BURNS McDONNELL

Lambert Creek Bacterial Source Identification Study 2014 Final Report

VLAWMO
Vadnais Lake Area
Water Management Organization

Vadnais Lake Area Water Management Organization

Lambert Creek Bacterial Source Identification Study
Project No. 78186

October 30, 2015

Lambert Creek Bacterial Source Identification Study 2014 Final Report

prepared for

Vadnais Lake Area Water Management Organization
Vadnais Heights, MN

Project No. 78186

October 30, 2015

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
BMP	best management practice
Burns & McDonnell	Burns & McDonnell Engineering, Inc.
cfs	cubic feet per second
COC	Chain of Custody
GIS	Geographic Information System
I-35E	Interstate 35E
MCA	microbial community analysis
mL	milliliter
MPN	Most Probable Number
MS4	municipal separate storm sewer system
qPCR	quantitative polymerase chain reaction
SOP	Standard Operating Procedure
SPRWS	Saint Paul Regional Water Service
TMDL	total maximum daily load
VLAWMO	Vadnais Lake Area Water Management Organization

1.0 INTRODUCTION

Lambert Creek is located in the northeast Twin Cities Metropolitan Area of Minnesota in the Upper Mississippi River Basin. The Lambert Creek Watershed covers an area of approximately 25 square miles and includes portions of the cities of North Oaks, White Bear Lake, Gem Lake, Vadnais Heights, Lino Lakes, and White Bear Township, Minnesota. The watershed falls within the jurisdiction of the Vadnais Lake Area Water Management Organization (VLAWMO) and consists of a mix of urban, open space, parks, and agricultural land uses. A map of the Lambert Creek Watershed is shown on Figure 1-1.

Lambert Creek does not currently meet Minnesota State standards for the indicator bacteria *Escherichia coli* (*E. coli*) and has been placed on the State's 303(d) List of Impaired Water Bodies. As a result, in August 2013, the Minnesota Pollution Control Agency developed a total maximum daily load (TMDL) for *E. coli* in Lambert Creek (Wenck, 2013), which is the total amount of a pollutant that a water body can assimilate without exceeding the established water quality standard for that pollutant.

In response to the TMDL, VLAWMO contracted Burns and McDonnell Engineering, Inc. (Burns & McDonnell) to conduct a bacterial source identification study to identify the sources of *E. coli* in the Lambert Creek Watershed and recommend best management practices (BMPs) that can be implemented to meet the load reduction requirements of the TMDL. This document summarizes the results of the first year (2014) of Lambert Creek Bacterial Source identification Study (Source Identification Study).

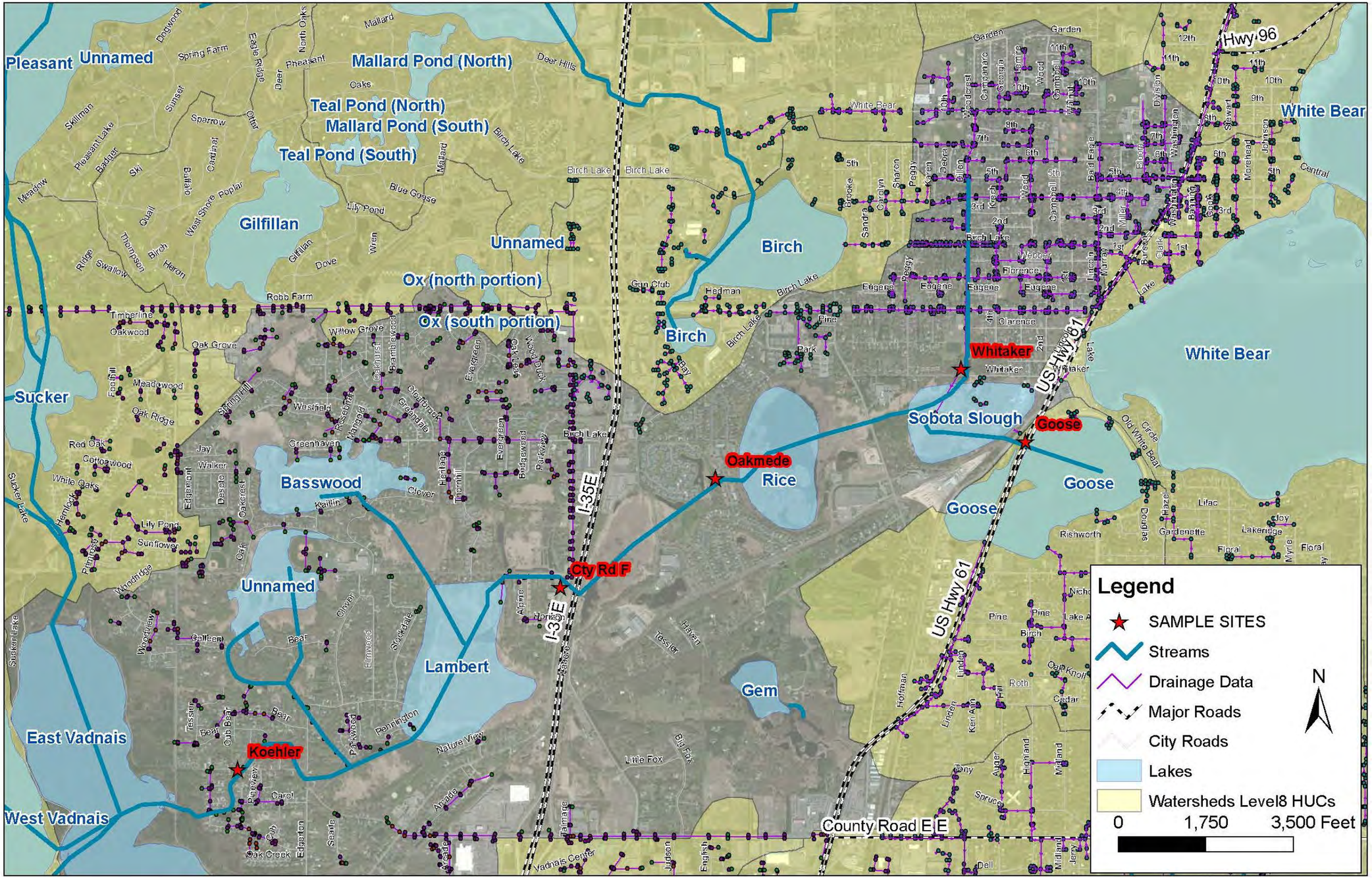
1.1 Project Objectives

The Lambert Creek Watershed encompasses the following five contiguous drainages, each with a Primary Monitoring Site at its base where TMDL compliance monitoring is conducted: Whitaker, Goose, Oakmede, Country Road F, and Koehler (Figure 1-1). A Monitoring Plan for the Source Identification Study was developed in the summer of 2014 to identify the sources of bacteria in two of the five Lambert Creek drainages: Oakmede and County Road F. Although the TMDL requires bacterial load reductions during both dry and wet weather, this first phase of the Source Identification Study, which was conducted in the summer and fall of 2014, focused exclusively on identifying bacterial sources in dry weather (i.e., at least 72 hours following a rain event).

1.2 Project Team

This report and the Monitoring Plan for the Source Identification Study were produced by Burns & McDonnell, but the field sampling, assessment, and coordination with the required laboratories was conducted by staff from VLAWMO.

Figure 1-1: Map of the Lambert Creek Watershed and Five Primary Monitoring Sites



2.0 PROJECT SETTING

This chapter discusses the setting for the Oakmede and County Road F drainages.

2.1 Oakmede Drainage

The Oakmede Drainage lies near the center of the Lambert Creek Watershed, as shown on Figure 1-1. The drainage is less urbanized than the other drainages in the Watershed with the majority of urban runoff flowing into Rice Lake, which comprises nearly a third of the Oakmede Drainage. Flows exit Rice Lake on the west side, approximately 250 feet upstream of the Oakmede Primary Monitoring Site (Oak-P), which is located just downstream (west) of Oakmede Lane (Figure 2-1). Water flowing out of Rice Lake passes over a weir and through a short reach before passing under Oakmede Lane via a culvert just upstream of Oak-P. It is assumed that nearly 100 percent of the dry weather flow in the Oakmede Drainage passes through Rice Lake before reaching Oak-P.

In addition to the flows from the Oakmede Drainage that pass through Rice Lake upstream of Oak-P, there is a very small drainage of urbanized area that flows directly to Site Oak-P via surface streets along Oakmede Lane to the south of Site Oak-P and Oakmede Lane, with Fisher Lane to the north. This sub-drainage is shown in red on Figure 2-1. There are no storm drains in this small sub-drainage, and any flow that may reach Oak-P will be conveyed along Oakmede Lane by gutters that discharge to Lambert Creek via storm drain inlets just upstream of Site Oak-P. Other urbanized areas in the Oakmede Drainage discharge directly to Rice Lake via the municipal separate storm sewer system (MS4) outfalls before passing over the weir upstream of Oakmede Lane and eventually Oak-P.

The reach of Lambert Creek between the Rice Lake Weir (Site Oak-C1) to just downstream of Oak-P was restored in 2013. Prior to restoration, stream bank erosion was apparent on both sides of the reach, there was extensive riparian overgrowth, and large amounts of wood debris, detritus, and sediment had accumulated in the stream (Figure 2-2). Over the course of the restoration project, riparian cover was thinned, debris was removed from the stream channel, and the banks were stabilized.

Figure 2-1: Map of the Oakmede Drainage and Monitoring Sites

Figure 2-2: Lambert Creek at Oakmede Monitoring Site Before (A) and After (B) Restoration

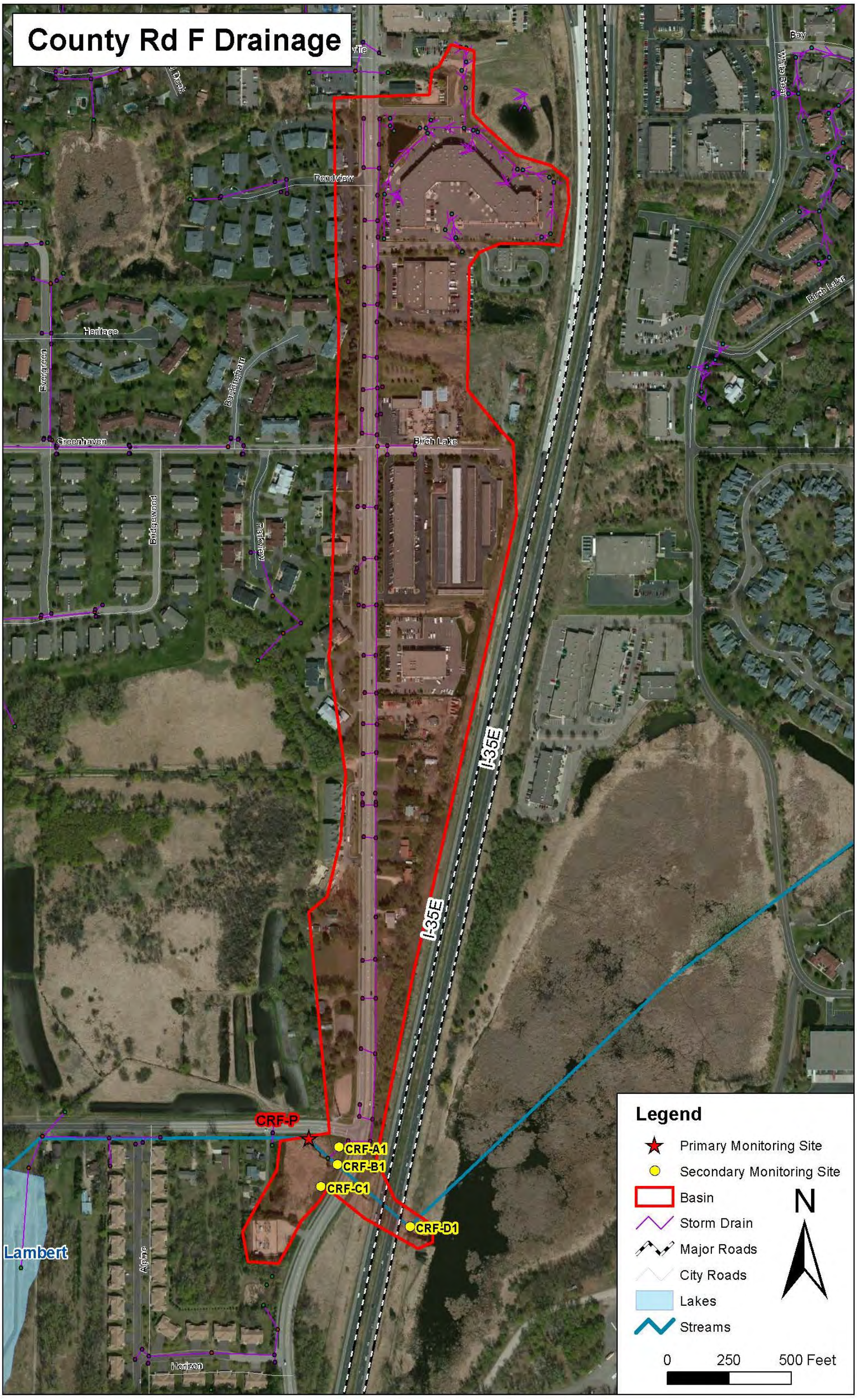
A field reconnaissance of the Oakmede Drainage was conducted on May 16, 2014. Based on the results of the reconnaissance, field maps created from Geographic Information System (GIS) files provided by VLAWMO were updated to include the extent of the drainage with direct inputs to Oak-P, as shown in red on Figure 2-1. Besides the flows passing over the Rice Lake Weir and the potential for dry weather flows from direct surface runoff, other potential sources of *E. coli* observed during the reconnaissance were some wading birds and ducks seen just downstream of Oak-P.

2.2 County Road F Drainage

The County Road F Drainage is in the lower portion of the Lambert Creek Watershed, as shown on Figure 1-1. A field reconnaissance of the County Road F Drainage was conducted on May 16, 2014 and is summarized in Appendix A. Based on the results of the reconnaissance and GIS layers provided by VLAWMO, a map of the drainage showing potential future monitoring sites was produced (Figure 2-3). The drainage is relatively small and consists primarily of mixed residential, light commercial, and open space land uses intermixed with a wetland located just to the east of Interstate 35E (I-35E).

The Primary Monitoring Site for the County Road F Drainage (CRF-P) is located near the intersection of County Road F and Centerville Road, east of I-35E (Figure 2-3). There are three main sources of flow that co-mingle just upstream of CRF-P (see photographs in Appendix A). The largest flows come from the mainstem of Lambert Creek, which conveys flows from a wetland on the east side of I-35E. The outfall of the mainstem is located on the west side of I-35E (Site CRF-B1) where it co-mingles with flows from the second outfall (Site CRF-A1). During the field reconnaissance, the source of water flowing from this outfall was determined to be a storm drain that conveyed flow from a small detention pond at the top of the County Road F Drainage on the east side of Centerville Road (across from Pondview Court). The third potential source of flow to Site CRF-P is a small drainage south of CRF-P that discharges via an outfall adjacent to Centerville Road (Site CRF-C1). This outfall was dry during the field reconnaissance.

Figure 2-3: Map of the County Road F Drainage and Monitoring Sites



3.0 STUDY DESIGN

The study design for the Source Identification Study was based on similar studies conducted in other regions of the county for identifying sources of indicator bacteria in urban watersheds. It is based on three design approaches that have been shown to be effective in identifying sources of bacteria in urban watersheds throughout the country (SCCWRP, 2013). The study design approaches are: (1) Phased, (2) Tiered, and (3) Adaptive. Each of these design approaches is described briefly, below.

3.1 Phased Approach

The Lambert Creek Watershed encompasses approximately 25 square miles (Wenck, 2013), consisting of a diverse mix of urban, open space, and recreational land uses intermixed with numerous creeks, wetlands, and lakes. The TMDL requires that the water quality standards for *E. coli* are met at all monitoring locations within the watershed during both dry and wet conditions. In order to identify the sources of bacteria in this diverse watershed, the study has been phased to focus first on dry weather conditions (at least 72 hours following precipitation). Identifying and remediating sources of bacteria is simpler under dry weather conditions than wet weather conditions, particularly when the watershed has not been thoroughly characterized or monitored. Thus, the Phased Approach for this study will focus initially on dry weather conditions, only.

In addition, the study will be phased in terms of spatial assessments and will focus first on two of the five major drainages in the watershed: Oakmede and County Road F. The phased approach will provide for an efficient use of limited resources and an effective means of initiating the bacterial source identification study for the Lambert Creek Watershed.

3.2 Tiered Approach

The Tiered Approach uses a step-wise process of assessing the watershed and identifying sources of bacteria in a prioritized, progressive process. For the Oakmede and County Road F drainages, the following steps will be implemented in the sequence described below to focus the assessment on high priority sources of bacteria first, followed by additional steps as the study progresses. This tiered approach has been developed from similar monitoring programs (SCCWRP, 2013) and modified with elements specific to the Lambert Creek Watershed.

The study was implemented using the following tiered steps:

1. Characterize the watershed by obtaining infrastructure maps, examining historical monitoring data for spatial and temporal trends, and conducting visual inspections during a site

reconnaissance to develop a list of potential fecal contamination sources and transport mechanisms.

2. Based on the watershed characterization, develop a list of Study Questions to be addressed by the assessment and that are specific to the conditions within that drainage.
3. Conduct initial monitoring to produce a more detailed picture of spatial and temporal patterns in the drainage.
4. Where human sources are a potential contributor, test ambient waters for human source-specific genetic markers (even if traditional tools have not identified a leaking sanitary system). Place high priority on either detecting or confirming a human fecal source, as this source may pose the greatest relative human health risk.
5. Where leakage from a sanitary system is a potential source, investigate it using traditional tools such as closed circuit television inspections or dye testing.
6. Where human sources have been accounted for and the relative human loadings are better understood, and/or a likely animal fecal pollution source (e.g., runoff from a dog park) has been identified, test ambient waters using non-human (animal) source-specific genetic markers.
7. Where source-specific genetic markers have yet to be developed for the suspected source(s), consider testing ambient waters using microbial community analysis (MCA) methods.

The basic steps listed above were modified to meet the specific characteristics of the Oakmede and County Road F drainages. Future iterations of the Monitoring Plan will use this same process to develop specific step-wise investigation elements for other drainages in the Lambert Creek Watershed.

3.3 Adaptive Approach

Source identification studies can be difficult to conduct due to the ubiquitous nature of bacteria in the environment, the multiple sources within a given watershed, and the potential for regrowth of bacteria outside the host animal. For these reasons, source identification studies often do not lend themselves to prescriptive monitoring plans where the details of each monitoring element are determined prior to the initiation of the study. Instead, the most effective source identification studies rely on a basic monitoring framework with elements developed from the tiered approach discussed above. The details of each monitoring element are adaptive, whereby the results of the first element are used to focus the design for subsequent elements in the study. The adaptive approach allows the design of each element of the study to be built upon the results of the previous element, resulting in an increasingly focused approach to identifying the sources of bacteria in the drainage. The end result is a comprehensive and efficient assessment of potential bacterial sources in the drainage, leading to multiple lines of evidence for

identifying those sources that have the greatest impact on water quality. These results also allow for focused recommendations on effective and efficient BMPs to remediate the bacterial source.

In this study, elements were developed specifically for the Oakmede and County Road F drainages and basic monitoring schedules were provided to answer the drainage-specific Study Questions. When the results from the initial assessments were collected and analyzed, additional details were provided in the Monitoring Plan for subsequent monitoring.

3.4 Oakmede Drainage

The following subsections describe the study design for the Oakmede Drainage.

3.4.1 Study Questions

Based on the information collected during the site reconnaissance, the following Study Questions related to the Oakmede Drainage were addressed in this study:

1. Are there differences between the *E. coli* concentrations at the Rice Lake Weir and those at Oak-P?
2. How do concentrations differ at Oak-P before and after restoration?
3. Do dry weather flows from surface runoff along Oakmede Lane affect *E. coli* concentrations at Oak-P?
4. What are the temporal patterns in *E. coli* concentrations in the Oakmede Drainage?
5. Does the *E. coli* in the Oakmede Drainage originate from human sewage?
6. Does the *E. coli* in the Oakmede Drainage originate from fecal material from non-human sources?

3.4.2 Monitoring Elements

The monitoring elements listed in Table 3-1 were designed to answer the Oakmede Drainage Study Questions. Because the study design for this assessment uses an adaptive approach, whereby the results of the first element are used to focus the design for subsequent elements, the elements were conducted sequentially as listed in Table 3-1.

