), as well as a back-up gauge if available. Required meteorological data includes precipitation and air temperature data, to be summarised in a minimum of 15 minute intervals for the entire duration of the monitoring project. CVC will work with the Town of Caledon to determine the location of the best station and obtain access to the data.

Monitoring Deployment Locations:

CVC will obtain all necessary access permits from the Town of Caledon for the installation of monitoring equipment.

Inlet Location:

This monitoring station will be located in the inlet ditch to the pond facility, directly downstream of the location of daylighting from the nearby subdivision (Figure 3).

The exact location of sonde installation will be selected based on anticipated depth of flow along the inlet channel in order to ensure the collection of high quality data. Slight modifications to the inlet channel (i.e. creating an area with greater ponding depth through the use of an impermeable liner or the movement of rock materials) may be conducted in order to ensure an ideal location for sonde installation. Modifications will be minor and discrete and will not impact the overall functioning of the channel.

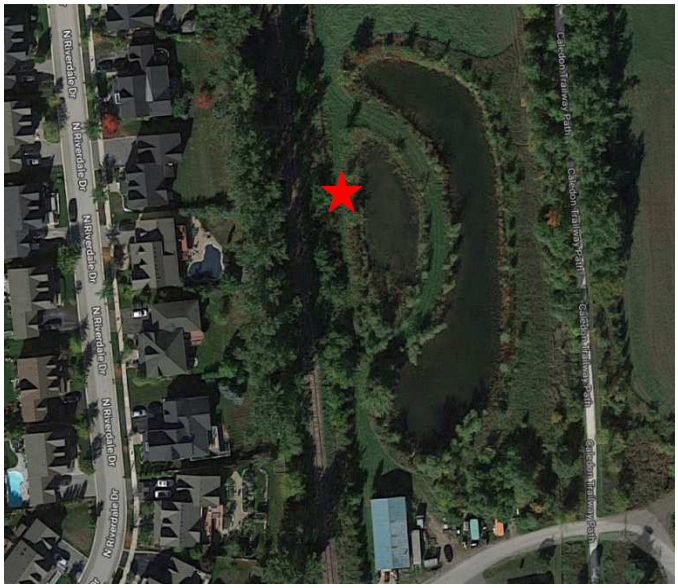

Figure 3: Riverdale Farms pond and inlet location

Access to Inlet Location

The inlet monitoring location will be accessed from the Riverdale Farms property located just south of the Pond, by walking alongside the rail tracks to the inlet location. Permission for parking at the Riverdale Farms property needs to be to be obtained by the Town of Caledon prior to the start of monitoring this project.

Figure 4: Inlet to Riverdale Farms pond

Outlet Location

This monitoring station will be located just downstream of the pond outlet headwall in the outlet channel.

The exact location of sonde installation will similarly be selected based on anticipated depth of flow in the outlet channel. Slight modifications to the outlet channel (i.e. creating an area with greater ponding depth through the use of an impermeable liner or the movement of rock materials) may be conducted in order to ensure an ideal location for sonde installation.

Modifications will be minor and discrete and will not impact the overall functioning of the outlet channel.

Access to Outlet Location

The outlet monitoring location will be accessed from the Riverdale Farms property located just south of the Pond, or if necessary from the Caledon Trailway Path. Permission for parking at the Riverdale Farms property should be obtained prior to the start of monitoring this project. Caledon Trailway parking is located just south of the pond location at the corner of McLaughlin Rd and the Caledon Trailway Path trailhead.

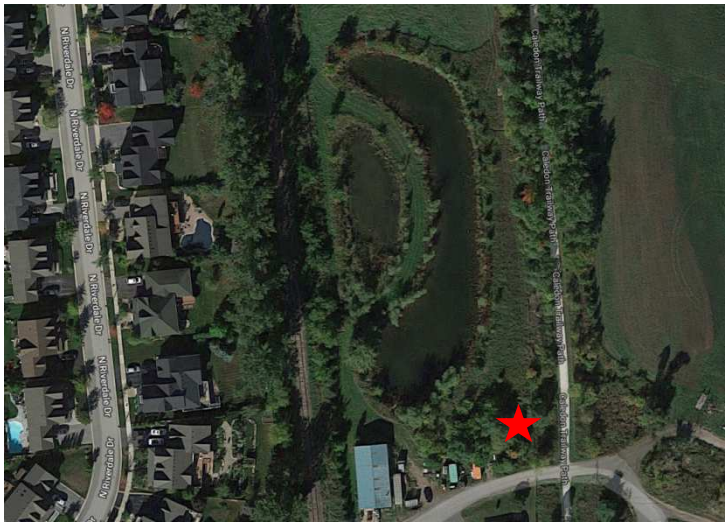

Figure 5: Riverdale Farms pond and outlet location

Figure 6: Outlet headwall/culvert from downstream perspective

Figure 7: Outlet headwall/culvert from upstream perspective

Estimated Costs:

The following table provides estimated costs for the monitoring activities at Riverdale Farms Pond and the subsequent reporting requirements:

Monitoring from Apr 2018 – Sep 2019

Equipment and Services	Quantity	Total
Bathymetric Survey	1	$ 1,404.03
YSI 600 OMS Purchase	2	$ 21,341.18
Hobo U20 Loggers (rental from CVC)	3	$ 2,440.80
PVC Pipes, parts, caps	2	$ 395.50
Calibration solution	1	$ 827.16
Miscellaneous parts, fuel, mileage	N/A	$ 2,825.00
Batteries	36	$ 561.79
		$ 29,795.46
Staff time:	DAYS	
Administration	4	$ 3,535.00
Initial Meetings	1	$ 1,120.00
Site Visits	1.5	$ 1,732.50
Installation and equip prep	3	$ 2,520.00
Troubleshooting, calibrations, downloads	14	$ 12,250.00
Data summary QA/QC	8	$ 6,160.00
Data Analysis	2	$ 1,260.00
Reports and progress reports	4	$ 4,445.00
Project Meetings	1	$ 1,145.00
		$ 34,167.50

TOTAL Project Cost:	$ 63,962.96
In-Kind (CVC):	$ 5,000.00
CWWF Grant:	$ 58,962.30

Credit Valley Conservation Authority will own all monitoring equipment upon completion of this project. CVC will be responsible for equipment maintenance and repair.

Analysis and Reporting:

Site visits will be conducted monthly to conduct equipment maintenance, assessments, and download data. All data will be reviewed during the site visit to ensure its accuracy and equipment functionality. Data will be post-processed in the office by CVC staff, including compilation as well as QA/QC processes in Excel spreadsheets.

Data analysis and summary will include:

1. Determining the magnitude and trends in turbidity concentrations over time and over precipitation events;
2. Calculation of Total Suspended Solid concentration based on turbidity concentrations and a previously established relationship between these parameters;
3. Evaluation of approximate concentration differences in: TSS, turbidity, conductivity and temperature between the inlet and outlet monitoring locations during storm events and during inter event periods.

In completing the above, results from the Riverdale Farms Pond monitoring activities will be outlined in a Monitoring Summary memo. This will be used as an example of the expected results that can be obtained from similar monitoring activities, as well as possible implications of the findings.

At the culmination of the project, CVC will produce a final report that outlines a guideline for a generalized stormwater management monitoring program for the Town inclusive of existing and the assumption of new stormwater facilities procedures. The underlying objective of this program will be to meet the monitoring and reporting requirements as outlined in Environmental Compliance Approvals for similar pond installations. The Riverdale Farms Pond monitoring memo will be an appendix to this proposed monitoring program report.