Table 3-1: Monitoring Elements for the Oakmede Drainage

Element Number	Monitoring Element	Study Question Addressed	Monitoring Location and Frequency
1	Visual Observations	1 through 6	At least weekly from July through October
2	*E. coli* Monitoring (culture)	1 through 4	Weekly from July through October
3	Flow Monitoring	4	Instantaneous monitoring from July through October
4	Human Origin Assessment	5	Site Oak-P and Oak-C1 weekly in July and August. Additional monitoring may be necessary depending on initial results
5	Non-human Origin Assessment	6	To be determined, based on results of Elements 1 through 3
6	Microbial Community Analysis	6	Not conducted in 2014

3.4.3 Monitoring Locations

Site selection for the bacterial source identification in the Oakmede Drainage was based on historical data available for the drainage and the results of the site reconnaissance conducted in May 2014. The monitoring sites are shown graphically on Figure 2-1and described in Table 3-2.

Table 3-2: Monitoring Sites for the Oakmede Drainage

Site ID	Site Location	Site Sub-drainage Description
Oak-P	Primary Monitoring Site at base of Oakmede Drainage just downstream (west) of Oakmede Lane	The entire Oakmede Drainage
Oak-A1	On Oakmede Lane north of storm drain inlet that discharges to Lambert Creek upstream of Oak-P	Oakmede Lane and Fisher Lane south of Bibeau Road and north of Lambert Creek
Oak-B1	On Oakmede Lane south of storm drain inlet that discharges to Lambert Creek	Oakmede Lane south of Lambert Creek
Oak-C1	A t Rice Lake Weir	Entire Oakmede Drainage except reach between weir and Oak-P

3.4.4 Element 1 – Visual Observations

Visual observations are a critical component to bacterial source tracking investigations and may be used to address all six Study Questions for the Oakmede Drainage. Visual observations were made at each site during every field visit on a Visual Observation Form designed for the Lambert Creek Watershed (see Appendix B). The most critical observations in this drainage were evidence of any flow in the gutters along Oakmede Lane, flow conditions at the Oak-P Weir and the Rice Lake Weir, and any conditions in

the reach between these two areas that may generate elevated *E. coli* concentrations (e.g., bird activity, stream bank erosion, etc.). Stream stage was also recorded at the Oak-P Weir during each field visit to assess changes in flow over time. Digital photographs accompanied any meaningful observations and were stored electronically with the Visual Observation Forms for the Oakmede Drainage.

3.4.5 Element 2 – *E. coli* Monitoring

The purpose of the *E. coli* monitoring is to address Study Questions 1 through 4 for the Oakmede Drainage. The monitoring sites identified on Figure 2-1 and described in Table 3-2 were assessed over the course of the study from July through October 2014, following the initial schedule and frequency described in Table 3-3. The initial monitoring schedule was adjusted over the course of the study so that monitoring was conducted at least 72 hours after rain events, which were common, particularly in the early summer months. The first 3 weeks of the assessment were focused on Study Questions 1 through 3 by comparing the *E. coli* concentrations at Oak-P to those just upstream at the Rice Lake Weir (Oak-C1).

Table 3-3: Monitoring Locations, Frequency, and Analyses for the Oakmede Drainage

Week #	Week in 2014	Site Monitored				Analysis		
		Oak-P	Oak-A1	Oak-B1	Oak-C1	Cult[a]	Hum[b]	Non-Hum[c]
1	7/14	4	4	4	4	16		
2	7/21	4	4	4	4	16		
3	7/28	4	4	4	4	16		
4	8/4	2[d]	2	2	2[d]	8	4	
5	8/11	2[d]	2	2	2[d]	8	4	
6	8/18	2[d]	2	2	2[d]	8	4	
7	8/25	2[d]	2	2	2[d]	8	4	2
8	9/1	2	2	2	2	8	tbd[e]	2
9	9/8	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	2
10	9/15	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	2
11	9/22	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	2
12	9/29	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
13	10/6	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
14	10/13	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
15	10/20	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
Total:								

(a) Culture sample collected and analyzed for *E. coli*
(b) Sample collected and analyzed for the Human Marker using qPCR
(c) Sample collected and analyzed for Non-human Markers (e.g., avian or canine)
(d) Sample collected and analyzed for the Human Marker using qPCR in addition to *E. coli*
(e) Sample collection to be determined based on previous monitoring results

3.4.6 Element 3 – Flow Monitoring

Flow Monitoring was used to address Study Question 4 by helping to assess temporal patterns at Oak-P in 2014 and comparing these patterns to those recorded in previous years. Stream stage was monitored at the Oakmede Weir during weekly site visits and converted to flow using the Manning Equation. Stream stage was monitored at Site Oak-P during each site visit and recorded on the Visual Observation Form. Stage was then converted to flow by VLAWMO staff and stored electronically. These recordings provide a measure of instantaneous flow at the time of stage measurement.

Precipitation data for Vadnais Heights, Minnesota, were downloaded from the following Accuweather website: www.accuweather.com/en/us/vadnais-heights-mn/55127/august-weather/338928?monyr=8/1/2014 &view=table.

3.4.7 Element 4 – Human Origin Assessment

Element 4 addresses Study Question 5: Does the *E. coli* in the Oakmede Drainage originate from human sewage? To answer this question, samples were collected and analyzed for the Human source-specific genetic marker (Human Marker) (see Chapter 4.0 – Materials and Methods) at two locations in the Oakmede Drainage: Oak-P and Oak-C1 (Table 3-3). After the basic spatial patterns of *E. coli* between these two sites were assessed during the first 3 weeks of the study, samples were collected and analyzed for the Human Marker using quantitative polymerase chain reaction (qPCR) techniques. Samples for the Human Marker were collected and analyzed using the methods detailed in Appendices C and D and in SCCWRP (2013). Samples were collected for the Human Marker from Oak-P and Oak-C1. Each site was sampled two times per week over the course of the 2-week monitoring period for a total of eight samples analyzed for the Human Marker from the Oakmede Drainage.

3.4.8 Element 5 – Non-human Origin Assessment

The purpose of Element 5 is to address Study Question 6: Does the *E. coli* in the Oakmede Drainage originate from fecal material from non-human sources? This element was conducted after the initial spatial patterns were determined and Study Question 1 had been addressed. The study design for the Non-human Origin Assessment was developed based on the initial results.

3.4.9 Element 6 – Microbial Community Analysis

MCA was not conducted at any site in the Oakmede Drainage in 2014.

3.5 County Road F Drainage

The study design for the County Road F Drainage is presented below.

3.5.1 Study Questions

Based on the information summarized above, the following Study Questions related to the County Road F Drainage were addressed in this study:

1. Are there differences between the *E. coli* concentrations at CRF-P and the three outfalls that discharge just upstream (CRF-A1, CRF-B1, and CRF-C1)?
2. How do *E. coli* concentrations differ on the mainstem at the base of the wetland (CRF-D1) and the outfall on the west side of I-35E (CRF-B1)?
3. How do *E. coli* concentrations and flows from Centerville Road that discharge at outfall CRF-A1 influence bacterial concentrations at CRF-P?
4. What are the temporal patterns in *E. coli* concentrations in the County Road F Drainage?
5. Does the *E. coli* in the County Road F Drainage originate from human sewage?
6. Does the *E. coli* in the County Road F Drainage originate from fecal material from non-human sources?

3.5.2 Monitoring Elements

The monitoring elements listed in Table 3-4 were designed to answer the County Road F Drainage Study Questions. Because the study design for this assessment uses an adaptive approach, whereby the results of the first element are used to focus the design for subsequent elements, the elements were conducted sequentially as listed in Table 3-4.

Table 3-4: Monitoring Elements for the County Road F Drainage

Element Number	Monitoring Element	Study Question Addressed	Monitoring Location and Frequency
1	Visual Observations	1 through 6	At least weekly from July through October
2	*E. coli* Monitoring (culture)	1 through 4	Weekly from July through October
3	Flow Monitoring	3 and 4	Instantaneous monitoring July through October
4	Human Origin Assessment	5	Site CRF-P and CRF-D1 weekly July - August. Additional monitoring to be determined
5	Non-human Origin Assessment	6	To be determined, based on results of Elements 1 through 3
6	Microbial Community Analysis	6	Not conducted in 2014

3.5.3 Monitoring Locations

Site selection for the bacterial source identification in the County Road F Drainage was based on historical data available for the drainage and the results of the site reconnaissance conducted in May, 2014. The monitoring sites are shown graphically on Figure 2-3 and described in Table 3-5.

Table 3-5: Monitoring Sites for the County Road F Drainage

Site ID	Site Location	Site Drainage Description
CRF-P	Primary Monitoring Site at base of County Road F Drainage at County Road F and Centerville Road	The entire County Road F Drainage
CRF-A1	At the storm drain outfall that drains the Centerville Road from Pondview Court to County Road F	Centerville Road north of County Road F
CRF-B1	At the storm drain outfall at the mainstem on the west side of I-35E	Reach under I-35E between the wetland and outfall on west side of I-35E
CRF-C1	West of Centerville Road and south of outfalls CRF-A1 and CRF-B1	Small area to south of CRF-P adjacent to Centerville Road
CRF-D1	At wetland weir	Entire County Road F Drainage except Centerville Road areas

3.5.4 Element 1 – Visual Observations

As described for the Oakmede Drainage (Section 3.4.4), visual observations are a critical component to bacterial source tracking investigations and may be used to address all six Study Questions for the County Road F Drainage. Visual observations were made at each site during every field visit on a Visual Observation Form designed for the Lambert Creek Watershed (see Appendix B). The most critical observations in this drainage were evidence of any flow in the gutters and storm drains along Centerville Road, any flows entering the storm drain from the detention pond at the top of the Centerville Road drainage across from Pondview Court, estimates of flow at all monitoring locations identified on Figure 2-3, and observations of wildlife or wildlife signs in the wetland weir at Site CRF-D1. Stream stage was also recorded at the CRF-P Weir during each field visit to assess changes in flow over time. Digital photographs were taken of any meaningful observations and were stored electronically with the Visual Observation Forms for the County Road F Drainage.

3.5.5 Element 2 – *E. coli* Monitoring

The purpose of the *E. coli* monitoring is to address Study Questions 1 through 4 for the County Road F Drainage. The monitoring sites identified on Figure 2-3 and described in Table 3-5 were assessed over the course of the study from July through September 2014 on a weekly basis following the schedule and frequency described in Table 3-6. Similar to the Oakmede Drainage, the initial monitoring schedule for

the County Road F Drainage was adjusted over the course of the study so that monitoring was conducted at least 72 hours after rain events, which were common, particularly in the early summer months. The first 3 weeks of the assessment focused on Study Questions 1 through 3 by comparing the *E. coli* concentrations at CRF-P to those just upstream (sites CRF-A1, CRF-B1, and CRF-C1) and those at the wetland weir (Site CRF-D1).

Table 3-6: Monitoring Locations, Frequency, and Analyses for the County Road F Drainage

Week #	Week in 2014	Site Monitored					Analysis		
		CRF-P	CRF-A1	CRF-B1	CRF-C1	CRF-D1	Cult[a]	Hum[b]	Non-Hum[c]
1	7/14	4	4	4	4	4	20		
2	7/21	4	4	4	4	4	20		
3	7/28	4	4	4	4	4	20		
4	8/4	2[d]	2	2	2	2[d]	10	4	
5	8/11	2[d]	2	2	2	2[d]	10	4	
6	8/18	2	2	2	2	2	10	4	
7	8/25	2	2	2	2	2	10	4	2
8	9/1	2	2	2	2	2	10	tbd[e]	2
9	9/8	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	2
10	9/15	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	2
11	9/22	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	2
12	9/29	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
13	10/6	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
14	10/13	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
15	10/20	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]	tbd[e]
Total:									

(a) Culture sample collected and analyzed for *E. coli*
(b) Sample collected and analyzed for the Human Marker using qPCR
(c) Sample collected and analyzed for Non-human Markers (e.g., avian or canine)
(d) Sample collected and analyzed for the Human Marker using qPCR in addition to *E. coli*
(e) Sample collection to be determined based on previous monitoring results

3.5.6 Element 3 – Flow Monitoring

Flow Monitoring was used to address Study Questions 3 and 4 by helping to assess temporal patterns at the CRF-P in 2014 and comparing these patterns to those recorded in previous years. In addition, estimates of flow at sites CRF-A1, CRF-B1, CRF-C1, and CRF-D1 help determine the relative extent to which these drainages contribute to elevated *E. coli* levels at CRF-P. There is no flow meter in place at CRF-P or other sites in the drainage. However, stream stage was monitored at CRF-P by measuring stream stage on the Visual Observation Form. Stage was then converted to flow by VLAWMO staff and

stored electronically. These recordings provide a measure of instantaneous flow at the time of stage measurement.

3.5.7 Element 4 – Human Origin Assessment

Element 4 addresses Study Question 5: Does the *E. coli* in the County Road F Drainage originate from human sewage? To answer this question, samples were collected and analyzed for the Human Marker at two locations in the Country Road F Drainage: CRF-P and CRF-D1 (Table 3-6). After the basic spatial patterns of *E. coli* between these two sites were assessed during the first several weeks of the study, samples were collected and analyzed for the Human Marker using qPCR techniques. Samples for the Human Marker were collected and analyzed using the methods outlined in Chapter 4 and detailed in Appendices C and D and in SCCWRP (2013). Each site was sampled two times per week over the course of the 2-week monitoring period for a total of eight samples analyzed for the Human Marker from the County Road F Drainage.

3.5.8 Element 5 – Non-human Origin Assessment

The purpose of Element 5 is to address Study Question 6: Does the *E. coli* in the County Road F Drainage originate from fecal material from non-human sources? This element was conducted after the initial spatial patterns are determined and Study Questions 1 through 3 were addressed. The study design for the Non-human Origin Assessment was developed based on the initial results.

3.5.9 Element 6 – Microbial Community Analysis

MCA was not conducted at any site in the County Road F Drainage in 2014.

4.0 MATERIALS AND METHODS

The sampling and analysis procedures used over the course of the study are discussed below.

4.1 Visual Observations

Visual observations are a critical component to bacterial source tracking investigations. They provide a direct means of assessing potential anthropogenic and non-anthropogenic bacterial inputs that are often unanticipated or over-looked when a project is designed. In this study, visual observations were made at each site during every field visit and recorded on a Visual Observation Form designed for the Lambert Creek Watershed (see Appendix B). The Visual Observation form contains information for each site visited, including weather (including last time since rainfall), watershed and assessment location, site conditions, evidence of human bacterial sources, evidence of non-human bacterial sources, and evidence of flow or other transport mechanism.

4.2 Sample Collection for Culture Analyses

Grab samples of water were collected at each sampling location from the center of the channel or storm drain (as applicable). Samples were collected in sterile, plastic, 100-mL bottles. Sample containers were kept in clear, resealable plastic bags until use. Just prior to sampling, the bag and sample container were opened, with both container and lid held face-down to prevent airborne particulate contamination. The bottle was filled and capped. No sediment or debris was allowed to enter the sample bottle.

Each field sample was labeled and identified with the project title, appropriate identification number, date and time of sample collection, and preservation method. The sample container was then sealed in the plastic bag. All samples were stored on ice in the dark from the time of sample collection until delivery to the analytical laboratory. All samples were delivered to the analytical laboratory in time to meet the required 6-hour holding time limitation.

To verify proper sampling technique, field blanks were collected at a rate of 5 percent of the overall samples per field event. Field blanks were collected using the sampling technique described above except that reagent-grade, nuclease-free water was substituted for the water sample.

4.3 Sample Collection for Molecular Analyses

Field collection procedures for samples that were analyzed for genetic markers (human or non-human) are detailed in the Standard Operating Procedures (SOP) for the Collection, Storage, and Transport of Samples for Molecular Analysis in Appendix C.

4.4 Laboratory Analyses for Culture Samples

Samples collected for culture analysis were analyzed by the Saint Paul Regional Water Service (SPRWS) in Saint Paul, Minnesota. All samples collected for culture analysis were analyzed by Method SM 9223B (Colilert® Quanti-Tray®)-97. The SPRWS is accredited for this analysis under the Safe Drinking Program.

4.5 Laboratory Analyses for Molecular Samples

The samples collected for molecular analyses were filtered by staff at the Ramsey County Department of Public Works following the protocols described in Appendix D. The processed filters were shipped to Weston Solutions in Carlsbad, California, following the protocols in Appendix D. Laboratory analyses for the human and non-human (e.g., avian) genetic markers followed the protocols for qPCR assays described in SCCWRP (2013).

4.6 Sample Handling and Tracking

Each sample collected over the course of the study received a unique alphanumeric code (sample I.D. number) for tracking. This code was standardized for all samples and contained information as to the monitoring site, sample date, and sample interval number or sequential monitoring event number (as appropriate).

To verify proper tracking and handling of the samples, Chain-of-Custody (COC) Forms (provided by VLAWMO and/or participating laboratories) accompanied the samples from the initial pickup to the final extractions and analysis. These forms, or equivalent, were used to track and handle samples. All samples collected were labeled with the following information:

- Project name
- Date
- Time
- Sampling location name and number
- Preservative
- Collector's initials
- Sample I.D. number
- Analyte(s) to be analyzed

Completed COC forms were placed in a plastic bag and kept inside the container containing the samples. Once delivered to the laboratory, the COC form was signed by the person receiving the samples. The

condition of the samples were noted and recorded by the receiver. COC records were included in the final reports prepared by the analytical laboratories (see Appendix E).

Upon delivery to the laboratory, the laboratory manager inspected the condition of the samples and reconciled the label information to the COC form. The time of sample collection was noted, and the samples were stored at the appropriate temperature until analysis began, always within the 6-hour holding time limitation.

5.0 RESULTS

5.1 Oakmede Drainage

The Oakmede Drainage was monitored a total of 33 times between July 7 and October 22, 2014 (the Monitoring Period). All observations and sampling was conducted during dry weather, at least 72 hours after the last storm event. The results are presented below.

5.1.1 Visual Observations

A total of 22 observations were made in the Oakmede Drainage in 2014 (see Appendix B for the Visual Observation Forms). During all observation days, flow in Lambert Creek was observed at the weir below Rice Lake (Site Oak-C1; see Figure 2-1) and at Oak-P. However, no flow was observed along Oakmede Lane during any of the observation periods, and there was no evidence of dry weather flows entering Lambert Creek from the storm drain inlets along Oakmede Lane (Sites Oak-A1 and Oak-B1). Therefore, field staff were not able to collect samples from these monitoring locations.

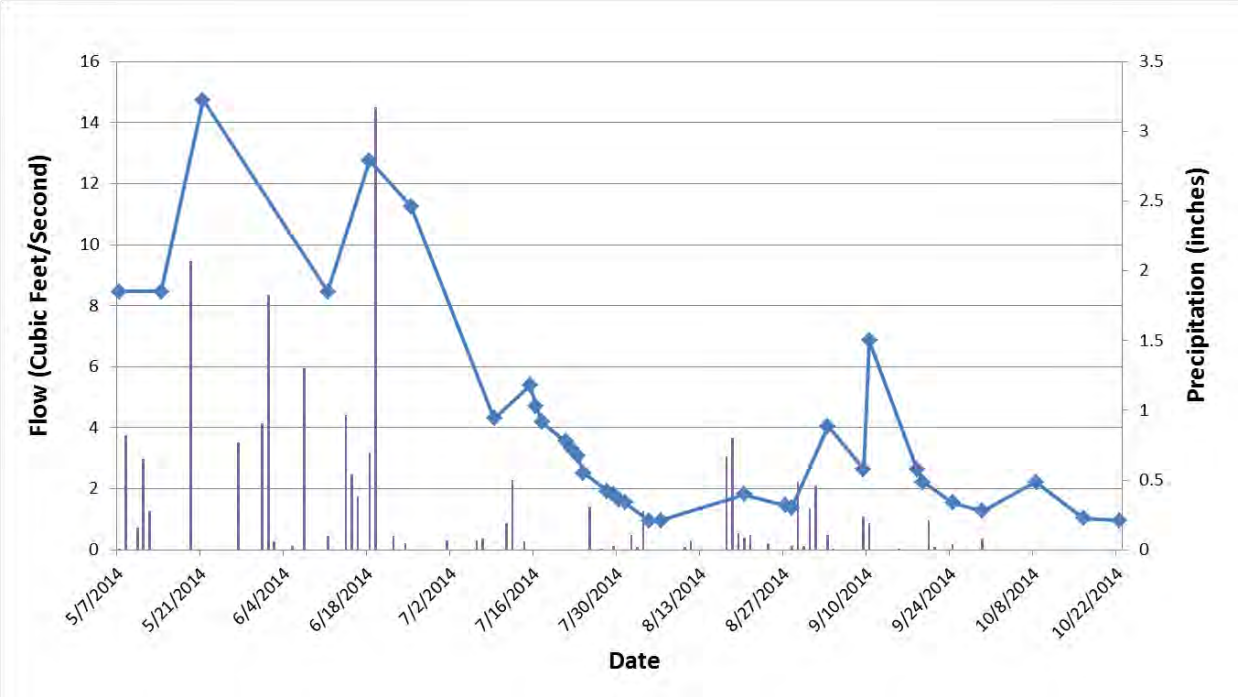
There was no evidence of human waste at any of the Oakmede sites over the Monitoring Period (no signs of homeless encampments, sewage leaks, odors, etc.). Birds were observed at Site Oak-C1 over the course of the study, including Canadian geese, ducks, and blue herons. Bird fecal matter was also observed at Site Oak-C1, on the Rice Lake Weir and just downstream of it.

5.1.2 Flow Monitoring

Instantaneous flow was measured by VLAWMO staff at Oak-P 33 times over the Monitoring Period by measuring stream stage at the weir and converting the results to flow. The data are presented on Figure 5-1 along with precipitation data for Vadnais Heights over the same period of time. Flows were typically measured weekly and when a bacterial sample was collected at the site.

Flow was greatest at Oak-P from May through early July (ranging from 8.5 to 14.7 cubic feet per second [cfs]), reflecting the rain events that impacted the region during that time period (Figure 5-1). Stream flows decreased in mid-July and generally remained below 5 cfs through the end of October, except for a spike in flow that occurred in early September.

Figure 5-1: Stream Flow (Blue Line) at Oakmede Primary Monitoring Site and Precipitation Data (Purple Bars) for Vadnais Heights, Minnesota



Source of precipitation data: Accuweather website: www.accuweather.com/en/us/vadnais-heights-mn/55127/august-weather/338928?monyr=8/1/2014 &view=tableE. coli Monitoring

5.1.3 *E. coli* Monitoring

Concentrations of *E. coli* from samples collected at the Oak-P and Oak-C1 sites (Figure 2-1) over the Monitoring Period are presented in Table 5-1 (see Appendix E for laboratory reports of *E. coli* data). A total of 22 dry weather samples were collected from Oak-P during the Monitoring Period for *E. coli* enumeration. Sixteen samples were collected and analyzed from the Oak-C1 Site over the Monitoring Period. *E. coli* concentrations at the Oak-C1 Site were greater than those at the Oak-P site for the first 2 weeks of the Monitoring Period (July 15 through July 30), but that trend was not observed for the remainder of the Monitoring Period. Overall, the geometric mean concentration for samples collected from the Oak-C1 site (51.04 Most Probable Number [MPN] / 100 milliliters [mL]) was greater than that at the Oak-P Site (23.95 MPN /100 mL); however, the geometric means were not significantly different from one another (student's t-test, $p = 0.06$).

Table 5-1: *E. coli* Concentrations at the Oak-P and Oak-C1 Sites by Date

Date	*E. coli* Concentrations (MPN / 100 mL)	
	Oak-P Site	Oak-C1 Site
7/15/2014	28	57
7/16/2014	21	43
7/17/2014	68	93
7/21/2014	16	104
7/22/2014	28	142
7/23/2014	28	114
7/24/2014	16	28
7/28/2014	46	35
7/29/2014	20	276
7/30/2014	18	72
7/31/2014	36	18
8/4/2014	14	13
8/27/2014	25	ns[a]
8/28/2014	28	ns[a]
9/3/2014	76	26
9/9/2014	26	17
9/18/2014	56	49
9/24/2014	53	ns[a]
9/29/2014	56	56
10/8/2014	6	ns[a]
10/16/2014	8	ns[a]
10/22/2014	3	ns[a]
Geometric mean	**23.95**	**51.04**

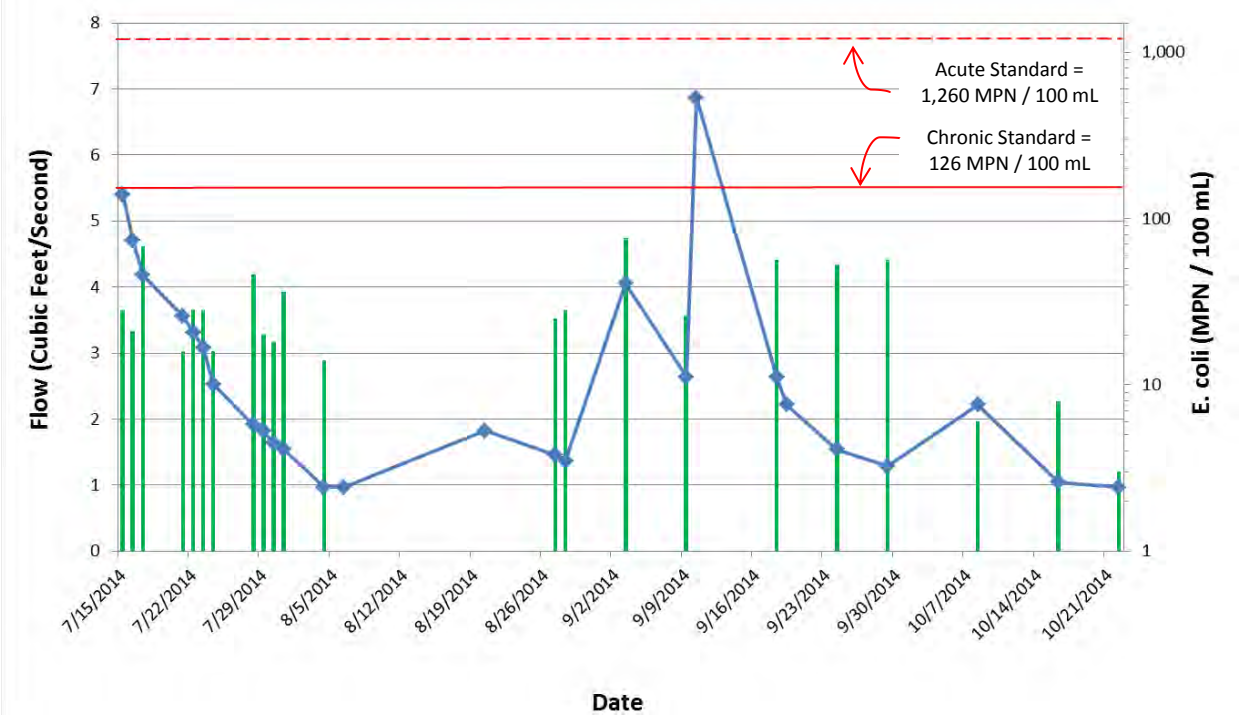
(a) No sample collected

E. coli concentrations at the Oak-P Site are plotted along with flow on Figure 5-2. The chronic and acute State standards for *E. coli* concentrations used in the Lambert Creek *E. coli* TMDL (Wenck, 2013) are also plotted on Figure 5-2 and defined as follows:

- Chronic Standard: The 30-day geometric mean *E. coli* concentration of five or more samples collected in a calendar month are not to exceed 126 MPN / 100 mL
- Acute Standard: 10 percent of samples collected in a calendar month are not to exceed an *E. coli* concentration of 1,260 MPN / 100 mL

The chronic and acute standards are represented on Figure 5-2 as solid and dashed lines, respectively. The data presented in Table 5-1 and on Figure 5-2 indicate that *E. coli* concentrations during dry weather at the Oak-P and Oak-C1 sites were below both the chronic and acute standards in the TMDL.

Figure 5-2: Stream Flow (Blue Line) and *E. coli* Concentrations (Green Bars) at the Oakmede Primary Monitoring Site Showing Acute and Chronic Water Quality Standards



5.1.4 Human and Non-human Origin Assessment

A limited number of samples were collected from sites Oak-P and Oak C and analyzed for two genetic markers using qPCR: the Human Marker and the Bird Marker. The results are presented in Table 5-2 (see Appendix F for laboratory reports of molecular data). Eight samples were collected and analyzed for the Human Marker. All were negative. Six samples were collected and analyzed for the Bird Marker. All were positive.

Table 5-2: Results of Human and Non-human Genetic Marker Assays at Monitoring Sites Oak-P and Oak-C1

Date	Site	Human Marker	Bird Marker
9/3/2014	Oak-P	Negative	Positive
	Oak-C1	Negative	Positive
9/8/2014	Oak-P	Negative	ns[a]
	Oak-C1	Negative	ns[a]
9/9/2014	Oak-P	Negative	Positive
	Oak-C1	Negative	Positive
9/29/2014	Oak-P	Negative	Positive
	Oak-C1	Negative	ns[a]

(a) No sample collected

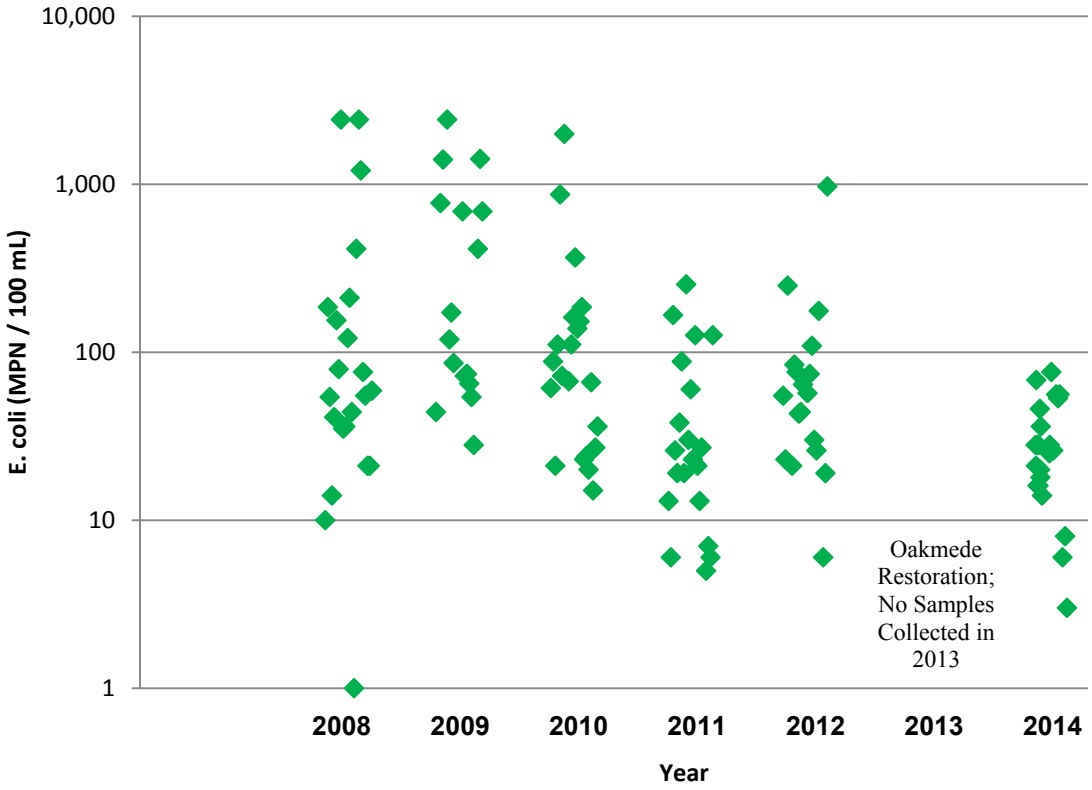
5.1.5 Annual *E. coli* Assessment

Study Question 2 for the Oakmede Drainage was: How do concentrations differ at Oak-P before and after restoration? Restoration of the stream reach between the Rice Lake Weir to just downstream of Oak-P was conducted in 2013, as discussed in Section 2.1 and depicted on Figure 2-2. In order to address this Study Question, *E. coli* data from samples collected by VLAWMO staff at Oak-P from 2008 through 2014 were assessed. A summary of the *E. coli* results for samples collected over this period are presented in Table 5-3. Discrete dry weather *E. coli* concentrations are shown graphically by year on Figure 5-3. No samples were collected in 2013 when the site was being restored.

Table 5-3: Summary Statistics of Dry Weather *E. coli* Concentrations at Site Oak-P

Year	Annual Number of Samples (n)	*E. coli* Concentrations (MPN / 100 mL)			Percent of Values > 126 MPN / 100 mL	Percent of Values > 1,260 MPN / 100 mL
		Annual Geometric Mean	Minimum Value	Maximum Value		
2008	22	77	1	2,420	32%	9%
2009	16	219	28	2,420	50%	19%
2010	21	84	15	1,986	33%	5%
2011	20	28	5	253	20%	0%
2012	18	57	6	968	17%	0%
2013	No data collected					
2014	22	24	3	76	0%	0%

Figure 5-3: Dry Weather *E. coli* Concentrations at Site Oak-P



Over the 7-year period, the geometric mean *E. coli* concentration was greatest in 2009 and generally followed a decreasing tend from 2009 through 2014 (Table 5-3). The annual geometric mean concentration in 2012 (57 MPN / 100 mL), prior to restoration, was twice that in 2014 (24 MPN / 100 mL), after restoration had been completed. In addition, the data presented on Figure 5-3 suggest that the number of samples that exceeded the concentration threshold of 126 MPN / 100 mL have decreased from a peak in 2009 (when 50 percent of the samples exceeded the threshold) to zero exceedances in 2014. A total of 17 percent of the samples exceeded the threshold in 2012, the year prior to restoration.

5.2 County Road F Drainage

The County Road F Drainage was monitored a total of 33 times between May 7 and October 22, 2014. All observations and sampling was conducted during dry weather, at least 72 hours after the last storm event. The results are presented below.

5.2.1 Visual Observations

A total of 23 observations were made in the County Road F Drainage in 2014 (see Appendix B for Visual Observation Forms). Observations were conducted at four locations: CRF-P, CRF-A1, CRF-B1, and CRF-D1 (Figure 2-3). No flow was observed at Site CRF-C1 over the course of the Monitoring Period,

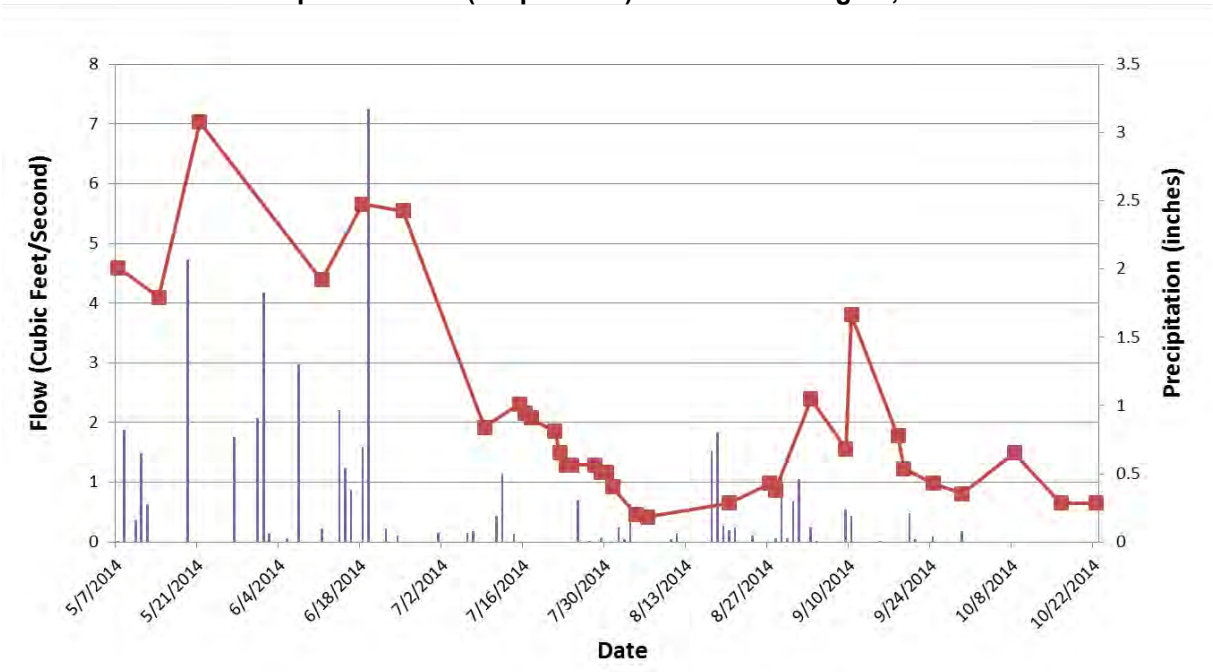
and this site was not sampled. During all observation days, flow in Lambert Creek was observed at CRF-P, CRF-B1, and at the wetland weir (CRF-D1). At Site CRF-A1, which drains Centerville Road north of County Road F, there was no flow (stagnant, ponded water only) or flow was minimal.

There was no evidence of human waste at any of the County Road F sites over the Monitoring Period (no signs of homeless encampments, sewage leaks, odors, etc.). Birds were observed in the watershed over the course of the study at Site CRF-D (near the wetland weir, (Figure 2-3), including Canadian geese, ducks, and blue herons. Birds were not observed at the other sites over the Monitoring Period; however, bird waste was observed on the flume at Site CRF-P during monitoring conducted on July 28.

5.2.2 Flow Monitoring

Instantaneous flow was measured at CRF-P a total of 33 times between May 7 and October 22, 2014, by measuring stream stage at the weir and converting the results to flow. The data are presented on Figure 5-4 along with precipitation data for Vadnais Heights over the same period of time. Flows were typically measured weekly and when a bacterial sample was collected at the site.

Figure 5-4: Stream Flow (Brown Line) at County Road F Primary Monitoring Site and Precipitation Data (Purple Bars) for Vadnais Heights, Minnesota



Source of precipitation data: Accuweather website: www.accuweather.com/en/us/vadnais-heights-mn/55127/august-weather/338928?monyr=8/1/2014 &view=table

Flow at CRF-P (Figure 5-4) was similar to that observed at Oak-P (Figure 5-1). Flow was greatest from May through early July (ranging from 4.1 to 7.0 cfs), reflecting the rain events that impacted the region

during that time period. Stream flows decreased in mid-July and generally remained below 2 cfs through the end of October, except for a spike in flow that occurred in mid-September.

5.2.3 *E. coli* Monitoring

Concentrations of E. coli from samples collected at the four County Road F sites where flow was observed are presented in Table 5-4 (see Appendix E for laboratory reports of *E. coli* data).

Table 5-4: *E. coli* Concentrations at the County Road F Monitoring Sites by Date

Date	*E. coli* Concentrations (MPN / 100 ML)			
	CRF-P Site	CRF-A1 Site	CRF-B1 Site	CRF-D1 Site
7/15/2014	54	31	62	57
7/16/2014	214	47	248	35
7/17/2014	40	3	47	48
7/21/2014	55	3	57	36
7/22/2014	68	3	63	57
7/23/2014	39	3	34	32
7/24/2014	26	132	28	22
7/28/2014	18	31	10	21
7/29/2014	44	37	41	30
7/30/2014	28	30	37	25
7/31/2014	28	3	11	15
8/4/2014	13	30	118	23
8/27/2014	52	ns[a]	ns[a]	ns[a]
8/28/2014	55	ns[a]	ns[a]	ns[a]
9/3/2014	148	ns[a]	ns[a]	157
9/8/2014	ns	ns[a]	ns[a]	ns[a]
9/9/2014	71	ns[a]	ns[a]	126
9/18/2014	118	ns[a]	ns[a]	135
9/24/2014	91	ns[a]	ns[a]	ns[a]
9/29/2014	1,120[b]	ns[a]	ns[a]	96
10/8/2014	140	ns[a]	ns[a]	ns[a]
10/16/2014	124	ns[a]	ns[a]	ns[a]
10/22/2014	14	ns[a]	ns[a]	ns[a]
Geometric mean	**52.05**	**13.81**	**43.71**	**43.93**

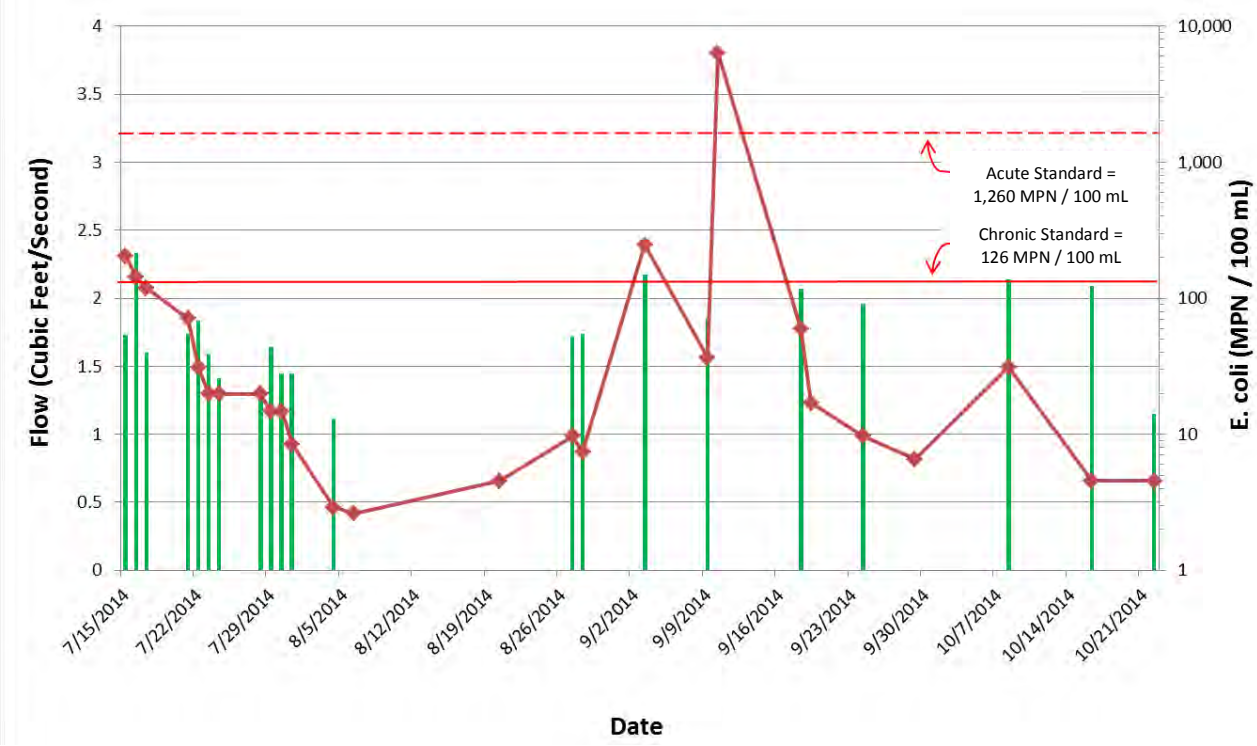
(a) No sample collected
(b) Storm drain flow was heavy due to fire hydrant flushing being conducted by the City. This data point was removed from the geometric mean calculation.

A total of 22 dry weather samples were collected from the County Road F monitoring sites during the Monitoring Period for *E. coli* enumeration. All samples had concentrations less than 250 MPN/100 mL except for one sample that was collected from CRF-P on September 29, 2014, which had an *E. coli* concentration of 1,120 MPN/100 mL. Observations made during this sampling event indicate that flow in the storm drain was very high due to hydrant flushing that was being conducted by the City at the time of sample collection.

The geometric mean concentrations of *E. coli* at Site CRF-P (52.05 MPN/100 mL) was significantly greater than that at Site CRF-A1 (13.81 MPN/100 mL) (Student's t-test, p = 0.018). However, the geometric mean concentration at Site CRF-P was not significantly different from those at site CRF-B1 (Student's t-test, p = 0.491) or CRF-D1 (Student's t-test, p = 0.487). In addition, the geometric mean concentration at Site CRF-D1 at the wetland weir was not significantly different than that at Site CRF-B1 downstream (Student's t-test, p = 0.794).

E. coli concentrations at the CRF-P Site are plotted along with flow on Figure 5-5. The criteria used in the Lambert Creek *E. coli* TMDL (see Section 5.1.3) (Wenck, 2013) are also plotted on Figure 5-5. The data represented in Table 5-4 and on Figure 5-5 indicate that *E. coli* concentrations during dry weather at the CRF-P were below the chronic and acute standards in the TMDL.

Figure 5-5: Stream Flow (Brown Line) and *E. coli* Concentrations (Green Bars) at the County Road F Primary Monitoring Site Showing Acute and Chronic Water Quality Standards



5.2.4 Human and Non-human Origin Assessment

A limited number of samples were collected from sites CRF-P and CRF-D1 (Figure 2-3) and analyzed for two genetic markers using qPCR: the Human Marker and the Bird Marker. The results are presented in Table 5-5 (see Appendix F for laboratory reports of molecular data). Eight samples were collected and analyzed for the Human Marker. All were negative. Five samples were collected and analyzed for the Bird Marker. All were positive.

Table 5-5: Results of Human and Non-human Genetic Marker Assays at Monitoring Sites CRF-P and CRF-D1

Date	Site	Human	Bird
9/3/2014	CRF-P	Negative	Positive
	CRF-D1	Negative	Positive
9/8/2014	CRF-P	Negative	ns[a]
	CRF-D1	Negative	ns[a]
9/9/2014	CRF-P	Negative	Positive
	CRF-D1	Negative	Positive
9/29/2014	CRF-P	Negative	Positive
	CRF-D1	Negative	ns[a]

(a) No sample collected

6.0 CONCLUSIONS

6.1 Oakmede Drainage

Based on the results provided above for the Oakmede Drainage, the following Study Question conclusions can be drawn.

6.1.1 Study Question 1

Are there differences between the *E. coli* concentrations at the Rice Lake Weir (Site Oak-C1) and those at Oak-P?

This question was addressed with the *E. coli* concentration data presented in Table 5-1. Although the geometric mean concentration of *E. coli* at Oak-P (23.95 MPN / 100 mL) was half of that measured at Oak-C1 (51.04 MPN / 100 mL), the difference was not significant. This suggests that *E. coli* concentrations were low in the water exiting Rice Lake and did not change in the short reach between the weir and Oak-P. The purpose of addressing this Study Question was to determine the potential for regrowth and/or wildlife in increasing bacterial concentrations downstream of the Rice Lake wetland. The results suggest that concentrations are not increasing in this reach of Lambert Creek.

6.1.2 Study Question 2

How do concentrations differ at Oak-P before and after restoration?

As discussed in Section 2.1, the reach of Oakmede Creek between the Rice Lake Weir to just downstream of Oak-P was restored in 2013 (see before and after photographs on Figure 2-2). To assess the impact the restoration may have had on *E. coli* concentrations at Oak-P, dry weather *E. coli* concentrations before (2008 through 2012) and after (2014) restoration were compared. The data presented in Subsection 5.1.5 show a decreasing trend in *E. coli* concentrations from 2009 through 2014 and a drop in the geometric mean *E. coli* concentrations from 2012 (prior to restoration) to 2014 (after restoration). In addition, *E. coli* concentrations from the samples collected at Oak-P in 2014 were all below 126 MPN / 100 mL, as opposed to previous years where concentrations above this threshold were documented. Although the monitoring data suggest that the restoration efforts may have had a positive effect on reducing *E. coli* concentrations in this reach of lambert Creek, additional data will need to be collected in subsequent years to determine the extent to which the restoration has decreased *E. coli* concentrations and improved water quality at this site.

6.1.3 Study Question 3

Do dry weather flows from surface runoff along Oakmede Lane affect *E. coli* concentrations at Oak-P?

Over the course of the 2014 Monitoring Period, no dry weather flows were observed at Sites Oak-A1 and Oak-B1, which drain Oakmede Lane to Lambert Creek (Figure 2-1). Based on these observations, no dry weather flows were observed at Oakmede Lane that would have affected *E. coli* concentrations at Oak-P. Observations also suggested that there were no signs of recent flow in the gutters associated with these sites (e.g., sediment, debris, staining), which suggests that Oakmede Lane is not a likely source of elevated bacterial concentrations at Oak-P during dry weather.

6.1.4 Study Question 4

What are the temporal patterns in *E. coli* concentrations in the Oakmede Drainage?

Based on a graphical representation of *E. coli* concentrations and flow at Oak-P shown on Figure 5-2, *E. coli* concentrations remained relatively consistent from July 15 through the end of September, then dropped in October. This may have been due to a decrease in water temperature in the fall, which has been shown to be correlated with decreasing bacterial concentrations in the environment. Bacterial concentrations during dry weather did not appear to correlate with flow during the Monitoring Period (see Figure 5-2).

6.1.5 Study Question 5

Does the *E. coli* in the Oakmede Drainage originate from human sewage?

The low concentrations of *E. coli* in the Oakmede Drainage (Figure 5-2) and the negative results for the Human Marker (Table 5-2) suggest that bacteria originating from humans was not a likely source of *E. coli* at Oak-P or the Rice Lake Weir. Although the sample size for the Human Marker tests was small (n = 8), these results, combined with the overall low bacterial concentrations and absence of human fecal matter during the Visual Observations, suggest that human sewage is an unlikely source of *E. coli* in the Oakmede Drainage during dry weather periods.

6.1.6 Study Question 6

Does the *E. coli* in the Oakmede Drainage originate from fecal material from non-human sources?

A small set of samples (n = 5) was collected from the Oakmede Drainage and analyzed for the Bird Marker (Table 5-2). All five of the samples were positive for the Bird Marker. These results, combined with the Visual Observations documenting birds and bird fecal matter during the monitoring, as well as the absence of fecal matter from human origin, indicate that birds are a likely source of *E. coli* in the Oakmede Drainage.

6.2 County Road F Drainage

Based on the results provided above for the County Road F Drainage, the following Study Question conclusions can be drawn.

6.2.1 Study Question 1

Are there differences between the *E. coli* concentrations at CRF-P and the three outfalls that discharge just upstream (CRF-A1, CRF-B1, and CRF-C1)?

The results of the *E. coli* monitoring presented in Table 5-4 can be used to address this Study Question. Site CRF-A1 drains Oakmede Lane to the north of County Road F and CRF-P (Figure 2-3). During the site reconnaissance, a detention pond was identified near the top of the Centerville Road Drainage. The pond discharges via the MS44 directly into the outfall that discharges at Site CRF-A1. During the 2014 monitoring, Visual Observations determined that during the majority of the monitoring days, there was no flow in this drainage (water was ponded). The lack of flow suggests that the drainage from Centerville Road had minimal (if any) effect on dry weather *E. coli* concentrations over the course of the Monitoring Period. In addition, *E. coli* concentrations were very low (geometric mean of 13.81 MPN / 100 mL, Table 5-4), suggesting that if the flows from CRF-A1 were to reach CRF-P, they would be unlikely to increase receiving water concentrations of *E. coli* during dry weather conditions. Bacterial concentrations at the wetland weir (Site CRF-D1) and at the mouth of the I-35E culvert just downstream (Site CRF-B1) were similar to those at CRF-P, and it was determined that flow off the wetland weir is the major source of flow (and bacteria) at CRF-P. In contrast, no flow was observed at Site CRF-C to the south of CRF-P during the 2014 Monitoring Period, suggesting that the area does not influence *E. coli* concentrations during dry weather periods.

6.2.2 Study Question 2

How do *E. coli* concentrations differ on the Mainstem at the base of the wetland (CRF-D1) and the outfall on the west side of I-35E (CRF-B1)?

The purpose of this Study Question was to determine if regrowth of bacteria within the I-35E culvert between the wetland weir and CRF-P increased bacterial concentrations at Site CRF-P. The results presented in Table 5-4 indicate that the *E. coli* concentrations at the wetland weir (CRF-D1) and the mouth of the culvert (CRF-B1) were very similar over the course of the Monitoring Period (geometric means of 43.93 MPN / 100 mL and 43.71 MPN / 100 mL, respectively.). These results indicate that regrowth of bacteria in the I-35E culvert (if present) was not affecting *E. coli* concentrations at CRF-P.

6.2.3 Study Question 3

How do *E. coli* concentrations and flows from Centerville Road that discharge at outfall CRF-A1 influence bacterial concentrations at CRF-P?

As discussed in Study Question 1, it is unlikely that flow from the Centerville Road outfall (Site CRF-A1) influenced the *E. coli* concentrations at CRF-P during the Monitoring Period.

6.2.4 Study Question 4

What are the temporal patterns in *E. coli* concentrations in the County Road F Drainage?

Based on a graphical representation of *E. coli* concentrations and flow at CRF-P shown on Figure 5-4, *E. coli* concentrations decreased slightly from July 15 through August 5, but remained elevated from August 26 through mid-October. Overall, concentrations were well below water quality standards identified in the TMDL.

6.2.5 Study Question 5

Does the *E. coli* in the County Road F Drainage originate from human sewage?

The low concentrations of *E. coli* in the County Road F Drainage (Figure 5-4) and the negative results for the Human Marker (Table 5-5) suggest that bacteria originating from humans was not a likely source of *E. coli* at CRF-P or the Wetland Weir (CRF-D1). Although the sample size for the Human Marker tests was small (n = 8), these results, combined with the overall low bacterial concentrations and absence of human fecal matter during the Visual Observations, suggest that human sewage is an unlikely source of *E. coli* in the County Road F Drainage during dry weather periods.

6.2.6 Study Question 6

Does the *E. coli* in the County Road F Drainage originate from fecal material from non-human sources?

A small set of samples (n = 5) was collected from the County Road F Drainage and analyzed for the Bird Marker (Table 5-5). All five of the samples were positive for the Bird Marker. These results, combined with the Visual Observations that documented birds and bird fecal matter during the monitoring, as well as the absence of fecal matter from human origin, indicate that birds are a likely source of *E. coli* in the County Road F Drainage.

7.0 RECOMMENDATIONS

Based on the results of the study presented above, the following recommendations are submitted for consideration.

7.1 Oakmede Drainage

1. Continue monitoring Oak-P for *E. coli* and flow during dry weather on a monthly basis (minimum) from May through October in subsequent years to determine if the results obtained in this study remain consistent over time.

2. Use data collected in future monitoring years to continue to assess the effectiveness of the restoration of the Lambert Creek reach at Oakmede by comparing *E. coli* concentrations before and after restoration (2013). Assessments conducted with additional data collected in the future will help determine the effectiveness of stream restoration as a viable BMP for reducing *E. coli* concentrations at other locations in the Lambert Creek Watershed.

7.2 Country Road F Drainage

1. Continue monitoring CRF-P for *E. coli* and flow during dry weather on a monthly basis (minimum) from May through October in subsequent years to determine if the results obtained in this study remain consistent over time.

7.3 Additional Recommendations

1. Conduct dry weather bacterial source identification assessments at the three other Primary Monitoring Sites in the Lambert Creek Watershed (Whitaker, Goose, and Kohler), using specific approaches for each drainage.

2. After dry weather monitoring has been completed at all five Primary Monitoring Sites in the Lambert Creek Watershed (see Figure 1-1), develop and implement a plan for identifying sources of *E. coli* during wet weather conditions. These assessments should be conducted using the Phased, Tiered, and Adaptive Approach described in Chapter 3 along with drainage-specific results obtained from dry weather assessments.

8.0 LITERATURE CITED

Southern California Coastal Water Research Project (SCCWRP). (2013). *The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches*.

Wenck. (2013). *Vadnais Lake Area WMO Total Maximum Daily Load (TMDL) and Protection Study*. Prepared by Wenck Associates, Inc. for Vadnais Lake Area Water Management Organization (VLAWMO).

APPENDIX A - PHOTOGRAPHIC SUMMARY OF SITE RECONNAISANCE

Lambert Creek Bacterial Source Identification Study

Photographic Summary of Site Reconnaissance

VLAWMO

May 2014

Lambert Creek Bacterial Source Identification Study

Photographic Summary of Site Reconnaissance

prepared for

VLAWMO
Vadnais Heights, MN

May 2014

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

Lambert Creek Source Identification Study

Photographic Summary of Site Reconnaissance

The primary objective of the Lambert Creek Bacterial Source Identification Study (Project) is to identify the sources of fecal indicator bacteria (*Escherichia coli*) in the receiving waters of the Lambert Creek Watershed. One of the first steps in that process is to conduct a site reconnaissance of the watershed to better understand the potential sources of bacteria as well as the transport mechanisms that may deliver the bacteria to the receiving waters. This document is a photographic summary of the site reconnaissance of Lambert Creek that was conducted by staff from the Vadnais Lake Area Water Management Organization (VLAWMO) and staff from Burns & McDonnell Engineering Company (Burns & McDonnell) on May 15 and 16, 2014. The results of the reconnaissance will be incorporated into a Monitoring Plan for the Project that will serve as a resource for identifying the sources and transport mechanisms of bacteria in the watershed that will eventually be used to identify best management practices (BMPs) to reduce bacterial loads in Lambert Creek. The purpose of this document is to summarize the basic site characteristics identified in the reconnaissance.

Historically, bacterial monitoring in the Lambert Creek Watershed has been conducted at five sites distributed throughout the watershed. The watershed boundary and monitoring sites are shown on Figure 1. The Site Reconnaissance focused on documenting the basic characteristics of each of the drainages within the watershed that might contribute bacteria to each of the five monitoring sites:

1. Whitaker
2. Goose Lake
3. Oakmede
4. County Road F
5. Kohler

A brief summary of the basic characteristics of each drainage is provided below along with representative photographs from the Site Reconnaissance. Drainage maps that identify potential bacterial sources for each Monitoring Site will also be prepared and incorporated into the Monitoring Plan.

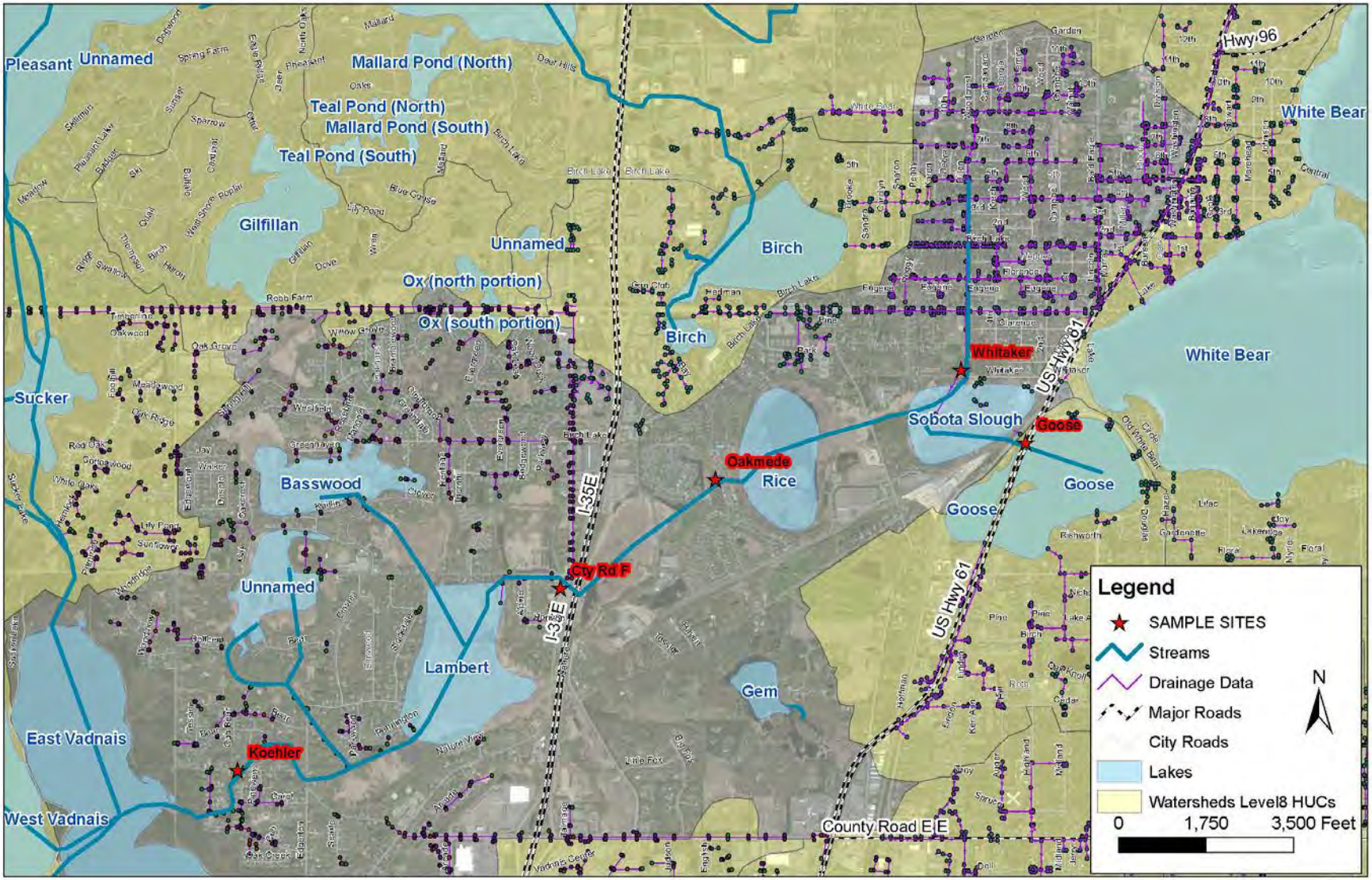


Figure 1. Map of the Lambert Creek Watershed showing the five Monitoring Sites assessed in the Site Reconnaissance conducted on May 15 and 16, 2014

Whitaker

Description: Potential dry weather bacterial sources in the Whitaker drainage include parks and grassy areas in the upper drainge and regrowth within the storm drain infrastructure. BMPs at the Central Middle School appear to be preventing dry weather flows from entering the storm drain. Storm drains in the upper drainge were dry above Fourth Street and east of Krech Street. Storm drain was flowing downstream of this location and groundwater infiltration is the suspected source. Groundwater infiltration was observed at the outfall (see photo below).

Central Middle School seasonal wetland near top of drainage

Central Middle School Infiltration BMP showing curb cut

Park inlet in upper watershed Park off Thury Court

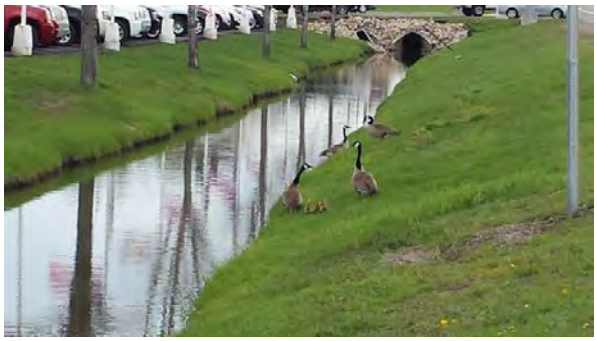
Stream gauging access in lower watershed in Columba Park

Groundwater infiltration into storm drain at Whitaker Monitoring Site outfall

Whitaker Monitoring Site, showing weir and forebays

Goose

Description: Potential bacterial sources in the Goose drainage include dry weather flows from two outfalls that convey water from East to West Goose Lake, a warm water discharge at the southern end of West Goose Lake, a canal that flows into East Goose Lake with grassy slopes and goose fecal matter, and resident waterfowl just upstream of the Monitoring Site. The east side of West Goose Lake had no outfalls and some BMPs in place near the boat manufacturing facilities. The golf course does not discharge to the Goose Monitoring Site.



Channel draining to East Goose Lake near Polar car dealership, potential bird FIB source

Southern Inlet from East Goose to West Goose Lake, just downstream from channel at left

Permitted warm water outfall discharging to southern end of West Goose Lake

Northern inlet to West Goose Lake from East Goose Lake

Ducks near Goose Monitoring Site

Goose Monitoring Site, weir, and gauging station

Oakmede

Description: Potential dry weather bacterial sources at the Oakmede Monitoirng Site appear to be limited to the flows from Rice Lake (just upstream of the Oakmede Monitoirng Site), a very small urban drainage along Oakmede Lane, north and south of the Monitoring Site (approximately 700 feet of roadway on either side), and resident waterfowl (*e.g.*, herons, egrets, and ducks, which were observed during the reconnaissance). Recent restoration efforts should be monitored for effectiveness in reducing bacterial concentrations.

Wetland upstream of Oakmede Monitoring Site

Dry storm drain south of Monitoring Site along Oakmede Lane

Lift Station near outfall north of Monitoring Site off Bibeau Road

Storm drain inlet adjacent to lift station, drains to wetland, not directly to Monitoring Site

Flow from wetland just upstream of Oakmede Monitoring Site

Oakmede Monitoring Site showing weir, gauging station, and recent restoration

County Road F

Description: Potential dry weather bacterial sources at the County Road F drainage include three outfalls that discharge just upstream of the Monitoirng Site: one that drains Centerville Road to the north, one that drains a very small area of Centerville Road to the south, and the main flow that comes from the east side of I-35E downstream of a wetland. The south side of Centerville Road was dry at the time of the reconnaissance. Small flows were observed from the Centerville Road north of the outfall and were found to originate from a detention pond at the top of the drainage across from Pondview Court.

Detention pond north of County Road F Monitoring Site – source of dry weather flows

Dry outfall just south of County Road F Monitoring Site

Flow from wetland east of I-35E, upstream of Monitoring Site

Confluence of streams from north (left outfall) and east (right outfall) of Monitoring Site

County Road F Monitoring Site (foreground) downstream of confluence

County Road F Monitoring Site and gauging station

Koehler

Description: The Kochler drainage is the most complex of the drainages within the Lambret Creek Watershed and there are seveal potential dry weather bacterial sources, including agricultural sources, urban runoff and regrwoth within storm drain infrastrucure, parks and grassy fields, triburaties, abundant avian and mamalian wildlife, open compost piles along the streambank, overflow from stormwater detention ponds, seasonal marshy areas and bogs, and potential leakage from sewage infrastructure.

Agricultural field at top of the Koehler drainage area

Energy dissipation BMP at the top of the Koehler drainage area

Marshy area behind ball field in park at Bear Avenue North

Grass clippings and debris on streambank adjacent to pond off Pennington Place

Outfall of tributary to mainstem Lambert Creek off Parkwood Circle

Koehler Monitoring Site and stream gauge station

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APPENDIX B - VISUAL OBSERVATION FORMS

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Josh Lekson Other Team Members: Brian Corcoran
Date: Time: 9:45 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		[redacted]-Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	(Partly Cloudy)	Overcast	< 72 hours	(> 72 hours)
Comments: Windy			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description	N/A	N/A	N/A

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				Goose Poop

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge .6 5.39 CFS	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No		NO	Oak 2		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: bmc Other Team Members: JL

Date: 10-22-14 Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak-P	Blume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			grey .27 .97 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 105		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 10/16/14 Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge .21 1.04 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 103		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: fmc
Other Team Members: JL
Date: 10/8
Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		OaK P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.34 x .65 2.22 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 101		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: DMC
Other Team Members: JC
Date: 9-29-14
Time: 9:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			2 gauge 1.28 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 9/29		

Provide additional comments on back of form.

Mark 17

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Date: 9-29-14
Other Team Members: JL
Time: 9:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		OakC	weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	(Overcast)	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.04 gauge 1.28 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			OaK98		

Provide additional comments on back of form.
MOaK18

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Josh L Other Team Members: _____

Date: 9-29-14 Time: 10:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		OakP	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.27 gauge 1.54 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			OakP6		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: _____ Other Team Members: _____

Date: _____ Time: 7:45 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.38 rating 2.64 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 91		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: _____ Other Team Members: _____

Date: _____ Time: 9:00am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak C	
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 Blue heron			

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.38 gauge 2.64 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 92		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JC
Date: 9-9-14 Time: 8am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	~~Yes~~ No			

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.38 gauge 2.64 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 07		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: fmc
Date: 9.9.14
Other Team Members: JL
Time: 8 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak C	~~Bone~~ Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	Egret			

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.30 gpm 2.64 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 88		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Brian Corcoran
Other Team Members: SL
Date: 9-8-14
Time: 9:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	(Overcast)	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.4 gauge 2.86 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 83		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JC
Date: 9-8-14
Time: 7:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			4 gauge 2.86 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 84		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date: 9-3-14
Time: 8:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.5 4.1 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak81		

Provide additional comments on back of form.

MOak3

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date:
Time: 9:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		OakC	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number			Raccoon poop	

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.5 4.1 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			OakBZ		

Provide additional comments on back of form.

MOak4

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL
Date: 8/28 Time: 9:30am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.25 gauge 1.37 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 77		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL
Date: 8/27 Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede	~~Oakmede~~	~~Oakmede~~ Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			2.6 1.46 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 75		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bruce
Date: 8-4-14
Other Team Members:
Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	(Overcast)	< 72 hours	(> 72 hours)
Comments:			Comments: Little misty on sample day	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			2 gauge 0.97 cfs	unknown
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 69		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 8-4-14 Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	(Overcast)	< 72 hours	(> 72 hours)
Comments:			Comments: Little misty on sample day	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			2 gauge 0.97 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 70		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-31-14 Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak P	flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.27 gauge 1.54 cfs	water
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak G3		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members:
Date: 7-31-14 Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	6 ducks below Weir 4 Geese on bank	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			1.54 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 64		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Eric
Other Team Members: JL
Date: 7-30-14
Time: 9:30am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	Plume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			28 gage 1.63 cfs	overland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 57		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: DMC
Other Team Members: JL
Date: 9.30
Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.28 gage 1.63 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 58		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bruce Other Team Members: JL

Date: 7-29-14 Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak-P	Plume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.3 gauge 1.82 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak-S1		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-29-14 Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak-C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			3 gauge 1.82 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 52		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bure
Other Team Members:
Date: 7-28-14
Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak P	Plum
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	(Overcast)	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.31 1.92cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 45		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-28-14
Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.31 1.92cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 46		Some goose poo below weir

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-24-14
Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Very nice day			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.37 gauge 2.52 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 39		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-24-14
Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak-C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Nice			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NH	NH	NH	NH

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.37 gauge 2.52 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 40		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: bmc
Other Team Members:
Date: 7-23-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.42 gauge 3.08 CFS	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 37		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-23-14 Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		OakC	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 duck Mallard	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.42 sample 3.08 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 38		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-22-14 Time: 9:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak P	~~Wet~~ Pond
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.4H gauge 3.32 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak 27		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-22-14 Time: 9:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 adult Duck 5 ducklings	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			44 gauge 3.32 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 28		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: JL Other Team Members: BC
Date: 7-21-14 Time: 9:30 a.m.

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	2 ducks	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			FG gauge 3.56 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Oak 21		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: JL
Other Team Members: BC
Date: 7-25-19
Time: 9:30 a.m.

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak P	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	(Partly Cloudy)	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			46 gauge 3.56 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Oak #20		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: bmc Other Team Members: _____

Date: 7-17-14 Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak-P	[redacted] Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	(Partly Cloudy)	Overcast	< 72 hours	(> 72 hours)
Comments: Nice day			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	[redacted] NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			gauge 51 4.18 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No		(No)	Oak-13		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-17-14 Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak C	weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	(Partly Cloudy)	Overcast	< 72 hours	(> 72 hours)
Comments: Nice			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description	~		~

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 duck above weir	NA	NA	Bird Poop on weir wall

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			gauge .51 4 18cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No		(NO)	Oak-14		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-17-14 Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak-C	weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	(Partly Cloudy)	Overcast	< 72 hours	(> 72 hours)
Comments: Nice			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 duck above weir	NA	NA	bird poop on weir wall

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			gauge .57 4.18 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No		(NO)	Oak-15		Duplicate sample for Lab

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date: 7-16-14
Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		Oak - C	Weir
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Perfect			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge .55 4.71 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		NO	Oak 8		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date: 7-16-14
Time: 9:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
(Oakmede)		Oak-1	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments: Perfect			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			gauge .55 4.71 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No		(NO)	Oak-7		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Brian Corcoran Other Team Members: Josh L.
Date: 7-15-14 Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		[redacted]-OakF	Flume
County Road F			
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Windy			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description	NA	NA	NA

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge 6 5.39 CFS	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No	NO		OAK1		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Josh L. Other Team Members: Brian C.

Date: 7/15/14 Time: 10:30 a.m.

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		CRF #4	Storm Sewer Outlet
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Windy			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description	N/A	N/A	N/A

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded (Stagnant water)				Storm Sewer
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		NO	CRF-5		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: SL
Date: 10-22-14
Time: 10:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)		Crf P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	(Partly Cloudy)	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			gauge .20 .65 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Crf 106		Film on top of water along bank

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: AMC Other Team Members: _____

Date: 10-16-14 Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C/F P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge : 2 .69 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C/F 104		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 10-8 Time: 10:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.34 gauge 1.49 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 102		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Date: 9-29-14
Other Team Members: JL
Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Cof P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments: Water flowing from storm sewer City cleaning Fire hydrants	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			~2 cfs gauge	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Cof 100		

Provide additional comments on back of form.

MCf 20

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: bmc
Date:

Other Team Members: JL
Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C/f D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			3 3 7.81 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C/f 99		

Provide additional comments on back of form.
MCrf 19

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Josh L Other Team Members: _____
Date: 9-24-14 Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.26 gauge 98 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf95		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: _____ Other Team Members: _____

Date: _____ Time: 8:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf 0	
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.38 gauge 1.78 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 93		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: _____ Other Team Members: _____

Date: _____ Time: 8:30 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C of P	
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			38 gauge 1.78 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C of 94		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: fmc
Other Team Members: DL
Date: 9/9/14
Time: 8:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C of D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	3 geese			

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			1.56 cfs gauge	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C1F89		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: bmc
Other Team Members: JL
Date: 9-9-14
Time: 8:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf P	Plume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			1.56 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 90		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JC
Date: 9-8-14
Time: 9:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.38 cms 1.78 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 85		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: RMC
Other Team Members: JL
Date: 9-8-14
Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Conf P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.38 pump 1.78 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Cif 86		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL
Date: 9-3-14 Time: 8:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)	~~Crf79~~	CrfP	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	(Overcast)	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.46 2.4 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Crf 79		

Provide additional comments on back of form.

MCrf1

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Date: 9-3-14
Other Team Members: JL
Time: 8:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)		CrfD	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	(Overcast)	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.96 2.4 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			CrfBO		

Provide additional comments on back of form.
MCrf2

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bmc
Other Team Members: JL
Date: 8/28
Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F	[redacted]	Clf P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	Pile of poop on Flume

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			0.2-1 gpm 0.87 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Clf 78		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JC

Date: 8/27 Time: 10:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)		CrF P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			2.6 0.98 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			CrF76		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 8-4-14 Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Cif D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			16 gpm 0.46 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Cif 71		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Marc Other Team Members: _____

Date: 8-4-14 Time: 10:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C of P	Flare
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.16 gauge 0.46 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C of 72		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: fymc
Date: 8-4-14
Other Team Members:
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Cof A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stagnant	
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Cof 73		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 8-4-14 Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C of B	35E Bmc
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			16 gauge 0.46cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C of 74		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: bmc
Other Team Members:
Date: 7-31-14
Time: 9:45 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C1f D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	8 ducks above weir	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.25 gauge 0.93 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C1f 65		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Date: 7-31-14
Other Team Members:
Time: 10 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		CrF-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.25 gage 0.93 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			CrFG6		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-31-14
Time: 10 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stagnant	
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 67		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-31-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf B	35E 1/2
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.25 gage 0.93 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 68		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL
Date: 7-30-14 Time: 9:45 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)		C1f D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.29 1.17 cfs	culvert
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			C1f-59		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-30 Time: 10am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C/f P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.29 gage 1.17 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C/f 60		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date: 7-30-14
Time: 10am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C of A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.01	very slowly moving
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C of G1		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JC
Date: 7-30-14 Time: 10am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf 13	35E pipe
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.29 gauge 1.17 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 62		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Brian Other Team Members: JL
Date: 7-29-14 Time: 10:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf D	weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.29 cumecs 1.17 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 53		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JC
Date: 7-29-14 Time: 10:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C1f-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.29 avg 1.17 cfs	within
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C1f-54		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Brian Other Team Members: JL

Date: 7-29-14 Time: 10:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stagnant	
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-55		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Dmc
Other Team Members: SL
Date: 7-29-14
Time: 10:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-B	35E Pipe
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			29 gage 1.17 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-56		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-28-14 Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.38 1.29cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 47		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-28-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Cf-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	Pile of Poop on flume

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.31 gpm 1.29 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Cf 48		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-28-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stagnant	
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-49		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bure
Other Team Members: _____
Date: 7-28-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf B	35E Hyc
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.31 gauge 1.29 cfs	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 50		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-24-14
Time: 9:45 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		CrF-D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.37 1.39 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			CrF-41		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-24-14 Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.78 gauge 1.29 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-42		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-24-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-1A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stagnant	
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-43		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-24-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-B	35E pipe/wetland
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			3 V 1.29 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-44		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Date: 7-23
Other Team Members:
Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.31 gauge 1.29 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 33		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members:
Date: 7-23-14
Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Cuf-4	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stagnant	Storm Sewer
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Cuf-34		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Date: 7-23-14
Other Team Members:
Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf B	35E pipe
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.31 gauge 1.29 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 35		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Date: 7-23-14
Other Team Members:
Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 blue heron	1 deer on path	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.31 gauge 1.29 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 36		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-22-14 Time: 9:30am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-D	Wetland
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 duck	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.34 gauge 1.49 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-29		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date: 7-22-14
Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C1f-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.34 gauge 1.49 cfs	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C1f-30		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date: 7-22-14
Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stag	
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 31		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL
Date: 7-22-14 Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-B	35E - wetland
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.34 gauge 1.49 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-32		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Blue | Other Team Members: JL
Date: 7-21-14 | Time: 9:45

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-D	weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Warm			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description	–	~	~

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	1 duck	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			39 gauge 1.85 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf 23 [illegible]3		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bmc
Other Team Members: JL
Date: 7-21-14
Time: 10:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		C.1f - A	Storm Sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stag	Storm drain
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			C.1f - 25		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-21-14 Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-B	Wetland
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.39 gauge 1.85 cfs	Wetland / 35E Pipe
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No			Crf-26		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Brent Other Team Members: JL
Date: 7-21-14 Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)		Crf-1	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	(Partly Cloudy)	Overcast	< 72 hours	(> 72 hours)
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (e.g., port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	N/A	N/A	N/A	N/A

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			.39 gauge 1.85 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No			Crf-24		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-17-14 Time: 10:00am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-0	weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge .42 2.07 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		No	Crf-16		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bruce Other Team Members: _____

Date: 7-17-14 Time: 10:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge .42 2.07 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		No	Crf-17		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-17-14 Time: 10:15

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-A	Storm sewer
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded			Stagnant	Storm drain
Flowing				
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		No	Crf-18		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: _____

Date: 7-17-19 Time: 9:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-B	West of Hwy 35 Pipe
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments:			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge .40 207 cfs	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		NO	Crf-19		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Bmc
Other Team Members: JL
Date: 7-16-14
Time: 9:45 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Perfect			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	Ducks (6) in front of weir	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge .43 2.15 CFS	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		No	Crf-9		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-16-14 Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)		Crf-A	
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(≥ 72 hours)
Comments: Perfect			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description	~		~

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
(Ponded)				Stagnant / storm drain
(Flowing)			~~[illegible]~~	
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No		(No)	Crf-11		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-16-14 Time: 10:00

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		Crf-B	
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Perfect			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			gauge 2.15 CFS .43	Wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No		NO	Crf-12		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC
Other Team Members: JL
Date: 7-16-14
Time: 10:00 am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
(County Road F)		Crf-P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
(Sunny)	Partly Cloudy	Overcast	< 72 hours	(> 72 hours)
Comments: perfect			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	NA	NA	NA	NA

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
(Flowing)			gauge .43 2.15 CFS	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
(Yes)	No		(No)	Crf-10		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: BMC Other Team Members: JL

Date: 7-15-14 Time: 10 30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		CrF-B	lowest end of pipe under road
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Windy			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			guage: 45 (2.31 CFS)	From wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No	No		CrF-6		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Brian Corcoran Other Team Members: JL

Date: 7-15-14 Time: 10:30

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede		~~Crf F~~	~~Flume~~
County Road F		Crf P	Flume
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Windy			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description			

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number				

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.45 cfs	Wetland (2.31 CFS)
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No	No		Crf-4		

Provide additional comments on back of form.

Lambert Creek Bacterial Source Identification Study
Visual Observation Form

FIELD TEAM:

Name of Observer: Brian Corcoran Other Team Members: Josh L.

Date: 7-15-14 Time: 10am

SITE LOCATION:

Sub-Drainage (circle one)	Sub-Drainage	Site ID	Site Description
Whitaker			
Goose			
Oakmede			
County Road F		CRF-D	Weir
Koehler			

WEATHER CONDITIONS:

Cloud Cover (circle one)			Time Since Last Precipitation (circle one)	
Sunny	Partly Cloudy	Overcast	< 72 hours	> 72 hours
Comments: Windy			Comments:	

POTENTIAL BACTERIAL SOURCES FROM HUMAN ORIGIN:

	Homeless Population	Evidence of Sewage Leaks	Other (*e.g.*, port o potties, leaking public restrooms, etc.)
Description	~	~	~

POTENTIAL BACTERIAL SOURCES FROM NON-HUMAN ORIGIN:

	Birds	Deer	Rodent	Other
Description / Number	2 on fence	~	~	~

EVIDENCE OF FLOW:

Condition (circle one)	Size	Depth	Flow Estimate	Source of Water
Ponded				
Flowing			.45 (2.31 CFS)	wetland
Previously Flowing				

SAMPLES AND PHOTOGRAPHS:

Sample Taken (circle one)		Photo Taken (circle one)		Sample ID	Photo ID	Comments
Yes	No	NO		Crf 3		

Provide additional comments on back of form.

APPENDIX C - STANDARD OPERATING PROCEDURES FOR THE COLLECTION, STORAGE, AND TRANSPORT OF SAMPLES FOR MOLECUALR ANALYSIS

1.0 SCOPE

Field methods for the proper collection, preservation, and storage of samples for molecular analysis are described. Methods are consistent with **Standard Methods 9060**, "Collection and Preservation of Samples", the **NPDES Storm Water Sampling Guidance Manual (EPA, 1993)**.

2.0 HEALTH & SAFETY

2.1 Clothing

All participating personnel wear disposable gloves, close-toed shoes and any required safety gear for laboratory work and field sampling. Goggles and face masks are worn when appropriate or required. Gloves are changed as per the protocol to follow, and after any spills or possible contamination.

2.2 Practices

During procedures involving bleach, wear lab coats, protective glasses, and gloves. Change gloves after bleach application, taking care to not leave bleach on surfaces that others may contact with bare skin (e.g, phone, door knobs, etc.).

2.3 Personnel

Only properly trained technicians will perform the procedures described herein.

2.4 Equipment, Materials, and Conditions

All personnel are responsible to know how to safely utilize/handle all pertinent equipment and materials. DNA Away and dilute bleach solutions can irritate eyes, skin, and mucous membranes. See MSDS for more information.

At no time will the sample collector risk personal health or safety in an attempt to collect a sample. When taking surface samples from a boat, or any samples from a stream, a pole from a fixed platform or bridge is used whenever possible. Stream banks and channel slopes are avoided. All personnel are aware of the potential dangers and proper use/handling of all equipment and materials.

3.0 EQUIPMENT AND SUPPLIES

3.1 Equipment

If applicable:

sampling pole
boat or kayak

3.2 Supplies

- 250 mL sterile, nuclease-free sample bottles (Thermo N_411-0250 HDPE sterile, nuclease free or equivalent)
- re-sealable plastic bags, small and large
- disposable laboratory gloves
- cooler or other insulated container*
- blue ice*
- nuclease-free water
- DNA-Away® (Cat#7010 Molecular Bio Products or equivlaent)
- Kimwipes (large)
- water-proof, felt-tip markers
- garbage bags for discard
- Hand sanitizer
- 70% Ethanol
- 10% Bleach
- Hand sanitizer
- Sterile PBS for field blanks

*pre-cleaned with DNA-away® or 10% bleach

4.0 PROCEDURES

4.1 Laboratory Sample Bottle and Cooler Preparation

The following preparation step is to be performed by trained staff. A minimum of 24 hours notice for sample-bottle requests is required.

4.1.1 Prepare blue ice

- Spray blue ice with 10% bleach/ 70% ethanol rinse. Place blue ice in a clean garbage bag(s) and freeze.

4.1.2 Prepare coolers

Two coolers are used: one to carry fresh supplies and one containing blue ice to transport samples to the laboratory.

- Spray the interior of the coolers and the exterior lip used to open/close the cooler with 10% bleach. Allow to sit for 15 minutes. Spray with 70% ethanol and wipe with Kimwipes to remove residual bleach.
- Spray writing markers with DNA-Away/ 70% ethanol rinse and place in resealable plastic bag
- Load supply cooler with the following:
    - bottles (needed plus a couple of extra)
    - gloves of needed sizes (put in resealable plastic bags to save space)
    - bag of cleaned writing instruments
    - kimwipe box (large size)
    - bag(s) with PCR blank water
    - package of plastic bags of needed sizes
    - garbage bag(s) for waste
- Load transport cooler with blue ice. Remove blue ice from the freezer and place in a second new garbage bag (in case freezer was dirty).

4.1.3 Prepare sample bottles

- Spray laboratory surface with 10% bleach and allow to sit for 15 minutes. Change gloves. Spray bench top with 70% ethanol and wipe with Kimwipes to remove residual bleach (if hood surface is metal, rinse surface with sterile DI prior to ethanol to avoid corrosion).
- For ease of use in the field, remove and discard the plastic seal encasing the sampling bottle. If possible, bottles should be pre-labeled to ease field manipulation. Place bottle in a resealable plastic bag.
- Place field blank bottle (nuclease-free water) in a re-sealable plastic bag.

4.2 Field Sample Collection and Handling

4.2.1 Preparation and General Information

- Tie discard bag onto handle of cooler with blue ice.
- Clean hands with hand sanitizer.
- Allow hands to dry and put on clean disposable gloves. Try to avoid touching fingers of gloves with bare hands, try to handle glove collar.

  o It is important to **avoid contamination of sample from human skin cells**. Do not touch skin with clean gloves (for example, wipe face with sleeve - not glove). In general, try to keep gloves clean prior to sampling.

  o For certain field situations (e.g., kayak sampling), it may be difficult to change gloves between sites. In such cases, wear multiple gloves discarding outer glove set between sample sites.
- Use water-proof permanent markers. Ensure that bottles are labeled with sample identification according to Chain of Custody (COC), date, and time of collection. Outer plastic bags can be labeled if it helps with organization in the field. Double check sample collection against sample plan/COC. Ensure that field blank is on the COC.
- All information pertinent to the sampling is recorded on field log-in sheets and chain of custody forms. Unique sample identifiers should be used (e.g., Event#-site or date-site instead of listing only the site).
- Information needed includes name of sample event; sample identifier, date and time of sampling for each sample, sample matrix (e.g., fresh or salt water), storage conditions (e.g., "sterile plastic bottles"), transport conditions (e.g., "on ice"), preservation conditions if applicable (note: sodium thiosulfate should NOT be used in molecular samples). Information to note includes purpose of sampling; location of sampling points (e.g., GPS coordinates); name and address of field contact. Important field observations include type and number of animals, fecal deposits, diapers, decaying plant material, trash, etc. Other information may include suspected sample composition, including concentrations; number and volume of samples taken; description of sampling point; sampling method; producer of material being sampled and address, if different from location.

4.2.2 Sample collection, by hand

- Upon reaching the sampling location, remove bottle from plastic bag; ensure that bag does not blow away.

- Carefully open sampling container, keeping lid face-down to avoid airborne contamination.
- Use one hand for sampling, keeping the other hand clean and holding the cap face down. Fill bottle, keeping opening away from body. Collect on incoming wave or incoming stream flow.
- Quickly recap using the clean hand, ensuring that cap is sealed tightly.
- In the case of field duplicate collection or if bacteria and PCR samples are being sampled simultaneously, give caps to a partner to hold. If no partner is available, set caps on a clean area face-up. This poses some risk of air contamination, so work quickly. In addition, take extra care to not touch the inside surface of the lid or bottle during capping.
- Shake or dry excess water with kimwipe. Return sample bottle to resealable plastic bag. It helps to have a partner for this step, particularly if replicates are being collected.
- Place sample in cooler. If replicate samples are taken from a site, place in a large plastic bag for organization.
- Discard gloves.
- It is important to **avoid site cross-contamination**. Sanitize hands and wear fresh gloves prior to handling sample bottle(s) for the next site.
- Collect field blanks on site according to dictate of sample plan/Chain of Custody. Technique is similar to that used for collecting a fresh field sample except that the provided molecular-grade water is poured into the sample container.

4.2.3 Sample collection, by pole

Use two trained technicians, if possible; one responsible for cleaning and holding pole.

- Wearing new gloves, spray pole with DNA Away or 10% bleach. Spray pole with 70% ethanol to rinse residual chemical. Allow pole to dry or wipe with kimwipe. If pole gets contaminated (e.g., if it is set down), repeat decontamination procedure. Use fresh gloves and repeat decontamination prior to sampling a new site.
- Remove bottle from plastic bag, place bottle in the support clip, and close the clip. Remove cap of the bottle, holding it face down (easiest to hand cap to partner).
- Use plunge technique to take sample. Submerge the bottle below the water surface by plunging it open-end down (set hinge to allow this). Upon reaching desired depth,

pole is scooped so that hinge turns bottle face-up and the bottle is allowed to fill. Samples are kept free from uncharacteristic floating debris.

- Cap bottle tightly and unclip.
- Place bottle in plastic bag, and place in cooler, as described for samples collected by hand.
- A field blank is performed using the same procedure as the collection of samples at the end of each set of samples using nuclease free water. Technicians should be facing the wind when performing the field blank.
- Use fresh gloves and repeat decontamination prior to sampling a new site.

4.3 Sample Storage

- All samples are kept on gel ice packs or refrigerated from the time of sample collection until delivery to the analytical laboratory.
- Exposure to direct sunlight is avoided as much as possible, as ultra-violet rays are detrimental to bacterial DNA, resulting in unreliable analytical results. Samples are therefore covered or placed in an ice chest with a closed lid immediately following collection.
- Samples are stored away from all food, reagents, and other potentially contaminating sources.

4.4 Sample Delivery/Chain of Custody

- All samples are delivered to the analytical laboratory, and analysis is begun as quickly as possible, and always within the maximum holding time of twenty-four hours (8 hours for enterococci analysis).
- All samples are kept covered and on ice during transport.
- Chain-of-custody (COC) forms are filled out by the sampling team for all samples submitted to the analytical laboratory. COCs will include the sample identification, location, date and time of sampling, sample preservative type (if any), sample type, sampler's name and signature, and any comments regarding the sample. Separate chains of custody should be filled out for samples for molecular analysis and for traditional bacteria sampling.
- Upon delivery to the laboratory, the laboratory supervisor or properly trained technician verifies that the time of sample collection is noted, and the samples are stored at the appropriate temperature until analysis is begun. At this point the laboratory has become responsible for the sample custody.

5.0 QUALITY CONTROL/ASSURANCE

- All participating personnel are fully trained in the aseptic technique of sample collection as well as the use of any specialized sampling equipment.
- Precautions are taken to avoid exposing samples to human, atmospheric, and other potential sources of contamination.
- Samples are collected upstream and upwind of sampling personnel to minimize introduction of contaminants.
- Disposable gloves are worn at all times when handling sample containers and sampling equipment. If gloved hands contact any surface that is suspected of being a contamination risk, the glove should be removed and replaced with a fresh, clean one.
- No material other than the sample water ever contacts the inner surface of a sample container, lid, or sampling tube. If any contact occurs, a new, sterile container is properly labeled and used and the old container discarded.
- No eating, drinking, or smoking is allowed while samples are being taken.

6.0 REFERENCE DOCUMENTS

Standard Methods for the Examination of Water and Wastewater 1060, "Collection and Preservation of Samples," 19th Ed., 1995.

US EPA Office of Water, 1993. NPDES Storm Water Sampling Guidance Manual, C.K. Smoley, 122 pp.

APPENDIX D - LABORATORY PROTOCOLS FOR SAMPLES FOR MOLECULAR ANALYIS

1.0 SCOPE

This method describes general procedures for filtering samples for molecular analysis.

2.0 HEALTH AND SAFETY

2.1 Personnel

Only properly trained technicians will perform the procedures described herein.

2.2 Clothing

All participating personnel must wear disposable gloves, close-toed shoes and any required safety gear for molecular biology laboratory work. Goggles and face masks are worn when appropriate or required. Gloves are changed as per the protocol to follow, after any spills and when any possible contamination is suspected.

2.3 Practices

- During procedures involving bleach, wear lab coats, protective glasses, and gloves. Change gloves after bleach application, taking care to not leave bleach on surfaces that others may contact with bare skin (ex., phone, door knobs, etc.). Remove residual bleach with an ethanol or DI water rinse.
- Mouth pipetting is prohibited.
- Change gloves regularly to avoid sample contamination.
- Remove gloves before handling door knobs, phones, etc.
- Bleach is caustic. Wear appropriate personal protection.
- Flammable liquids are to be in kept in glass, not plastic.
- Maintain adequate distance between open flame and ethanol.
- When holding flaming forceps, keep hand above the forceps to avoid flaming ethanol dripping onto hand.
- Keep the forceps fairly still until flame has burned out. In particular, do not move flaming forceps over ethanol container. If a drop of flaming ethanol drops into the container, it will ignite.

2.4 Equipment and Materials

- All personnel are responsible to know how to safely utilize/handle all pertinent equipment and materials. Some reagents are potentially harmful. DNA Away and dilute bleach solutions can irritate eyes, skin, and mucous membranes. See MSDS for more information. Copies of Material Safety Data Sheets are available in the Molecular lab, and from the safety officer.

2.5 Waste and Sterilization

- Wipe surfaces where filtration, DNA extraction, or PCR reaction set up will occur with 10% bleach (10% solution of household bleach which is 5-6% sodium hypoclorite) or DNA Away (MBP Inc.). Let stand for 15 minutes. Use UV light if available (15 minutes). Change gloves. Rinse metal and surfaces that will contact skin or clothing with sterile DI water after bleaching to remove residual bleach. Spray surfaces with 70% ethanol. Bleach is not appropriate for all equipment due to corrosion. Check manufacturers recommendations if unsure. Change gloves after decontamination.
- Biological waste is to be autoclaved and discarded in appropriate autoclave bags according to standard microbiological procedures and local and state rules. Samples, reference materials, and equipment known or suspected to have viable bacteria attached or contained will be sterilized prior to disposal.
- All sharps and glass are disposed of in designated sharps disposal containers.

3.0 Supplies

- Sterile, disposable membrane filtration units consisting of 100 mL capacity funnel filter base with 47 mm diameter membrane filters (e.g., Pall MicroFunnels™ funnels Supor® Membrane (0.22 µM), part number 4806 or equivalent). Polycarbonate filters (0.45 µm) can also be used.
- Replacement filters to fit funnel, if replicate samples are being processed.
- GenRite DNA Extraction Kit Pre-loaded bead tubes Part # S205-080

4.0 SAMPLE FILTRATION

4.1 Treat work surfaces with 10% bleach solution for 15 min, rinse by spraying with 70% ethanol to remove residual bleach (if surface will corrode, rinse with sterile water prior to ethanol treatment).

4.2 Prior to filtering, label GeneRite DNA EZ kit extraction tubes (containing glass beads) for each sample on the top and side and place the tubes in a cleaned (bleached or DNA AWAY) and dried rack, leaving space between tubes in order to minimize the risk of cross contamination between samples. Alteratively, 1.7 mL centrifuge tubes (sterile, nuclease free) can be used, but extraction tubes are preferable.

4.3 OPTIONAL: If filters are to be stored (frozen) in lysis buffer, label one bead tube containing glass beads from the GeneRite DNA EZ kit for each sample, referred to as an extraction tube, on the top and side and add 500 µL of lysis buffer (with salmon sperm DNA at a concentration of 0.2 µg/mL, optional depending upon analysis to be performed). Place the extraction tubes in a cleaned (bleached or DNA AWAY treated) and dried rack.

4.4 A method blank is filtered Phosphate Buffered Saline, PBS, (100 ml, no rinse) replacing the environmental sample. All other processes are the same as a sample. Create 1 method blank per set of extractions. Typically 6 - 23 samples will be extracted at one time (= 1 set). Decide the number of extraction sets prior to filtration and create the number of method blanks, as needed.

4.5 In an area, separate from the filtration area, unpackage bottles. Check bottles against the Chain of Custody (COC), and organize bottles in order that appears on the COC.

4.6 To ensure cleanliness in the filtration area: Note bottle name. Wipe the bottle with DNA AWAY. Re-label the bottle if needed. Set bottle onto a clean Kimwipe. Repeat, for each bottle using a new Kimwipe for each. Maintain COC order. Wipe gloves with DNA AWAY between dealing with bottles from a new site. Change gloves when done cleaning the bottles. Bottles are now ready for transfer to the filtration area.

4.7 Decontaminate filter manifold with DNA AWAY or 10% Bleach / 70% ethanol rinse (use a DI rinse in between if manifold is metal to avoid corrosion). [Although the manifold does not come in direct contact with the samples, decontamination of the manifold reduces the risk of glove contamination and thus reduces the risk of cross-contamination overall].

4.8 Change gloves to avoid spread of bleach.

4.9 Aseptically remove sterile, disposable filter funnels (Pall Microfunnels containing Supor 0.2µM filter or equivalent) from packaging and place onto the vacuum manifold. Label funnel with sample name.

4.10 Shake water sample well (25 times) and pipet 100mL into the funnel using a sterile pipettor. Leaving the funnel lid in place, turn the vacuum pump on and open the vacuum line. After the sample has flowed through just to dryness, close the vacuum line. NOTE: if the sample is visibly sandy or otherwise adulterated, let the sample settle for approximately 1 minute after shaking to minimize filter clogging.

4.11 Rinse sides of funnel with 20-30 ml of sterile PBS and continue filtration until all liquid has been pulled through. Close the valves on the individual manifolds, and turn off vacuum. Note: same funnel can be used for replicate samples. Replace with new filter.

4.12 Decontaminate two forceps by dipping both sequentially into small beakers of: 1) 10% bleach 2) water, then 3) 95% ethanol. Flame forceps (see safety precautions). [Beakers only need a few mls of liquid, enough to cover the part of the forceps that touches the filter].

4.13 For each filter, remove funnel from the filter base. Leaving the filter on the base, use the forceps to aseptically roll the filter into a cylinder, being careful to only touch the rim of the filter paper that did not contact the sample.

4.14 Insert the rolled filter into the labeled extraction tubes from the GeneRite kit (as prepared in above in step 3.2). Cap tightly. Freeze tubes at -80C. Flash freezing is best; If possbile, dip in liquid nitrogen or a dry ice/ethanol slurry before transfer to -80C – but make sure tubes are capped tightly.

APPENDIX E - LABORATORY RESULTS FOR *E. COLI* ANALYSES

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

8/5/2014

Brian Corcoran - VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14AUG04-07-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on August 04, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

8/5/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

10/1/2014

VLAWMO - Brian Corcoran

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14SEP29-09-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO - Brian Corcoran:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on September 29, 2014.
The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine Roe
Water Quality Specialist II
(651) 266 1628
10/1/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP29-09-001		**Sample ID:**	Oak 97 - Oak P
		Collection Date:	9/29/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	19			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	36	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/29/14 10:50					
Date/Time Out Incubator	9/30/14 12:10					
Total Incubation Time	25.33333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	9/29/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP29-09-002		**Sample ID:**	Oak 98- Oak C
		Collection Date:	9/29/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	19			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	56	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/29/14 10:50					
Date/Time Out Incubator	9/30/14 12:10					
Total Incubation Time	25.33333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	9/29/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP29-09-003		**Sample ID:**	Oak 98 - Oak C duplicate
		Collection Date:	9/29/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	19			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	27	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/29/14 10:50					
Date/Time Out Incubator	9/30/14 12:10					
Total Incubation Time	25.33333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	9/29/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP29-09-004		**Sample ID:**	CrF 99 - CrF D
		Collection Date:	9/29/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	18			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	96	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/29/14 10:50					
Date/Time Out Incubator	9/30/14 12:10					
Total Incubation Time	25.33333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	9/29/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP29-09-005		**Sample ID:**	Crf 100 - CrF P
		Collection Date:	9/29/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	17			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	1120	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/29/14 10:50					
Date/Time Out Incubator	9/30/14 12:10					
Total Incubation Time	25.33333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	9/29/14 10:50					

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

9/29/2014

VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14SEP18-07-3
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on September 24, 2014.
The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine Roe
Water Quality Specialist II
(651) 266 1628

9/25/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP18-07-003		**Sample ID:**	Cr F 95 - Cr F P
		Collection Date:	9/24/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt				Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	91	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/24/14 11:45					
Date/Time Out Incubator	9/25/14 14:15					
Total Incubation Time	26.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/24/14 11:45					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP18-07-004		**Sample ID:**	Oak 96 - Oak P
		Collection Date:	9/24/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt				Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	53	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/24/14 11:45					
Date/Time Out Incubator	9/25/14 14:15					
Total Incubation Time	26.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/24/14 11:45					

Saint Paul Regional Water Services
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1900 Rice Street
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

9/19/2014

VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14SEP18-04-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on September 18, 2014.
The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine Roe
Water Quality Specialist II
(651) 266 1628
9/19/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP18-04-001		**Sample ID:**	Oak 91 - Oak P
		Collection Date:	9/18/2014
		Collection Time:	07:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	17			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	56	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/18/14 9:40					
Date/Time Out Incubator	9/19/14 9:45					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/18/14 9:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP18-04-002		**Sample ID:**	Oak 92- Oak C
		Collection Date:	9/18/2014
		Collection Time:	08:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	49	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/18/14 9:40					
Date/Time Out Incubator	9/19/14 9:45					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/18/14 9:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP18-04-003		**Sample ID:**	Cr F 93 - Cr F D
		Collection Date:	9/18/2014
		Collection Time:	08:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	16			Deg C	SM 2550B-93	
Total Coliforms	1986	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	135	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/18/14 9:40					
Date/Time Out Incubator	9/19/14 9:45					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/18/14 9:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP18-04-004		**Sample ID:**	Cr F 94 - Cr F P
		Collection Date:	9/18/2014
		Collection Time:	08:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	15			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	118	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/18/14 9:40					
Date/Time Out Incubator	9/19/14 9:45					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/18/14 9:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

9/10/2014

VLAWMO - Brian Corcoran

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14SEP09-04-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO - Brian Corcoran:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on September 09, 2014.
The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine Roe
Water Quality Specialist II
(651) 266 1628
9/10/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP09-04-001		**Sample ID:**	Oak 87 - Oak P
		Collection Date:	9/9/2014
		Collection Time:	08:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	26	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/9/14 11:00					
Date/Time Out Incubator	9/10/14 11:08					
Total Incubation Time	24.13333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/9/14 11:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP09-04-002		**Sample ID:**	Oak 88 - Oak P
		Collection Date:	9/9/2014
		Collection Time:	08:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	17	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/9/14 11:00					
Date/Time Out Incubator	9/10/14 11:08					
Total Incubation Time	24.13333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/9/14 11:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP09-04-003		**Sample ID:**	CrF 89 - CrF D
		Collection Date:	9/9/2014
		Collection Time:	08:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	126	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/9/14 11:00					
Date/Time Out Incubator	9/10/14 11:08					
Total Incubation Time	24.13333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/9/14 11:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14SEP09-04-004		**Sample ID:**	CrF 90 - CrF P
		Collection Date:	9/9/2014
		Collection Time:	08:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	71	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/9/14 11:00					
Date/Time Out Incubator	9/10/14 11:08					
Total Incubation Time	24.13333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	9/9/14 11:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

9/10/2014

VLAWMO - Brian Corcoran

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14AUG28-06-2
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO - Brian Corcoran:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on September 03, 2014.
The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine Roe
Water Quality Specialist II
(651) 266 1628

9/4/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG28-06-001		**Sample ID:**	Crf 79 - Crf P
		Collection Date:	9/3/2014
		Collection Time:	08:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	148	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/3/14 13:05					
Date/Time Out Incubator	9/4/14 13:10					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR/TTB					
Analysis Date/Time	9/3/14 13:05					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG28-06-002		**Sample ID:**	Crf 80 - Crf D
		Collection Date:	9/3/2014
		Collection Time:	08:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	157	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/3/14 13:05					
Date/Time Out Incubator	9/4/14 13:10					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR/TTB					
Analysis Date/Time	9/3/14 13:05					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG28-06-003		**Sample ID:**	Oak 81 - Oak P
		Collection Date:	9/3/2014
		Collection Time:	08:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	76	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/3/14 13:05					
Date/Time Out Incubator	9/4/14 13:10					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR/TTB					
Analysis Date/Time	9/3/14 13:05					

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1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG28-06-004		**Sample ID:**	Oak 82 - Oak C
		Collection Date:	9/3/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	26	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	9/3/14 13:05					
Date/Time Out Incubator	9/4/14 13:10					
Total Incubation Time	24.08333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR/TTB					
Analysis Date/Time	9/3/14 13:05					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

10/24/2014

Brian Corcoran - VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14OCT22-03-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on October 22, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

10/24/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT22-03-001		**Sample ID:**	Oak 105 - Oak P
		Collection Date:	10/22/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt				Deg C	SM 2550B-93	
Total Coliforms	1533	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	3	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/22/14 11:30					
Date/Time Out Incubator	10/23/14 12:18					
Total Incubation Time	24.8					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	10/22/14 11:30					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT22-03-002		**Sample ID:**	Oak 105 - Oak P duplicate
		Collection Date:	10/22/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt				Deg C	SM 2550B-93	
Total Coliforms	1733	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	6	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/22/14 11:30					
Date/Time Out Incubator	10/23/14 12:18					
Total Incubation Time	24.8					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	10/22/14 11:30					

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Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT22-03-003		**Sample ID:**	Cr F 106 - Cr F P
		Collection Date:	10/22/2014
		Collection Time:	10:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt				Deg C	SM 2550B-93	
Total Coliforms	1986	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	14	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/22/14 11:30					
Date/Time Out Incubator	10/23/14 12:18					
Total Incubation Time	24.8					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	10/22/14 11:30					

Saint Paul Regional Water Services
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1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

10/20/2014

Brian Corcoran - VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14OCT16-04-2
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on October 16, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

10/20/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT16-04-001		**Sample ID:**	Oak 103 - Oak P
		Collection Date:	10/16/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	14			Deg C	SM 2550B-93	
Total Coliforms	1733	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	8	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/16/14 10:45					
Date/Time Out Incubator	10/17/14 13:20					
Total Incubation Time	26.58333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	10/16/14 10:45					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT16-04-002		**Sample ID:**	Oak 103 - Oak P duplicate
		Collection Date:	10/16/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	14			Deg C	SM 2550B-93	
Total Coliforms	2420	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	4	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/16/14 10:45					
Date/Time Out Incubator	10/17/14 13:20					
Total Incubation Time	26.58333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	10/16/14 10:45					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT16-04-003		**Sample ID:**	Cr F 104 - Cr F P
		Collection Date:	10/16/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	14			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	124	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/16/14 10:45					
Date/Time Out Incubator	10/17/14 13:20					
Total Incubation Time	26.58333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	10/16/14 10:45					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
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Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

10/9/2014

VLAWMO - Brian Corcoran

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14OCT08-07-2
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO - Brian Corcoran:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on October 08, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

10/9/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT08-07-001		**Sample ID:**	Oak 101 - Oak P
		Collection Date:	10/8/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	16			Deg C	SM 2550B-93	
Total Coliforms	1300	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	6	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/8/14 10:50					
Date/Time Out Incubator	10/9/14 11:25					
Total Incubation Time	24.58333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	10/8/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT08-07-002		**Sample ID:**	Oak 101 - Oak P Dup
		Collection Date:	10/8/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	16			Deg C	SM 2550B-93	
Total Coliforms	1733	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	8	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/8/14 10:50					
Date/Time Out Incubator	10/9/14 11:25					
Total Incubation Time	24.58333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	10/8/14 10:50					

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Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14OCT08-07-003		**Sample ID:**	CrF 102 - CrF P
		Collection Date:	10/8/2014
		Collection Time:	10:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	15			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	140	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	10/8/14 10:50					
Date/Time Out Incubator	10/9/14 11:25					
Total Incubation Time	24.58333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	10/8/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

8/1/2014

Brian Corcoran-VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14JUL30-08-2
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran-VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 31, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

8/1/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL30-08-001		**Sample ID:**	Oak 63- Oak P
		Collection Date:	7/31/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	36	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/31/14 14:00					
Date/Time Out Incubator	8/1/14 14:10					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/31/14 14:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL30-08-002		**Sample ID:**	Oak 64- Oak C
		Collection Date:	7/31/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	18	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/31/14 14:00					
Date/Time Out Incubator	8/1/14 14:10					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/31/14 14:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL30-08-003		**Sample ID:**	Crf 65 - Crf D
		Collection Date:	7/31/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	15	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/31/14 14:00					
Date/Time Out Incubator	8/1/14 14:10					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/31/14 14:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL30-08-004		**Sample ID:**	Crf 66 - Crf P
		Collection Date:	7/31/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/31/14 14:00					
Date/Time Out Incubator	8/1/14 14:10					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/31/14 14:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL30-08-005		**Sample ID:**	Crf 67 - Crf A
		Collection Date:	7/31/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	
Total Coliforms	1986	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	3	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/31/14 14:00					
Date/Time Out Incubator	8/1/14 14:10					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/31/14 14:00					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL30-08-006		**Sample ID:**	Crf 68- Crf B
		Collection Date:	7/31/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	11	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/31/14 14:00					
Date/Time Out Incubator	8/1/14 14:10					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/31/14 14:00					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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Water Quality Laboratory
Report of Analytical Results

8/1/2014

Brian Corcoran-VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14JUL29-11-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran-VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 30, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

8/1/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-11-001		**Sample ID:**	Oak 57 - Oak P
		Collection Date:	7/30/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	18	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/30/14 11:15					
Date/Time Out Incubator	7/31/14 11:25					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/31/14 11:25					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-11-002		**Sample ID:**	Oak 58 - Oak C
		Collection Date:	7/30/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	72	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/30/14 11:15					
Date/Time Out Incubator	7/31/14 11:25					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/31/14 11:25					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-11-003		**Sample ID:**	Crf 59 - Crf D
		Collection Date:	7/30/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	25	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/30/14 11:15					
Date/Time Out Incubator	7/31/14 11:25					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/31/14 11:25					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-11-004		**Sample ID:**	Crf 60 - Crf P
		Collection Date:	7/30/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/30/14 11:15					
Date/Time Out Incubator	7/31/14 11:25					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/31/14 11:25					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-11-005		**Sample ID:**	Crf 61 - Crf A
		Collection Date:	7/30/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	30	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/30/14 11:15					
Date/Time Out Incubator	7/31/14 11:25					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/31/14 11:25					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-11-006		**Sample ID:**	Crf 62- Crf B
		Collection Date:	7/30/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	37	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/30/14 11:15					
Date/Time Out Incubator	7/31/14 11:25					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/31/14 11:25					

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Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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Water Quality Laboratory
Report of Analytical Results

8/1/2014

Brian Corcoran-VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14JUL29-08-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran-VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 29, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

8/1/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-08-001		**Sample ID:**	Oak 51 - Oak P
		Collection Date:	7/29/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	20	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/29/14 11:00					
Date/Time Out Incubator	7/30/14 11:15					
Total Incubation Time	24.25					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/29/14 11:00					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-08-002		**Sample ID:**	Oak 52 - Oak C
		Collection Date:	7/29/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	276	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/29/14 11:00					
Date/Time Out Incubator	7/30/14 11:15					
Total Incubation Time	24.25					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/29/14 11:00					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-08-003		**Sample ID:**	Crf 53 - Crf D
		Collection Date:	7/29/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	30	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/29/14 11:00					
Date/Time Out Incubator	7/30/14 11:15					
Total Incubation Time	24.25					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/29/14 11:00					

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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-08-004		**Sample ID:**	Crf 54 - Crf P
		Collection Date:	7/29/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	44	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/29/14 11:00					
Date/Time Out Incubator	7/30/14 11:15					
Total Incubation Time	24.25					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/29/14 11:00					

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-08-005		**Sample ID:**	Crf 55 - Crf A
		Collection Date:	7/29/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	37	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/29/14 11:00					
Date/Time Out Incubator	7/30/14 11:15					
Total Incubation Time	24.25					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/29/14 11:00					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL29-08-006		**Sample ID:**	Crf 56 - Crf B
		Collection Date:	7/29/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	41	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/29/14 11:00					
Date/Time Out Incubator	7/30/14 11:15					
Total Incubation Time	24.25					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/29/14 11:00					

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

8/1/2014

Brian Corcoran - VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14JUL28-05-3
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 28, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

8/1/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL28-05-001		**Sample ID:**	Oak 45 - Oak P
		Collection Date:	7/28/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	46	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/28/14 16:00					
Date/Time Out Incubator	7/29/14 16:00					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/28/14 16:00					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL28-05-002		**Sample ID:**	Oak 46 - Oak C
		Collection Date:	7/28/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	35	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/28/14 16:00					
Date/Time Out Incubator	7/29/14 16:00					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/28/14 16:00					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL28-05-003		**Sample ID:**	Crf 47 - Crf D
		Collection Date:	7/28/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	21	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/28/14 16:00					
Date/Time Out Incubator	7/29/14 16:00					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/28/14 16:00					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL28-05-004		**Sample ID:**	Crf 48 - Crf P
		Collection Date:	7/28/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	18	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/28/14 16:00					
Date/Time Out Incubator	7/29/14 16:00					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/28/14 16:00					

Saint Paul Regional Water Services
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1900 Rice Street
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL28-05-005		**Sample ID:**	Crf 49 - Crf A
		Collection Date:	7/28/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	18			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	31	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/28/14 16:00					
Date/Time Out Incubator	7/29/14 16:00					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/28/14 16:00					

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1900 Rice Street
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL28-05-006		**Sample ID:**	Crf 50 - Crf B
		Collection Date:	7/28/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	10	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/28/14 16:00					
Date/Time Out Incubator	7/29/14 16:00					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/28/14 16:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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Saint Paul, MN 55113
Ph (651) 266-1635
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Water Quality Laboratory
Report of Analytical Results

7/25/2014

Brian Corcoran - VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14JUL22-13-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 24, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alexis Rossow
Water Laboratory Technician II
(651) 266 1635

7/25/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-13-001		**Sample ID:**	Oak 39 - Oak P
		Collection Date:	7/24/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	16	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/24/14 13:40					
Date/Time Out Incubator	7/25/14 13:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/24/14 13:40					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-13-002		**Sample ID:**	Oak 40 - Oak C
		Collection Date:	7/24/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/24/14 13:40					
Date/Time Out Incubator	7/25/14 13:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/24/14 13:40					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-13-003		**Sample ID:**	Crf 41 - Crf D
		Collection Date:	7/24/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	22	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/24/14 13:40					
Date/Time Out Incubator	7/25/14 13:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/24/14 13:40					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-13-004		**Sample ID:**	Crf 42 - Crf P
		Collection Date:	7/24/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	26	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/24/14 13:40					
Date/Time Out Incubator	7/25/14 13:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/24/14 13:40					

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-13-005		**Sample ID:**	Crf 43 - Crf A
		Collection Date:	7/24/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	132	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/24/14 13:40					
Date/Time Out Incubator	7/25/14 13:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/24/14 13:40					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-13-006		**Sample ID:**	Crf 44- Crf B
		Collection Date:	7/24/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/24/14 13:40					
Date/Time Out Incubator	7/25/14 13:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/24/14 13:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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Water Quality Laboratory
Report of Analytical Results

7/24/2014

Brian Corcoran - VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14JUL22-12-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 23, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

7/24/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-12-001		**Sample ID:**	Oak 37 - Oak P
		Collection Date:	7/23/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/23/14 11:40					
Date/Time Out Incubator	7/24/14 12:21					
Total Incubation Time	24.68333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/23/14 11:40					

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-12-002		**Sample ID:**	Oak 38- Oak C
		Collection Date:	7/23/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	114	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/23/14 11:40					
Date/Time Out Incubator	7/24/14 12:21					
Total Incubation Time	24.68333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/23/14 11:40					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-12-003		**Sample ID:**	Crf 33 - Crf P
		Collection Date:	7/23/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	39	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/23/14 11:40					
Date/Time Out Incubator	7/24/14 12:21					
Total Incubation Time	24.68333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/23/14 11:40					

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Water Quality Laboratory
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-12-004		**Sample ID:**	Crf 34 - Crf A
		Collection Date:	7/23/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	3	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/23/14 11:40					
Date/Time Out Incubator	7/24/14 12:21					
Total Incubation Time	24.68333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/23/14 11:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-12-005		**Sample ID:**	Crf 35- Crf B
		Collection Date:	7/23/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	34	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/23/14 11:40					
Date/Time Out Incubator	7/24/14 12:21					
Total Incubation Time	24.68333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/23/14 11:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-12-006		**Sample ID:**	Crf 36 - Crf D
		Collection Date:	7/23/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	32	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/23/14 11:40					
Date/Time Out Incubator	7/24/14 12:21					
Total Incubation Time	24.68333333					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/23/14 11:40					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

7/24/2014

Brian Corcoran - VLAWMO

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14JUL22-10-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 22, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

7/24/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-10-001		**Sample ID:**	Oak 27 - Oak P
		Collection Date:	7/22/2014
		Collection Time:	09:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/22/14 11:55					
Date/Time Out Incubator	7/23/14 12:05					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/22/14 11:55					

Saint Paul Regional Water Services
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1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-10-002		**Sample ID:**	Oak 28 - Oak C
		Collection Date:	7/22/2014
		Collection Time:	09:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	142	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/22/14 11:55					
Date/Time Out Incubator	7/23/14 12:05					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/22/14 11:55					

Saint Paul Regional Water Services
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1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-10-003		**Sample ID:**	Crf 29 - Crf D
		Collection Date:	7/22/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	57	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/22/14 11:55					
Date/Time Out Incubator	7/23/14 12:05					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/22/14 11:55					

Saint Paul Regional Water Services
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1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-10-004		**Sample ID:**	Crf 30 - Crf P
		Collection Date:	7/22/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	68	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/22/14 11:55					
Date/Time Out Incubator	7/23/14 12:05					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/22/14 11:55					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-10-005		**Sample ID:**	Crf 31 - Crf A
		Collection Date:	7/22/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	3	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/22/14 11:55					
Date/Time Out Incubator	7/23/14 12:05					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/22/14 11:55					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL22-10-006		**Sample ID:**	Crf 32 - Crf B
		Collection Date:	7/22/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	63	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/22/14 11:55					
Date/Time Out Incubator	7/23/14 12:05					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/22/14 11:55					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

7/23/2014

Brian Corcoran - VLAWMO
800 E County Rd E
Vadnais Heights, MN

RE:	Project Name:	VLAWMO E. coli study 2014
	Report Serial Number:	14JUL21-06-3
	Work Order #:	
	Project:	
	Main Type:	
	Test Type:	
	Sampler:	
	Notes:	

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 21, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

7/22/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL21-06-001		**Sample ID:**	Oak 20 - Oak P
		Collection Date:	7/21/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1	RL	MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	16	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/21/14 10:30					
Date/Time Out Incubator	7/22/14 12:00					
Total Incubation Time	25.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/21/14 10:30					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL21-06-002		**Sample ID:**	Oak 21 - Oak C
		Collection Date:	7/21/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	104	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/21/14 10:30					
Date/Time Out Incubator	7/22/14 12:00					
Total Incubation Time	25.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/21/14 10:30					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL21-06-003		**Sample ID:**	CRF 23 - CRF D
		Collection Date:	7/21/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	36	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/21/14 10:30					
Date/Time Out Incubator	7/22/14 12:00					
Total Incubation Time	25.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/21/14 10:30					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL21-06-004		**Sample ID:**	CRF 24 - CRF P
		Collection Date:	7/21/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	55	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/21/14 10:30					
Date/Time Out Incubator	7/22/14 12:00					
Total Incubation Time	25.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/21/14 10:30					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL21-06-005		**Sample ID:**	CRF 25 - CRF A
		Collection Date:	7/21/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	3	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/21/14 10:30					
Date/Time Out Incubator	7/22/14 12:00					
Total Incubation Time	25.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/21/14 10:30					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL21-06-006		**Sample ID:**	CRF 26 - CRF B
		Collection Date:	7/21/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	57	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/21/14 10:30					
Date/Time Out Incubator	7/22/14 12:00					
Total Incubation Time	25.5					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/21/14 10:30					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

7/18/2014

Brian Corcoran - VLAWMO
800 East County Rd E
Vadnais Heights, MN

RE:	Project Name:	VLAWMO E. coli study 2014
	Report Serial Number:	14JUL17-04-1
	Work Order #:	
	Project:	
	Main Type:	
	Test Type:	
	Sampler:	
	Notes:	

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 17, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

7/18/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL17-04-001		**Sample ID:**	Oak 13 - Oak P
		Collection Date:	7/17/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	68	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/17/14 11:10					
Date/Time Out Incubator	7/18/14 11:20					
Total Incubation Time						
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/17/14 11:10					

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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL17-04-002		**Sample ID:**	Oak 14 - Oak C
		Collection Date:	7/17/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	93	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/17/14 11:10					
Date/Time Out Incubator	7/18/14 11:20					
Total Incubation Time						
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/17/14 11:10					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL17-04-003		**Sample ID:**	CRF 16- CRF D
		Collection Date:	7/17/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	48	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/17/14 11:10					
Date/Time Out Incubator	7/18/14 11:20					
Total Incubation Time						
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/17/14 11:10					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL17-04-004		**Sample ID:**	CRF 17 - CRF P
		Collection Date:	7/17/2014
		Collection Time:	10:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	40	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/17/14 11:10					
Date/Time Out Incubator	7/18/14 11:20					
Total Incubation Time						
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/17/14 11:10					

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL17-04-005		**Sample ID:**	CRF 18 - CRF A
		Collection Date:	7/17/2014
		Collection Time:	10:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	18			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	3	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/17/14 11:10					
Date/Time Out Incubator	7/18/14 11:20					
Total Incubation Time						
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/17/14 11:10					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL17-04-006		**Sample ID:**	CRF 19 - CRF B
		Collection Date:	7/17/2014
		Collection Time:	10:15 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	2420	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	47	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/17/14 11:10					
Date/Time Out Incubator	7/18/14 11:20					
Total Incubation Time						
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/17/14 11:10					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

7/18/2014

Brian Corcoran - VLAWMO
800 E County Rd E
Vadnais Heights, MN

RE:	Project Name:	VLAWMO E. coli study 2014
	Report Serial Number:	14JUL16-03-1
	Work Order #:	
	Project:	
	Main Type:	
	Test Type:	
	Sampler:	
	Notes:	

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 16, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

7/18/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL16-03-001		**Sample ID:**	Oak 7 - Oak P
		Collection Date:	7/16/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	21	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/16/14 10:50					
Date/Time Out Incubator	7/17/14 11:00					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/16/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL16-03-002		**Sample ID:**	Oak 8 - Oak C
		Collection Date:	7/16/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	43	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/16/14 10:50					
Date/Time Out Incubator	7/17/14 11:00					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/16/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL16-03-003		**Sample ID:**	CrF 9 - CrF D
		Collection Date:	7/16/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	21			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	35	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/16/14 10:50					
Date/Time Out Incubator	7/17/14 11:00					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/16/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL16-03-004		**Sample ID:**	CrF 10 - CrF P
		Collection Date:	7/16/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	214	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/16/14 10:50					
Date/Time Out Incubator	7/17/14 11:00					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/16/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL16-03-005		**Sample ID:**	CrF 11 - CrF A
		Collection Date:	7/16/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	16			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	47	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/16/14 10:50					
Date/Time Out Incubator	7/17/14 11:00					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/16/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL16-03-006		**Sample ID:**	CrF 12 - CrF B
		Collection Date:	7/16/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	248	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	7/16/14 10:50					
Date/Time Out Incubator	7/17/14 11:00					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	7/16/14 10:50					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

Saint Paul Regional Water Services
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

7/16/2014

Brian Corcoran - VLAWMO
800 East County Rd E
Vadnais Heights, MN

RE:	Project Name:	VLAWMO E. coli study 2014
	Report Serial Number:	14JUL15-02-1
	Work Order #:	
	Project:	
	Main Type:	
	Test Type:	
	Sampler:	
	Notes:	

Dear Brian Corcoran - VLAWMO:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on July 15, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

7/16/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
Ph (651) 266-1635
MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL15-02-001		**Sample ID:**	CRF3 - CRFD
		Collection Date:	7/15/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	027-123-106
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Escherichia coli	57	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Date/Time in Incubator	7/15/14 11:20					
Date/Time Out Incubator	7/16/14 11:30					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/15/14 15:00					

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL15-02-002		**Sample ID:**	CRF4 - CRFP
		Collection Date:	7/15/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	027-123-106
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Escherichia coli	54	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Date/Time in Incubator	7/15/14 11:20					
Date/Time Out Incubator	7/16/14 11:30					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/15/14 15:00					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL15-02-003		**Sample ID:**	CRF5 - CRFA
		Collection Date:	7/15/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	16			Deg C	SM 2550B-93	027-123-106
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Escherichia coli	31	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Date/Time in Incubator	7/15/14 11:20					
Date/Time Out Incubator	7/16/14 11:30					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/15/14 15:00					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL15-02-004		**Sample ID:**	CRF6 - CRFB
		Collection Date:	7/15/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	027-123-106
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Escherichia coli	62	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Date/Time in Incubator	7/15/14 11:20					
Date/Time Out Incubator	7/16/14 11:30					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/15/14 15:00					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14JUL15-02-005		**Sample ID:**	Oak1 - Oak P
		Collection Date:	7/15/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	027-123-106
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Date/Time in Incubator	7/15/14 11:20					
Date/Time Out Incubator	7/16/14 11:30					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/15/14 15:00					

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Lab ID: 14JUL15-02-006		**Sample ID:**	Oak2 - Oak C
		Collection Date:	7/15/2014
		Collection Time:	09:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	22			Deg C	SM 2550B-93	027-123-106
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Escherichia coli	57	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	027-123-106
Date/Time in Incubator	7/15/14 11:20					
Date/Time Out Incubator	7/16/14 11:30					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	7/15/14 15:00					

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Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

ND: Not detected below method detection limit.

RL: Report limit, estimated concentration above the method detection limit and below the reporting limit.

MCL: Maximum contaminant level determined by the Environmental Protection Agency.

* Empty field indicates non-accredited parameter.

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Report of Analytical Results

9/10/2014

VLAWMO - Brian Corcoran

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14AUG27-06-3
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO - Brian Corcoran:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on August 28, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

9/4/14

Saint Paul Regional Water Services
Water Quality Laboratory
1900 Rice Street
Saint Paul, MN 55113
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MN Lab ID 027-123-106

Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG27-06-001		**Sample ID:**	Oak 77- Oak P
		Collection Date:	8/28/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	28	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/28/14 12:35					
Date/Time Out Incubator	8/29/14 12:35					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	8/28/14 12:35					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG27-06-002		**Sample ID:**	Crf 78 - Crf P
		Collection Date:	8/28/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	55	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/28/14 12:35					
Date/Time Out Incubator	8/29/14 12:35					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	8/28/14 12:35					

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Water Quality Laboratory
Report of Analytical Results

9/10/2014

VLAWMO - Brian Corcoran

RE: Project Name: VLAWMO E. coli study 2014
Report Serial Number: 14AUG27-04-1
Work Order #:
Project:
Main Type:
Test Type:
Sampler:
Notes:

Dear VLAWMO - Brian Corcoran:

Enclosed are the analytical results for the sample(s) received by the SPRWS laboratory on August 27, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report. Quality Control data will be provided upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Justine C. Roe

Justine Roe
Water Quality Specialist II
(651) 266 1628

9/4/14

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG27-04-001		**Sample ID:**	Oak 75 - Oak P
		Collection Date:	8/27/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	25	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/27/14 12:40					
Date/Time Out Incubator	8/28/14 12:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	8/27/14 12:40					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG27-04-002		**Sample ID:**	Crf 76 - Crf P
		Collection Date:	8/27/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	23			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	52	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/27/14 12:40					
Date/Time Out Incubator	8/28/14 12:40					
Total Incubation Time	24					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	TTB					
Analysis Date/Time	8/27/14 12:40					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG04-07-001		**Sample ID:**	Oak 69 - Oak P
		Collection Date:	8/4/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	14	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/4/14 10:45					
Date/Time Out Incubator	8/5/14 10:55					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	8/4/14 10:45					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG04-07-002		**Sample ID:**	Oak 70 - Oak C
		Collection Date:	8/4/2014
		Collection Time:	09:30 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	25			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	13	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/4/14 10:45					
Date/Time Out Incubator	8/5/14 10:55					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	8/4/14 10:45					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG04-07-003		**Sample ID:**	Crf 71 - Crf D
		Collection Date:	8/4/2014
		Collection Time:	09:45 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	23	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/4/14 10:45					
Date/Time Out Incubator	8/5/14 10:55					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	8/4/14 10:45					

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Water Quality Laboratory
Report of Analytical Results

Lab ID: 14AUG04-07-004		**Sample ID:**	Crf 72 - Crf P
		Collection Date:	8/4/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	13	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/4/14 10:45					
Date/Time Out Incubator	8/5/14 10:55					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	8/4/14 10:45					

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Report of Analytical Results

Lab ID: 14AUG04-07-005		**Sample ID:**	Crf 73 - Crf A
		Collection Date:	8/4/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	20			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	30	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/4/14 10:45					
Date/Time Out Incubator	8/5/14 10:55					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	8/4/14 10:45					

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Report of Analytical Results

Lab ID: 14AUG04-07-006		**Sample ID:**	Crf 74 - Crf B
		Collection Date:	8/4/2014
		Collection Time:	10:00 hrs.
		Matrix:	AQUEOUS

Analyses

Coliform, Collilert - MPN

	Reported Results	Reporting Limit	Qual	Unit	Method Ref.	Lab Cert. No.*
Temperature - Lab Receipt	24			Deg C	SM 2550B-93	
Total Coliforms	Unable to Calc	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Escherichia coli	118	1		MPN/100 mL	SM 9223B (Colilert IDEXX Quanti-Tray)-97	
Date/Time in Incubator	8/4/14 10:45					
Date/Time Out Incubator	8/5/14 10:55					
Total Incubation Time	24.16666667					
Dilution Factor	1					
Prep By						
Prep Date/Time						
Analyzed By	JCR					
Analysis Date/Time	8/4/14 10:45					

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Water Quality Laboratory
Report of Analytical Results

Qualifiers

Definitions:

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* Empty field indicates non-accredited parameter.

APPENDIX F - LABORATORY RESULTS FOR MOLECULAR ANALYSES

Weston Solutions (real-time) PCR Report - Part A

Client: Burns & McDonnell
Project: Lambert Creek
Survey: Dry Weather
Date Received: 9/4/2014 & 9/10/2014
n Samples: 16
Date Filtered: not processed by Weston
Date Extracted: 9/11/2014
Date PCR: 9/18/2014

µL Template per Reaction: 2
Lab Blanks: passed n= 3
No Template Controls: passed n= 3
Positive Extraction Controls: passed n= 6
Assay: HumanBacteroidales-HF183TaqManSIPP
File name(s): Lamb_3_8_9Sep2014_HF183TaqmanSIPP_w_SPC_p1_keepall.pcrd

Weston DNA ID	Site ID	Sample ID	Date Sampled	Time Sampled	Matrix	Volume Filtered (mL)	Sample Avg	Sample Stdev	Units	Inhibition Control (Pass/Fail/ N/A)	Qualifier	Sample Result	Binary Result (positive/ negative)
1403LCMCRF1CRFP		MCrf1-CrfP	9/3/2014	0815	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1404LCMCRF2CRFD		MCrf2-CrfD	9/3/2014	0830	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1405LCMOAK3OAKP		MOak3-OakP	9/3/2014	0845	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1406LCMOAK4OAKC		MOak4-OakC	9/3/2014	0900	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1407LCMOAK4O4FB		MOak4-OakC (Blank Sample)	9/3/2014	0900	Blank Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1408LC_PBSBLANK		PBS Blank	9/3/2014	N/A	Blank Water	100	2	0	copies per dryg	Pass	§ <	ND	negative
1409LCMOAK5OAKP		MOak5-OakP	9/8/2014	0900	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1410LCMOAK6OAKC		MOak6-OakC	9/8/2014	0900	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1411LCMCRF7CRFD		MCrf7-CrfD	9/8/2014	0915	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1412LCMCRF8CRFP		MCrf8-CrfP	9/8/2014	0930	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1413LC_MCRF8_FB		MCrf8-CrfP (Blank)	9/8/2014	0930	Blank Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1414LCMOAK9OAKP		MOak9-OakP	9/9/2014	0800	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1415MOAK10-OAKC		MOak10-OakC	9/9/2014	0800	Fresh Water	20	10	0	copies per 100ml	Pass	§ <	ND	negative
1416MOAK10-OCFB		MOak10-OakC (Blank)	9/9/2014	0800	Blank Water	20	10	0	copies per 100ml	Pass	§ <	ND	negative
1417MCRF11-CRFD		MCrf11-CrfD	9/9/2014	0830	Fresh Water	20	10	0	copies per 100ml	Pass	§ <	ND	negative
1418MCRF12-CRFP		MCrf12-CrfP	9/9/2014	0845	Fresh Water	20	10	0	copies per 100ml	Pass	§ <	ND	negative

Abbreviations: Avg = Average; BDL = Below Detection Limit; cpr = copies per reaction; Cq = quantification (threshold) cycle; DNQ = Detectable But Not Quantifiable; FB = Field Blank; LLOQ = Lower Limit of Quantification; LOD = Limit of Detection; n=number; N/A = Not Applicable; ND = Not Detected; NDsub = substitution value for nondetects; PCR = Polymerase chain reaction; rxs = reactions; StdDev = Standard Deviation; sub = substitution; TSC = Target Sequence Copies; ROQ = Range of Quantification.
Footnotes: § Average computed for ND result by substituting Cq with maximum number of cycles (Boehm et al., 2013). ¥ Final call for site (Detected, DNQ, BDL, ND) called to match ≥2/3 of the reactions (Sinigalliano et al.; Schriewer et al. 2013). For enterococci, results are given in Target Sequence Copies (TSC), as per EPA Method 1611 (standard concs in TSC/ul = copies/ul * 4). Inhibition Control = 2 well spike with DNA dilution method run on the HF183Taqman assay. Sample results=avg of at least 2 rxs.

Satomi Yonemasu
Digitally signed by Satomi Yonemasu
DN: cn=Satomi Yonemasu, o=Weston Solutions, Inc., ou, email=SatomiYonemasu@westonsolutions.com, c=US
Date: 2014.09.26 14:22:51 -07'00'

QC Officer (Satomi Yonemasu) Date

WESTON SOLUTIONS, INC.
5817 Dryden Pl Suite 101
Carlsbad, CA 92008
(760) 795-0900 / (760) 931-1580 FAX
www.westonsolutions.com

Weston Solutions (real-time) PCR Report - Part A

Client: Burns & McDonnell
Project: Lambert Creek
Survey: Dry Weather
Date Received: 9/30/2014
n Samples: 5
Date Filtered: not processed by Weston
Date Extracted: 9/30/2014
Date PCR: 10/5/2014

µL Template per Reaction: 2
Lab Blanks: passed n= 3
No Template Controls: passed n= 6
Positive Extraction Controls: passed n= 4 samples and 3 blanks
Assay: HumanBacteroidales-HF183TaqManSIPP
File name(s): LAMBDW_29Sep2014_HF183TMSIPPwSPC_p1_kpall.pcrd

Weston DNA ID	Site ID	Sample ID	Date Sampled	Time Sampled	Matrix	Volume Filtered (mL)	Sample Avg	Sample Stdev	Units	Inhibition Control (Pass/Fail/ N/A)	Qualifier	Sample Result	Binary Result (positive/ negative)
1560MOAK17-OAKP		MOak17-OakP	9/29/2014	0900	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1561MOAK18-OAKC		MOak18-OakC	9/29/2014	0900	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1563MCRF19-CRFD		MCrf19-CrfD	9/29/2014	0930	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1564MCRF20-CRFP		MCrf20-CrfP	9/29/2014	0945	Fresh Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative
1562_MOAK18BLNK		MOak18-OakC Blank	9/29/2014	0900	Blank Water	100	2	0	copies per 100ml	Pass	§ <	ND	negative

Abbreviations: Avg = Average; BDL = Below Detection Limit; cpr = copies per reaction; Cq = quantification (threshold) cycle; DNQ = Detectable But Not Quantifiable; FB = Field Blank; LLOQ = Lower Limit of Quantification; LOD = Limit of Detection; n=number; N/A = Not Applicable; ND = Not Detected; NDsub = substitution value for nondetects; PCR = Polymerase chain reaction; rxs = reactions; StdDev = Standard Deviation; sub = substitution; TSC = Target Sequence Copies; ROQ = Range of Quantification.
Footnotes: § Average computed for ND result by substituting Cq with maximum number of cycles (Boehm et al., 2013). ¥ Final call for site (Detected, DNQ, BDL, ND) called to match ≥2/3 of the reactions (Sinigalliano et al.; Schriewer et al. 2013). For enterococci, results are given in Target Sequence Copies (TSC), as per EPA Method 1611 (standard concs in TSC/ul = copies/ul * 4). Inhibition Control = 2 well spike with DNA dilution method run on the HF183Taqman assay. Sample results=avg of at least 2 rxs.

Satomi Yonemasu

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QC Officer (Satomi Yonemasu) Date

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Weston Solutions (real-time) PCR Report - Part A

Client: Burns & McDonnell
Project: Lambert Creek Samples
Survey: Dry Weather
Date Received: varied
n Samples: 11
Date Filtered: varied
Date Extracted: varied
Date PCR: varied

µL Template per Reaction: 2
Lab Blanks: passed n= 1 sample = MOak18-OakC Blank
No Template Controls: passed n= 3 Melt Temp (81-81.9C): passed
Positive Extraction Controls: N/A run previously with human MST
Assay: AvianHelicobacter-GFDSYBRAvian
File name(s): Vent_LAMB_2014-1_GFDSYBRAvianp1ka.pcrd
LAMB_2014-1_GFDSYBRAvian_qPCR_retest.pcrd

Weston DNA ID	Site ID	Sample ID	Date Sampled	Time Sampled	Matrix	Volume Filtered (mL)	Sample Avg	Sample Stdev	Units	Inhibition Control (Pass/Fail/ N/A)	Qualifier	cpr	Sample Result	Binary Result (positive/ negative)
1403LCMCRF1CRFP	NA	MCrf1-CrfP	9/3/2014	0815	Fresh Water	100	129320	14932	copies per 100ml	N/A		1810	Detected, ROQ	positive
1404LCMCRF2CRFD	NA	MCrf2-CrfD	9/3/2014	0830	Fresh Water	100	239068	1822	copies per 100ml	N/A		3347	Detected, ROQ	positive
1405LCMOAK3OAKP	NA	MOak3-OakP	9/3/2014	0845	Fresh Water	100	587	139	copies per 100ml	N/A		8	DNQ	positive
1406LCMOAK4OAKC	NA	MOak4-OakC	9/3/2014	0900	Fresh Water	100	447	201	copies per 100ml	N/A		6	DNQ	positive
1414LCMOAK9OAKP	NA	MOak9-OakP	9/9/2014	0800	Fresh Water	100	676	201	copies per 100ml	N/A		9	DNQ	positive
1415MOAK10-OAKC	NA	MOak10-OakC	9/9/2014	0800	Fresh Water	100	317	217	copies per 100ml	N/A		4	DNQ	positive
1417MCRF11-CRFD	NA	MCrf11-CrfD	9/9/2014	0830	Fresh Water	100	50262	6867	copies per 100ml	N/A		704	Detected, ROQ	positive
1418MCRF12-CRFP	NA	MCrf12-CrfP	9/9/2014	0845	Fresh Water	100	50019	4965	copies per 100ml	N/A		700	Detected, ROQ	positive
1560MOAK17-OAKP	NA	MOak17-OakP	9/29/2014	0900	Fresh Water	100	1529	237	copies per 100ml	N/A		21	Detected, ROQ	positive
1564MCRF20-CRFP	NA	MCrf20-CrfP	9/29/2014	0945	Fresh Water	100	2739	546	copies per 100ml	N/A		38	Detected, ROQ	positive
1562_MOAK18BLNK	NA	MOak18-OakC Blank	9/29/2014	0900	Fresh Water	100	28	0	copies per 100ml	N/A	§ <	0	ND	negative

Abbreviations: Avg = Average; BDL = Below Detection Limit; cpr = copies per reaction; Cq = quantification (threshold) cycle; DNQ = Detectable But Not Quantifiable; FB = Field Blank; LLOQ = Lower Limit of Quantification; LOD = Limit of Detection; n=number; N/A = Not Applicable; ND = Not Detected; NDsub = substitution value for nondetects; PCR = Polymerase chain reaction; rxs = reactions; StdDev = Standard Deviation; sub = substitution; TSC = Target Sequence Copies; ROQ = Range of Quantification.
Footnotes: § Average computed for ND result by substituting Cq with maximum number of cycles (Boehm et al., 2013). ¥ Final call for site (Detected, DNQ, BDL, ND) called to match ≥2/3 of the reactions (Sinigalliano et al.; Schriewer et al. 2013). For enterococci, results are given in Target Sequence Copies (TSC), as per EPA Method 1611 (standard concs in TSC/ul = copies/ul * 4). Inhibition Control = 2 well spike with DNA dilution method run on the HF183Taqman assay. Sample results=avg of at least 2 rxs. £Values based on 100ml filtered, 10g sand, = 50g wrack (or fresh); sample may vary in filter volume/sample mass/DNA extraction volume.

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Weston Solutions (real-time) PCR Report - Part B

Client: Burns & McDonnell **Project:** Lambert Creek Samples **Survey:** Dry Weather **Date Received:** varied

Sample replicate information not provided; averages of replicates not calculated.

Standard Curve Metrics			
% Efficiency	90.73		
r^2	0.96		
slope	-3.57		
y-intercept	38.55		
curve source	plate curve		
standard source	plasmid, linear		
Site Conclusion Values	**ND sub**	**LOD**	**LLOQ**
cpr (copies per reaction)	0.4	3	20
LOD > % amplification	95		

Site Conclusion and Binary Result calculations use cpr values based on the following definitions:
ND: Cq=0, negative result.
BDL: 0<Cq≤LOD, Equivocal result, negative binary result.
DNQ: LOD<Cq≤LLOQ, positive binary result.
Detected, ROQ: Cq>LLOQ, positive result.
LLOQ = Cq LOD - 1.645*(StdDev Cq LOD)

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